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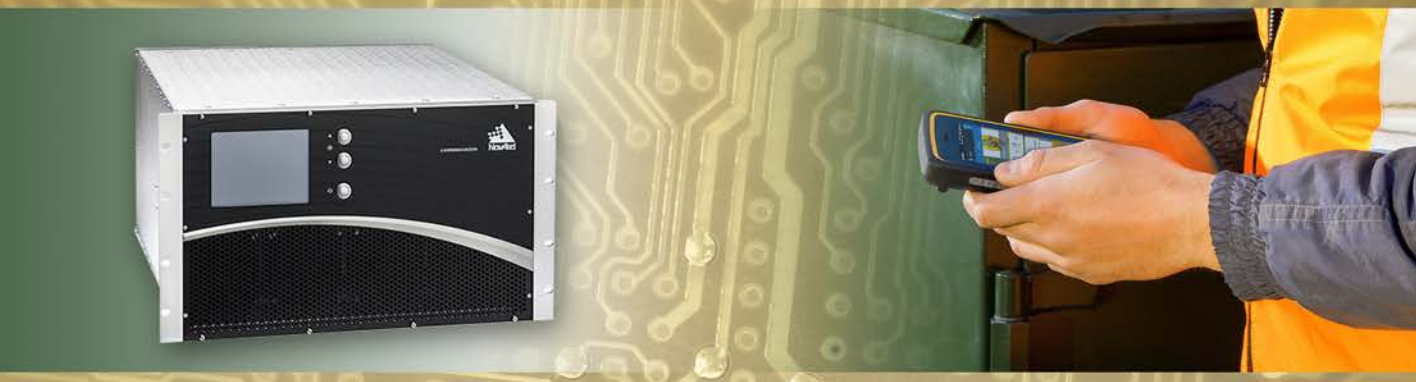
RECEIVER SURVEY 2016



Now in its 24th year, the annual *GPS World* Receiver Survey provides the longest running, most comprehensive database of GPS and GNSS equipment available in one place.

With information provided by 45 manufacturers on 438 receivers, the survey assembles data on the most important equipment features. Manufacturers are listed alphabetically. Footnotes and abbreviations (below) supply additional information to guide you through the survey.

We have made every effort to present an accurate listing of receiver information, but *GPS World* cannot be held responsible for the accuracy of information supplied by the companies or the performance of any equipment listed. In some cases, data had to be abbreviated or truncated to fit the space available. Contact the manufacturers directly with questions about specific units. To be listed in the 2017 Receiver Survey, e-mail **gpsworld@gpsworld.com**.

NOTES

[1] User environment and applications:

A	=	aviation
C	=	recreational
D	=	defense
G	=	survey/GIS
H	=	handheld
L	=	land
M	=	marine
Met	=	meteorology
N	=	navigation
O	=	other
P	=	other position reporting
R	=	real-time DGPS ref.
S	=	space
T	=	timing
V	=	vehicle/vessel tracking
1	=	end-user product
2	=	board/chipset/module for OEM apps

[2] Where three values appear, they refer to autonomous (code), real-time differential (code), and post-processed differential; where four values appear, they refer to autonomous (code), real-time differential (code), real-time kinematic, and post-processed differential.

[3] Cold start: ephemeris, almanac, and initial position and time not known.

[4] For a warm start, the receiver has a recent almanac, current time, and initial position, but no current ephemeris

[5] Reacquisition time is based on the loss of signal for at least one minute.

[6] E = provision for an external antenna
R = antenna is removable

ABBREVIATIONS

apps:	applications
ARINC:	Aeronautical Radio, Inc. standard
async:	asynchronous
bps:	bits per second
CP:	carrier phase
CEP:	circular error probable
diff:	differential
ext.:	external / int. = internal
m, min:	minutes
na or NA:	not applicable
nr:	no response
opt.:	optional
par.:	parallel
prog.:	programmable
ppm:	parts per million
RMS:	root mean square
s:	seconds
SBAS:	Satellite-Based Augmentation System
typ.:	typical
VRS:	Virtual reference station
WP:	waterproof
WR:	water resistant

A WORD FROM OUR SPONSOR

Finding the Right Receiver

BY Jason Hamilton

JASON HAMILTION, vice president, marketing at NovAtel.

In the 2014 GNSS Receiver Survey, I wrote a column on "Beyond Receiver Specifications." That material still holds true, and is available on our website; see the link at the end of this column. Here's a recap of those previously discussed criteria:

- Absolute vs relative accuracy
- Heading and orientation determination
- Interference robustness
- Antenna selection
- Ease of Integration

NEW TOPICS FOR 2016

A GNSS receiver can be a big investment, not just in the cost of the device itself, but in the effort you will expend to integrate the product into your system. Make an informed decision by following a structured process for choosing your receiver.

Start by assessing your requirements.

- What absolute accuracy, relative position, velocity, time and orientation do you need to achieve?
- What reliability do you need? At what confidence level? Check the spec carefully.
- What regions are you operating in and are there any legal or trade requirements to support specific constellations?
- What is your level of expertise? Do you need a highly configurable device or a device that is plug-and-play?
- Do you want a device at a chip level, receiver board level or enclosed product level?
- What are the constraints of your application? What is the relative importance of performance, size, weight, cost and power consumption?

DO YOUR RESEARCH

Not all devices are suitable for all applications. Investigate what options exist in the market — this survey is a good starting point. All receivers in the survey can calculate position to a few meters of accuracy. If your application demands more than that, you will have more evaluation to do.

The supplier website is a good place to start to assess a product's features in more detail such as supported interfaces and constellations. Product sheets found on the site will give performance specifications. User manuals, if available, will let you assess how configurable a product is and how easy it will be to integrate.

Read white papers or application profiles, such as the customer stories found in NovAtel's *Velocity* magazine posted in the Tech Talk section of our website, for insight into how others have successfully evaluated and integrated products or solutions similar to your own. A website should also give more information about receiver features like positioning techniques, multipath mitigation technology, interference mitigation techniques and correction sources to help make your purchase decision.

> "Ask for an on-site demo of the product or if the manufacturer has equipment available for you to perform your own evaluation."

If your search involves a GNSS/INS system, the site should clearly outline the differences in achievable performance between the supplier's IMU options.

Something of increasing importance is the receiver's ability to adapt to the environment in real time. Change in multipath conditions, satellite availability, correction availability and interference sources all impact the performance of the receiver. Suppliers are increasingly including features that seamlessly manage changes in positioning mode, correction streams and satellite geometry without requiring the user to intervene with the system.

If you don't see the performance metric you're interested in, or a specific product feature is unclear to you, call the manufacturer and inquire. Often this information is available, just not on the product sheet or website. This gives you a great chance to test out the knowledge and responsiveness of the supplier's customer service or sales team. Explain your application, environment and performance targets and have the supplier explain the benefit of different features, how they work and if they apply to your application.

TRY BEFORE YOU COMMIT

A specification is as good as the paper it's written on until it is proven. Once you have narrowed down your choices, make sure the claims are backed up in real life. Evaluate the product for yourself. Ask for an on-site demo of the product or if the manufacturer has equipment available for you to perform your own evaluation.

Get the equipment running in your environment as closely as you can to your real-world operational conditions. Evaluate it. Is the product easy to integrate? Is it easy to operate in the field? Can it be configured how you need it? Is the product documentation clear, complete and accurate? Does it run reliably and does it deliver the performance you need? These questions are hard to answer until you get the product in your hands. This step is invaluable.

This step also gives you the ability to test out the company's customer support. Call or email them if you have any integration problems and evaluate how well they do at getting you up and running.

RESEARCH THE COMPANY

Once you have evaluated the product and narrowed your selections, take the opportunity to evaluate the company you are about to do business with. Are the people approachable? Is the company long-established and reliable? Is there a threat of the supplier competing with you in your application? Is this a company you are excited to partner with in your project or product?

Use your own experience through product evaluation as a guide and also ask for references and even ask around in your network. What kind of experience have others had in dealing with the company?

WEIGH YOUR OPTIONS. MAKE A CHOICE

When all your homework is done, it's time to commit. Deciding between the plethora of options out there can be daunting, especially if the performance is similar. Choose the partner who you feel can not only deliver the performance you are looking for, but also will fit with the culture of your company and will offer the kind of communication channels you need to best help execute your business objectives.

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Go to "Tips for Choosing a GNSS Receiver" at www.novatel.com/support/knowledge-and-learning/ to learn more.

RECEIVER SURVEY 2016

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Manufacturer	Model	Channels/ tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real -time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
Baseband Technologies, Inc. **www.basebandtech.com**	Snapshot Receiver	user define	GPS L1 C / A code	user define	ACDHLMNOPV12	na	na	~5m	na	500Hz		2ms	2ms	2ms	na	na	na	na	na	na	na	Server - based GPS receiver
	Arduino compatible RF Shield (Eval) Kit	user define	GPS L1 C / A code	user define	ACDHLMNOPV12	na	<10g	~5m	na	500Hz		2ms	2ms	2ms	na	na	na	na	na	na	na	Server - based GPS receiver
	28 Day Extended Ephemeris client	user define	GPS L1 C / A code, GLONASS & BEIDOU (TBD)	user define	ACDHLMNOPRSTV12	na	na	Day 1: 3m, Day 7: 7, Day 14: 17m, Day 4: 65m (68% SISRE)	na	na		< 6s	<2s	<2s	na	na	na	na	na	na	na	Work with 28 Day Extended Epemeris service
Brandywine Communications **www.brandywinecomm.com**	NFS - 220	par 16 Channel	GPS L1 1575.42 MHz, C / A 1.023 MHz	16	T	1.75" (H) x 7.5" (D) x 19" (W) (1U)	11lb typical	2.4 m horizontal, 5 m altitude	100ns. Absolute UTC, Std Deviation 15ns (OCXO)	na		<60s	<10s		11	1 I / P, 4 O / P BNC 10MHz, 4 O / P BNC IRIG A135 B125 E115 G145, 1 O / P DB9 IRIG A005 B005 E005 G005, 1 RS232	9600, N, 8, 1	-10 to +50	85 - 265VAC 50 / 60Hz		external	Cost effective Multi - function Time / Frequency Reference
	NFS - 220 Plus	par 16 Channel	GPS L1 1575.42 MHz, C / A 1.023 MHz	16	T	1.75" (H) x 7.5" (D) x 19" (W) (1U)	11lb typical	2.4 m horizontal, 5 m altitude	100ns. Absolute UTC, Std Deviation 15ns (OCXO)	na		<60s	<10s		11	1 I / P, 4 O / P BNC 10MHz, 4 O / P BNC IRIG A135 B125 E115 G145, 1 O / P DB9 IRIG A005 B005 E005 G005, 1 RS232	9600, N, 8, 1	-10 to +50	85 - 265VAC 50 / 60Hz		external	Same as NFS - 220, but includes LED Time Display on front
	RTG - 510	12 channel	GPS L1 1575.42 MHz, C / A 1.023 MHz	12	T	1.75" (H) x 9" (D) x 19" (W) (1U)	5lb nominal	2.4 m horizontal, 5 m altitude	<30ns with GPS	na		<60s	<10s		22	1 I / P GPS ANT, 1 I / P 1PPS IN, 2 I / P IRIG A200x A13x IRIG B20x B12x CF per IEEE - 1344 IRIG E00x E11x IRIG G00x G14x IRIG H00x NASA 36 Have Quick	9600, N, 8, 1	-10 to +50	Single or Dual Hot - Swappable power supplies.85 - 264VAC 50 / 60Hz or - 48VDC	40w per power supply	external	Versatile unit suited for Test Ranges where multiple time code formats are required
	FRU - SAASM	par 12 channel	GPS L1 1575.42 MHz, C / A 1.023 MHz, GPS L2 1227.60 MHz, P (Y) 1.023 MHz	12	T	1.75" (H) x 14" (D) x 19" (W) (1U)		16m SEP	1 x 10 - 12	na			<120s with Almanac, CV loaded		11	1 I / P GPS ANT, 10 O / P 10MHz, 1 O / P 1PPS DB - 15, 1 O / P HAVEQUICK DB - 15, 2 I / O RJ - 45 10 / 100BaseT Ethernet		0 to +50	90VAC to 260VAC	<15W	external	Military Satcom Applications. Fully compliant with MIL - STD - 188 - 164B
	PTS	par 12 channel	GPS L1 1575.42 MHz, C / A 1.023 MHz, GPS L2 1227.60 MHz, P (Y) 1.023 MHz	12	T	3.47" (H) x 15.80" (D) x 9.5" (W) (2U)	5.5lb typical	16m SEP	1 x 10 - 12	na			<120s with Almanac, CV loaded		11	1 I / P GPS ANT, 10 O / P 10MHz, 1 O / P 1PPS DB - 15, 1 O / P HAVEQUICK DB - 15, 2 I / O RJ - 45 10 / 100BaseT Ethernet		0 to +50	90VAC to 260VAC	<15W	external	Rugged GPS Disciplined Time and Frequency System available in C / A code and SAASM versions
	Modular Master Clock	14 channel	GPS L1 1575.42 MHz, C / A 1.023 MHz	14	T	3.47" (H) x 20" (D) x 19" (W) (2U)	25lb nominal	16m SEP	15ns (1σ)	na		70 s	70 s	<5 s	na	Ports vary dependent on unit configuration		-15 to 55	90VAC to 265VAC 50 / 60Hz 18 - 36VDC		external	Advanced Modular System with touch screen interface, advanced integrity monitoring, and expansion features
	PTP80	12 channel	GPS L1 1575.42 MHz, C / A 1.023 MHz	12	T	1.75" (H) x 9" (D) x 19" (W) (1U)		2.4 m horizontal, 5 m altitude	<30ns with GPS	na		<60 s	<10 s		11	1 I / P GPS ANT, 4 RJ - 45 PTP O / P, 6 75Ω BNC E1 O / P, 1 BNC 50Ω 10 MHZ O / P, 1 BNC50Ω 1PPS O / P, 1 RS232 NMEA GPRMC O / P	9600, N, 8, 1	0 to +50	85 - 265VAC 50 / 60Hz		external	Cost - effective PTP Grandmaster with large no. of PTP outputs
	PTP - 8080	12 channel	GPS L1 1575.42 MHz, C / A 1.023 MHz	12	T	1.75" (H) x 9" (D) x 19" (W) (1U)		2.4 m horizontal, 5 m altitude	<30ns with GPS	na		<60s	<10s		11	1 I / P GPS ANT, 1 RJ - 45 CONSOLE, 8 RJ - 45 PTP O / P, 4 SFP MDI / MDIX 1000BASE - T, 1 BNC 50Ω 10 MHZ O / P, 1 BNC50Ω 1PPS O / P,		0 to +50	85 - 265VAC 50 / 60Hz		external	PTP Boundary Clock for use in PTP time distribution
	M210	12 channel	GPS L1 1575.42 MHz, C / A 1.023 MHz	12	T	1.75" (H) 9" (D) 19" (W) (1U)		2.4 m horizontal, 5 m altitude	<30ns with GPS	na		<60s	<10s		na	Ports vary dependent on unit configuration		0 to +40	85 - 265VAC 50 / 60Hz		external	Modular Timing System with customizable output options and large no. of expansion options
	M211	12 channel	GPS L1 1575.42 MHz, C / A 1.023 MHz	12	T	3.47" (H) x 20" (D) x 19" (W) (2U)		2.4 m horizontal, 5 m altitude	<30ns with GPS	na		<60s	<10s		na	Ports vary dependent on unit configuration		0 to +40	85 - 265VAC 50 / 60Hz		external	Modular Timing System with customizable output options and large no. of expansion options
	PCIe - 1588	12 channel	GPS L1 1575.42 MHz, C / A 1.023 MHz	12	T	Low Profile PCIe x 1 Rev 1.1		2.4 m horizontal, 5 m altitude	<30ns with GPS	na		<60s	<10s		3	1 I / P GPS ANT SMA, 1 RJ45 PTP, 1 MULTI - FUNCTION BREAKOUT CABLE CONNECTOR		-10 to +70	3.3V DC via PCIe bus		external	Compact PCIe PTP Grandmaster clock, capable of broadcasting PTP over a network or synchomizing a host computer's time via PCIe bus
CHC **www.chcnav.com**	i80 GNSS Receiver	220	GPS L1C / A, L1C, L2C, L2E, L5; GLONASS L1C / A, L1P, L2C / A, L2P, L3; SBAS; Galileo E1, E5A, E5B ; BeiDou B1, B2	44	GLMNVPR1	12.4 (φ) x 14cm	1.22kg	1 - 5m / 0.25m + 1ppm / 8mm + 1ppm / 3mm + 0.5ppm	100	5Hz RTK		<60s	<30s	<15s	6	2*7 pin Lemo, Radio Antenna, Bluetooth, WiFi, 3.75G Cellular Moderm	9600 - 115200	-45 to +65	ext	3.2W	Internal	Compact GNSS receiver
	X91 + GNSS Receiver	220	GPS L1C / A, L1C, L2C, L2E, L5; GLONASS L1C / A, L1P, L2C / A, L2P, L3; SBAS; Galileo E1 E5A, E5B; Beidou B1, B2	44	GLMNVPR1	18 (φ) x 8cm	1.35kg	1 - 5m / 0.25m + 1ppm / 8mm + 1ppm / 3mm + 0.5ppm	100	5Hz RTK		<60s	<30s	<15s	3	RS232, Bluetooth, Radio Antenna	9600 - 115200	-40 to +65	ext	2.6 W	Internal	Compact GNSS receiver
	X900 + GNSS Receiver	120	GPS L1, L2, L2C, L5; GLONASS L1, L2; SBAS; Galileo E1, E5A, E5B, Alt - BOC; BeiDou B1, B2,	Flexible Configuration: 120 L1, 60 L1 / L2	GLMNVPR1	19 x 20 x 8.4cm	19 x 20 x 8.4cm	2 - 3m / 0.25m + 1ppm / 10mm + 1ppm / 5mm + 1ppm	20	5Hz RTK		<50s	<35s	<1s	3	RS232, Bluetooth, Radio Antenna	9600 - 115200	-40 to +65	ext	2.6W	Internal	Compact GNSS receiver
	N71 GNSS Receiver	220	GPS L1C / A, L1C, L2C, L2E, L5; GLONASS L1C / A, L1P, L2C / A, L2P, L3; SBAS; Galileo E1 E5A, E5B; Beidou B1, B2	44	GLMNVPR1	19.5 x 14.5 x 5.1cm	1.35kg	1 - 5m / 0.25m + 1ppm / 8mm + 1ppm / 3mm + 0.5ppm	100	Up to 50Hz		<60s	<30s	<15s	5	RS232, GNSS Antenna Port, GPRS Antenna, Radio Antenna, LAN	9600 - 57600	-40 to +65	ext	2.6W	External	GNSS Sensor with PC Control Utility and Web User Interface
	N72 GNSS Receiver	220	GPS L1C / A, L2C, L2E, L5; GLONASS L1C / A, L1P, L2C / A, L2P; SBAS; Galileo E1, E5A, E5B; BeiDou B1, B2	44	GLMNVPR1	26.5 x 14.3 x 6.8cm	2.1kg	1 - 5m / 0.25m + 1ppm / 8mm + 1ppm / 2.5mm + 0.5ppm	100	Up to 50Hz		<60s	<30s	<15s	7	2*10 pin Lemo, TNC port (GNSS Antenna) , BNC port (External Frequency) , RJ45 Ethernet, DB9 Serial, USB	2400 - 115200	-40 to +65	ext / int	3.5W	External	GNSS Sensor with Front Panel and Web User Interface
	X20i GNSS Receiver	12	GPS L1C / A, SBAS	12	GLMNVPR1	17.5 (φ) x 6.55cm	0.7kg	2.5m / 0.3m + 2ppm / na / 5mm + 1ppm	20	1Hz		<60s	<30s	<10s	2	RS232, IOS Bluetooth	4800 - 115200	-30 to +60	ext	1.8W	External	Compact GNSS receiver, compatible with IOS device
	LT500H GNSS Handheld	120	GPS L1, L2, L2C; GLONASS L1, L2; BeiDou B1; Galileo E1; SBAS; QZSS	Flexible Configuration: 120 L1, 60 L1 / L2	GLN1	23.6 x 9.7 x 7.7cm	0.89kg	1.2m / 0.5m / 1cm + 1ppm / 1cm + 1ppm	na	1Hz		<50s	<35s	<1s	6	Mini USB, GPRS Antenna, 3.5G Cellular Moderm, Bluetooth, WiFi, Compact Flash	4800 - 115200	-30 to +70	ext	3W	Internal / External	GNSS Handheld Receiver
	LT500T GNSS Handheld	220	GPS L1C / A; GLONASS L1C / A; BeiDou B1; Galileo E1; SBAS; QZSS	44	GLN1	23.6 x 9.7 x 7.7cm	0.89kg	2m / 0.5m / na / 1cm + 1ppm	na	1Hz		<45s	<30s	<2s	6	Mini USB, GPRS Antenna, 3.5G Cellular Moderm, Bluetooth, WiFi, Compact Flash	4800 - 115200	-30 to +70	ext	2.8W	Internal / External	GNSS Handheld Receiver
	LT500U GNSS Handheld	72	GPS L1C / A; GLONASS L1C / A	All in view (GPS / GLONASS)	GLN1	23.6 x 9.7 x 7.7cm	0.89kg	2.5m / 2m / na / na	na	1Hz		<27s	<1s	<2s	6	Mini USB, GPRS Antenna, 3.5G Cellular Moderm, Bluetooth, WiFi, Compact Flash	4800 - 115200	-30 to +70	ext	2.8W	Internal / External	GNSS Handheld Receiver
ComNav Technology Ltd. **www.comnavtech.com**	K708	256	GPS: L1 C / A code, L1 / L2 P code, L2C, L5 BeiDou: B1, B2, B3 GLONASS: L1, L2 Galileo (Reserved) : QZSS (Reserved) ; SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMetMNOPRTV2	60 × 100 × 9mm	45g	1.5m / 0.5m / 10mm + 1ppm / 2.5mm + 1ppm (All values in Horiz, RMS)	20ns	20 Hz PVT 100Hz Raw data		<50s	<45s	<2s	6	3 ×RS232, 1 USB, 1 RJ45; 1 CAN	up to 921, 600 bps	-40 to +85	ext.	1.7W	MMCX acceptable	Triple frequency full constellation GNSS OEM Board
	K508	198	GPS: L1 C / A code, L1 / L2 P code, L5 BeiDou: B1, B2, B3 GLONASS: L1, L2 SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMetMNOPRTV2	60 × 100 × 9mm	42g	1.5m / 0.5m / 10mm + 1ppm / 2.5mm + 1ppm (All values in Horiz, RMS)	20ns	10Hz PVT 20Hz Raw data		<50s	<45s	<2s	3	3 ×RS232	up to 921, 600 bps	-40 to +85	ext.	1.85W	MMCX acceptable	Triple frequency GNSS OEM Board
	K528G	198	GPS: L1 C / A code, L1 / L2 P code Glonass: L1, L2 SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMetMNOPRTV2	60 × 100 × 10.2mm	46g	1.5m / 0.5m / 10mm + 1ppm / 2.5mm + 1ppm (All values in Horiz, RMS)	20ns	10Hz PVT & Heading 20Hz Raw data		<50s	<45s	<2s	3	3 ×RS232	up to 921, 600 bps	-40 to +80	ext.	1.9W	2*MCX acceptable	Dual frequency GNSS OEM Board for heading and positioning
	K528	198	GPS: L1 C / A code, L1 / L2 P code BeiDou: B1, B2 SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMetMNOPRTV2	60 × 100 × 10.2mm	46g	1.5m / 0.5m / 10mm + 1ppm / 2.5mm + 1ppm (All values in Horiz, RMS)	20ns	10Hz PVT & Heading 20Hz Raw data		<50s	<45s	<2s	3	3 ×RS232	up to 921, 600 bps	-40 to +80	ext.	1.85W	2*MCX acceptable	Dual frequency GNSS OEM Board for heading and positioning
	K501G	120	GPS: L1 C / A code, L1 / L2 P code GLONASS: L1, L2 SBAS: WAAS, EGNOS, MSAS, GAGAN	40	ADGHLMetMNOPRTV2	45.7 × 71.1 × 10.6mm	24g	1.5m / 0.5m / 10mm + 1ppm / 2.5mm + 1ppm (All values in Horiz, RMS)	20ns	10Hz PVT 20Hz Raw data		<50s	<45s	<2s	3	3 ×RS232	up to 921, 600 bps	-40 to +85	ext.	1.35W	MCX acceptable	Dual frequency GNSS OEM Board
	K501	120	GPS: L1 C / A code, L1 / L2 P code BeiDou: B1, B2, B3 (Optional) SBAS: WAAS, EGNOS, MSAS, GAGAN	40	ADGHLMetMNOPRTV2	45.7 × 71.1 × 10.6mm	25g	1.5m / 0.5m / 10mm + 1ppm / 2.5mm + 1ppm (All values in Horiz, RMS)	20ns	10Hz PVT 20Hz Raw data		<50s	<45s	<2s	3	3 ×RS232	up to 921, 600 bps	-40 to +85	ext.	1.45W	MCX acceptable	Dual frequency GNSS OEM Board
	K700	168	GPS: L1 GLONASS: L1 BeiDou: B1 SBAS: WAAS, EGNOS, MSAS, GAGAN	40	ADGHLMetMNOPRTV2	40.7× 71.1× 10.6mm	18g	1.5m / 0.5m / 10mm + 1ppm / 2.5mm + 1ppm (All values in Horiz, RMS)	20ns	50Hz PVT 100Hz Raw data		<50s	<45s	<2s	3	3 ×RS232	up to 921, 600 bps	-40 to +85	ext.	0.6W	MCX acceptable	Single frequency GNSS OEM Board
	K500	80	GPS: L1 GLONASS: L1 BeiDou: B1 SBAS: WAAS, EGNOS, MSAS, GAGAN	40	ADGHLMetMNOPRTV2	40.7× 71.1× 10.6mm	19g	1.5m / 0.5m / 10mm + 1ppm / 2.5mm + 1ppm (All values in Horiz, RMS)	20ns	10Hz PVT 20Hz Raw data		<50s	<45s	<2s	3	3 ×RS232	up to 921, 600 bps	-40 to +85	ext.	1.06W	MCX acceptable	Single frequency GNSS OEM Board
	T300	256	GPS: L1 C / A, L1 C, L2 P, L2C, L5 BeiDou: B1, B2, B3 GLONASS: L1 / L2 Galileo: Reserved SBAS: WAAS, EGNOS, MSAS, GAGAN	66	ADGLMetMNOPRV1	15.8 × 7.5cm (W×H)	0.95kg (Include Batteries)	1.5m / 0.5m / 8mm + 1ppm / 2.5mm + 0.5ppm (All values in Horiz, RMS)	20ns	10Hz PVT 20Hz Raw data		<50s	<30s	<2s	3	1 Lemo port ; 1 Bluetooth; 1 USB port	up to 921, 600 bps	-40 to +65	int. & ext	2.85W	internal	RTK GNSS Receiver
	M600	120	GPS: L1 C / A code, L1 / L2 P code; Glonass L1 / L2 BeiDou: B1, B2, B3 (Optional) SBAS: WAAS, EGNOS, MSAS, GAGAN	40	ADGLMNOPRTV1	145× 200 × 80mm	1.3kg	1.5m / 0.5m / 10mm + 1ppm / 2.5mm + 1ppm (All values in Horiz, RMS) Heading : Azimuth: (0.2 / R) ° Roll and Pitch Accuracy: (0.4 / R) °	20ns	10Hz PVT 20Hz Raw data		<50s	<45s	<2s	3	2 Lemo ports; 1 PPS (optional)	up to 921, 600 bps	-40 to +70	ext.	3W	2*TNC acceptable	GNSS Receiver for Heading and positioning
	M300 Pro	256	GPS: L1 C / A, L1 C, L2 P, L5 BeiDou: B1, B2, B3 GLONASS: L1 / L2 Galileo: Reserved QZSS: Reserved SBAS: WAAS, EGNOS, MSAS, GAGAN	66	ADGLMetMNOPRV1	163 × 202 × 75mm	2.4kg	1.5m / 0.5m / 8mm + 1ppm / 2mm + 1ppm (All values in Horiz, RMS)	20ns	20Hz PVT 50Hz Raw data		<50s	<30s	<2s	6	3 Lemo ports; 1 DB9 port; ; 1 USB port, 1 RJ45	up to 921, 600 bps	-40 to +80	ext. & int	3.5W	TNC acceptable	CORS Receiver with all the constellation and triple frequency. Built in Web server and Ntrip caster protocol
	M300	198	GPS: L1 C / A, L1 C, L2 P, L5 BeiDou: B1, B2, B3 GLONASS: L1 / L2 SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMNOPRTV1	145× 200 × 80mm	1kg	1.5m / 0.5m / 10mm + 1ppm / 2.5mm + 1ppm (All values in Horiz, RMS)	20ns	10Hz PVT 20Hz Raw data		<50s	<45s	<2s	3	2 Lemo ports; 1PPS (optional)	up to 921, 600 bps	-40 to +70	ext.	2.5W	TNC acceptable	Enclosure GNSS Receiver, smart sensors for high accuracy positioning
DataGrid, Inc. **www.datagrid-international.com**	Colibri	336 or more depending on config	L1 full cycle CP, C / A-code, L2 full cycle CP, P2, L2C code, SBAS, GLONASS L1, full cycle CP, C / A-code, L2 full cycle and L2 C / A code. Galileo E1.	30 or more depending on config	GLMMetNOPRTV1	Ø 17 x 10 cm	~400g depending on config.	1.5m / <1m / 1cm / <1cm (RMS)	<35	1, 1 / 2, 1 / 5, 1 / 10		<40s	36s	<1s	1, 1	USB, Bluetooth option	1, 200-115, 200 bps	-40 to +85	int., ext., LilonP.	1.5 to 2	L1 / L2 GNSS Internal	RTK, VRS, Precision post - proccessing, Precision GIS, GSM modem opt. WR. Fully wireless operation capable.
	Sparrow	336 or more depending on config	L1 full cycle CP, C / A-code, L2 full cycle CP, P2, L2C code, SBAS, GLONASS L1, full cycle CP, C / A-code, L2 full cycle and L2 C / A code. Galileo E1.	30 or more depending on config	GLMMetNOPRTV1	Ø 17 x 8.7 cm	1.2 kg	1.5m / <1m / 1cm / <1cm (RMS)	<35	1, 1 / 2, 1 / 5, 1 / 10, 1 / 20		<40s	36s	<1s	1, 1	USB, Ethernet	1, 200-115, 200 bps	-40 to +85	ext	1.5 to 2	Full GNSS Internal	RTK, VRS, Precision post - proccessing, Precision GIS, GSM modem, WR.
	Gator	336 or more depending on config	L1 full cycle CP, C / A-code, L2 full cycle CP, P2, L2C code, SBAS, GLONASS L1, full cycle CP, C / A-code, L2 full cycle and L2 C / A code. Galileo E1.	30 or more depending on config	ADGLMMetNOPVRSTV1	10 x 8.4 x 3.5cm	340g	1.5m / <1m / 1cm / <1cm (RMS)	<35	1, 1 / 2, 1 / 5, 1 / 10, 1 / 20		<40s	36s	<1s	1	USB	1, 200-115, 200 bps	-40 to +85	ext. USB powered	1.5	L1 / L2 GNSS (E)	RTK, VRS, Precision post - proccessing, Precision GIS, GSM modem opt. WR. Space qualified version available to qualifying customers.
	Guider	3 x 336 or more depending on config	L1 full cycle CP, C / A-code, L2 full cycle CP, P2, L2C code, SBAS, GLONASS L1, full cycle CP, C / A-code, L2 full cycle and L2 C / A code. Galileo E1.	3 x 30 or more depending on config	ADGLMMetNOPVRTV1	26 x 15 x 6 cm	1800g	1.5m / <1m / 1cm / <1cm (RMS)	<35	1, 1 / 2, 1 / 5, 1 / 10, 1 / 20		<40s	36s	<1s	2, 1, 1	Serial, USB, Ethernet	1, 200-115, 200 bps	-40 to +85	ext	5	3 x L1 / L2 GNSS External	Upto 3 GNSS receivers, to generate Position, heading, roll, pitch
	Toughman	336 or more depending on config	L1 full cycle CP, C / A-code, L2 full cycle CP, P2, L2C code, SBAS, GLONASS L1, full cycle CP, C / A-code, L2 full cycle and L2 C / A code. Galileo E1.	30 or more depending on config	GHLMMetNOPTV1	20 x 8.5 x 3.5cm	600g	1.5m / <1m / 1cm / <1cm (RMS)	<35	1, 1 / 2, 1 / 5, 1 / 10		<40s	36s	<1s	1, 1, 1, 1	Serial, A / D, USB, Bluetooth	1, 200-115, 200 bps	-30 to +70	int., ext., LilonP.	2.2	L1 / L2 (E)	GPS L1 / L2 carrierphase and data collection. WR
	Chameleon	336 or more depending on config	L1 full cycle CP, C / A-code, L2 full cycle CP, P2, L2C code, SBAS, GLONASS L1, full cycle CP, C / A-code, L2 full cycle and L2 C / A code. Galileo E1.	30 or more depending on config	GHLMMetNOPRTV1	27 x 8.5 x 3.5cm	750g	1.5m / <1m / 1cm / <1cm (RMS)	<35	1, 1 / 2, 1 / 5, 1 / 10		<40s	36s	<1s	2, 1, 1, 1	Serial, A / D, USB, Bluetooth	1, 200-115, 200 bps	-30 to +70	int., ext., LilonP.	3.2	L1 / L2 GNSS (E)	RTK, VRS, Precision post - proccessing, Precision GIS, GSM modem opt. WR

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Manufacturer	Model	Channels/ tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real -time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	DGRx - GNSS 3 (OEM)	336 or more depending on config	L1 full cycle CP, C / A-code, L2 full cycle CP, P2, L2C code, SBAS, GLONASS L1, full cycle CP, C / A-code, L2 full cycle and L2 C / A code. Galileo E1.	30 or more depending on config	ADGHLMMetOPRSTV2	90 x 60 x 12mm	~ 50g	1.5m / <1m / 1cm / <1cm (RMS)	<35	1, 1 / 2, 1 / 5, 1 / 10, 1 / 20 standard, higher rates optional.		<40s	<36 s	<1s	2	Serial	1, 200-115, 200 bps	-40 to +85	ext.	1.5	L1 / L2 GNSS (E)	Easy - to - upgrade / modify FPGA design with four reprogrammable sub - bands; two 1552 .. 1609 MHz and three 1166 .. 1253 MHz. Space qualified versions available to qualified customers.
	DGRx - GNSS 4 (OEM)	336 or more depending on config	L1 full cycle CP, C / A-code, L2 full cycle CP, P2, L2C code, SBAS, GLONASS L1, full cycle CP, C / A-code, L2 full cycle and L2 C / A code. Galileo E1, E5a / b.	40 or more depending on config	ADGHLMMetOPRTV2	75 x 45 x 10mm	~ 45g	1.5m / <1m / 1cm / <1cm (RMS)	<35	1, 1 / 2, 1 / 5, 1 / 10, 1 / 20 standard, higher rates optional.		<40s	<36 s	<1s	2	Serial	1, 200-115, 200 bps	-40 to +85	ext.	2.0	L1 / L2 / L5 GNSS (E)	Easy - to - upgrade / modify FPGA design with five reprogrammable sub - bands; two 1552 .. 1609 MHz and three 1166 .. 1253 MHz.
Eos Positioning Systems Inc. **www.eos-gnss.com**	Arrow Lite GPS	12 par.	GPS L1 C / A & CP	12	GLMNOPR1	12.5 x 8.4 x 4.2cm	372g	1.5m / 0.3m / 1cm / 5mm 1 - sigma	<<50 ns	1Hz (optional 10Hz & 20Hz)		60s	30s	<1s	2	Long - range Class 1 Bluetooth (Apple + SPP) , USB 1 RS - 232	4, 800 - 115, 200	-40 to +85	Integrated Battery / Opt. External	17 hrs / 1.4W	Active, L1 GPS	Single Frequency GPS. Real - time 60cm with SBAS. Universal Bluetooth compatibility with iOS, Android and Windows.
	Arrow 100 GNSS	158 par.	GPS L1 C / A & CP, GLONASS G1, BeiDou B1, Galileo E1, QZSS, SBAS, LBand opt.	52	GLMNOPR1	12.5 x 8.4 x 4.2cm	372g	1.5m / 0.3m / 1cm / 5mm 1 - sigma	20 ns	1Hz (optional 10Hz & 20Hz)		60s	30s	<1s	2	Long - range Class 1 Bluetooth (Apple + SPP) , USB 1 RS - 232	4, 800 - 230, 400	-40 to +85	Integrated Battery / Opt. External	12 hrs / 2.0W	Active, L1 / G1 / B1 / E1 / LBand	Single Frequency GNSS. 60cm SBAS, 30cm or opt. 1cm with RTK. Bluetooth compatibility iOS, Android and Windows.
	Arrow 200 GNSS	372 par.	GPS L1 / L2, C / A & P code & CP, GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5a / E5b, QZSS, Atlas LBand opt.	89	GLMNOPR1	12.5 x 8.4 x 4.2cm	372g	1.5m / 0.3m / 1cm / 5mm 1 - sigma	20 ns	1Hz (optional 10Hz & 20Hz)		60s	30s	<1s	2	Long - range Class 1 Bluetooth (Apple + SPP) , USB 1 RS - 232	4, 800 - 460, 800	-40 to +85	Integrated Battery / Opt.l External	9 + hrs / 2.5W	Active, L1 / L2, G1 / G2, B1 / B3, E1, LBand	Multi - Freq GNSS. 7cm Worldwide w / Atlas. 1cm RTK. Bluetooth compatibility with iOS, Android and Windows.
FOIF **www.foif.com**	A30	220	GPS: L1 C / A, L2E, L2C, L5 GLONASS: L1 C / A, L1P, L2 C / A, L2P SBAS (WAAS / EGNOS / MSAS) : L1 C / A, L5 GIOVE - A: L1 BOC, E5A, E5B, E5AltBOC GIOVE - B: L1 CBOC, E5A, E5B, E5AltBOC GALILEO: L1 CBOC, E5A, E5B, E5AltBOC (Reserved) Beidou: B1, B2	26	ADLMRSV1	10.1 x 19.7 x 19.7cm	1.3kg	~10m / 25cm + 1.0ppm / 8mm + 1.0ppm<0.25 m	20ns	up to 50Hz		<45s	<30s	<2s	2	RS232, USB	38400	-30 to +65	int, ext	12W	G18 - 104A	GPS L1 / L2 / L5 BDS B1 / B2 / B3 GLONASS L1 / L2 GALILEO E1 / E2 / E5a / E5b
	A50	220	GPS: L1 C / A, L2E, L2C, L5 GLONASS: L1 C / A, L1P, L2 C / A, L2P SBAS (WAAS / EGNOS / MSAS) : L1 C / A, L5 GIOVE - A: L1 BOC, E5A, E5B, E5AltBOC GIOVE - B: L1 CBOC, E5A, E5B, E5AltBOC GALILEO: L1 CBOC, E5A, E5B, E5AltBOC (Reserved) Beidou: B1, B2	26	ADLMRSV1	15x 14.8cm (gxH)	1.2kg	~10m / 25cm + 1.0ppm / 8mm + 1.0ppm<0.25 m	20ns	up to 50Hz		<45s	<30s	<2s	2	RS232, USB	38400	-30 to +65	int, ext	12W	G20 - 202B	GPS L1 / L2 / L5 BDS B1 / B2 / B3 GLONASS L1 / L2 GALILEO E1 / E2 / E5a / E5b
ftech Radio Frequency System Corporation **www.f-tech.com.tw**	FM3311	33 tracking + 99 acquisition	GPS / GLONASS L1 C / A code, SBAS	33	ACHLMNRV2	11 x 11 x 2.15mm	2g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	2	UART	4800-115200	-40 to +85	ext / built - in backup battery	20mA at 3.3V	active internal antenna	MT3331 chipset, GPS, GLONASS, GALILEO supported
	FMP3312 - TLP	33 tracking + 99 acquisition	GPS / GLONASS L1 C / A code, SBAS	33	ACHLMNRV2	26 x 26 x 11.7mm	12.5g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART	4800-115200	-40 to +85	ext / built - in backup battery	20mA at 3.3V	active internal antenna	as above
	FMP3351 - TLP	33 tracking + 99 acquisition	GPS / GLONASS L1 C / A code, SBAS	33	ACHLMNRV2	22 x 22 x 8mm	8g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART	4800-115200	-40 to +85	ext / built - in backup battery	20mA at 3.3V	active internal antenna	as above
	FM3911	22 tracking + 66 acquisition	GPS L1 C / A code, SBAS	22	ACHLMNRTV2	11 x 11 x 2.15mm	2g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	2	UART	4800 - 115200	-40 to +85	ext	19mA at 3.3V	ext., active or passive	MT3339 chipset, very high senstivity at - 165dBM
	FMP3906 - TLP	22 tracking + 66 acquisition	GPS L1 C / A code, SBAS	22	ACHLMNRV2	16 x 16 x 6.7mm	6g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART	4800-115200	-40 to +85	ext	20mA at 3.3V	active internal antenna	as above
	FMP12 - TLP	22 tracking + 66 acquisition	GPS L1 C / A code, SBAS	22	ACHLMNRV2	26 x 26 x 11.7mm	12.5g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART	4800-115200	-40 to +85	ext / built - in backup battery	20mA at 3.3V	active internal antenna	as above
	FMP51	22 tracking + 66 acquisition	GPS L1 C / A code, SBAS	22	ACHLMNRV2	22 x 22 x 8mm	8g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART	4800-115200	-40 to +85	ext	20mA at 3.3V	active internal antenna	as above
	FMP0439 - TLP	22 tracking + 66 acquisition	GPS L1 C / A code, SBAS	22	ACHLMNRV2	26 x 26 x 11.7mm	12.5g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	1	UART	4800-115200	-40 to +85	ext / built - in backup battery	24mA at 3.3V	active internal antenna	as above
	FM3906 - TLP	22 tracking + 66 acquisition	GPS L1 C / A code, SBAS	22	ACHLMNRTV2	16 x 16 x 6.7mm	6g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	1	UART	4800-115200	-40 to +85	ext	24mA at 3.3V	active internal antenna	as above
	FM3711	22 tracking + 66 acquisition	GPS L1 C / A code, SBAS	22	ACHLMNRTV2	11 x 11 x 2.15mm	2g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	2	UART	4800-115200	-40 to +85	ext	21mA at 3.3V	ext., active or passive	MT3337 ROM based chipset, low cost solution
	FMP31	22 tracking + 66 acquisition	GPS L1 C / A code, SBAS	22	ACHLMNRV2	22 x 22 x 8mm	8g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	1	UART	4800-115200	-40 to +85	ext	22mA at 3.3V	active internal antenna	as above
	FMP32	22 tracking + 66 acquisition	GPS L1 C / A code, SBAS	22	ACHLMNRV2	26 x 26 x 11.7mm	12.5g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	1	UART	4800-115200	-40 to +85	ext / built - in backup battery	22mA at 3.3V	active internal antenna	as above
	FGM - RLP	22 tracking + 66 acquisition + Q14	GPS L1 C / A code, SBAS	22	ACLMNRV2	30 x 34.1 x 8mm	50g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	1	UART / RS232	4800-115200	-40 to +85	ext / built - in backup battery	37mA at 3.3V	active internal antenna	Smart antenna model, multi type connector and various cable length availavle
	FGN - RLP	33 tracking + 99 acquisition	GPS / GLONASS L1 C / A code, SBAS	33	ACHLMNRV2	30 x 34.1 x 8mm	50g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART / RS232	4800-115200	-40 to +85	ext / built - in backup battery	37mA at 3.3V	active internal antenna	Smart antenna model, multi type connector and various cable length availavle
Furuno **www.furuno.com**	GN86	24	GPS L1 C / A, SBAS L1 C / A, GALILEO E1B / E1C, QZSS L1 C / A	12 GPS, 2 SBAS, 8 GALILEO, 2 QZSS	ALMNPV2	12.2 x 16.0 x 2.8mm			10us (Max)	1 / 2 / 5 / 10Hz		33s	30s	<1s	1	NMEA	4800 - 230400	-40 to +85	ext		Passive or Active	Active Anti - Jamming and Advanced Multipath Mitigation
	GN87	32	GPS L1 C / A, SBAS L1 C / A, GLONASS L1OF, GALILEO E1B / E1C, QZSS L1 C / A	12 GPS, 2 SBAS, 10 GLONASS, 8 GALILEO, 2 QZSS	ALMNPV2	12.2 x 16.0 x 2.8mm			10us (Max)	1 / 2 / 5 / 10Hz		33s	30s	<1s	1	NMEA	4800 - 230400	-40 to +85	ext		Passive or Active	Multi - GNSS, Active Anti - Jamming and Advanced Multipath Mitigation
	GV86	16	GPS L1 C / A, SBAS L1 C / A, QZSS L1 C / A	12 GPS, 2 SBAS, 2 QZSS	LNPV2	12.2 x 16.0 x 2.8mm			10us (Max)	1 / 2 / 5 / 10Hz		33s	30s	<1s	2	UART1 (for NMEA Input / Output) UART2 / I2C selectable (for IMU sensor data input) , Wheel tick capable	4800 - 230400	-40 to +85	ext		Passive or Active	Galileo Ready, High performance Dead Reckoning Active Anti - Jamming and Advanced Multipath Mitigation
	GV87	26	GPS L1 C / A, SBAS L1 C / A, GLONASS L1OF, QZSS L1 C / A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LNPV2	12.2 x 16.0 x 2.8mm			10us (Max)	1 / 2 / 5 / 10Hz		33s	30s	<1s	2	UART1 (for NMEA Input / Output) UART2 / I2C selectable (for IMU sensor data input) , Wheel tick capable	4800 - 230400	-40 to +85	ext		Passive or Active	Multi - GNSS, Galileo Ready High performance Dead Reckoning Active Anti - Jamming and Advanced Multipath Mitigation
	GT86	16	GPS L1 C / A, SBAS L1 C / A, QZSS L1 C / A	12 GPS, 2 SBAS, 2 QZSS	LNTPV2	12.2 x 16.0 x 2.8mm			15ns @1 sigma	1Hz		40s	35s	<5s	1	NMEA	4800 - 115200	-40 to +85	ext		Passive or Active	Galileo Ready, Active Anti - Jamming and Advanced Multipath Mitigation Time Pulse output (1PPS) and Clock output (configurable, e.g. 10MHz)
	GT87	26	GPS L1 C / A, SBAS L1 C / A, GLONASS L1OF, QZSS L1 C / A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LNTPV2	12.2 x 16.0 x 2.8mm			15ns @1 sigma	1Hz		40s	35s	<5s	1	NMEA or M12 Binary	4800 - 115200	-40 to +85	ext		Passive or Active	Multi - GNSS, Galileo Ready Active Anti - Jamming and Advanced Multipath Mitigation Time Pulse output (1PPS) and Clock output (configurable, e.g. 10MHz)
	GT8736	26	GPS L1 C / A, SBAS L1 C / A, GLONASS L1OF, QZSS L1 C / A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LNTPV2	40.0 x 60.0mm			15ns @1 sigma	1Hz		35s	35s	<5s	1	M12 Binary	9600	-40 to +85	ext		Active	Multi - GNSS, Galileo Ready Active Anti - Jamming and Advanced Multipath Mitigation
	eRideOPUS 6	24	GPS L1 C / A, SBAS L1 C / A, GALILEO E1B / E1C, QZSS L1 C / A	12 GPS, 2 SBAS, 8 GALILEO, 2 QZSS	ALMNPTV2	7.0 x 7.0mm				1 / 2 / 5 / 10Hz		33s	30s	<1s		NMEA	4800 - 230400	-40 to +85	ext		Passive or Active	Dead Reckoning or Timing software available For timing, Time Pulse output (1PPS) and Clock output (configurable, e.g. 10MHz)
	eRideOPUS 7	32	GPS L1 C / A, SBAS L1 C / A, GLONASS L1OF, GALILEO E1B / E1C, QZSS L1 C / A	12 GPS, 2 SBAS, 10 GLONASS, 8 GALILEO, 2 QZSS	ALMNPTV2	7.0 x 7.0mm				1 / 2 / 5 / 10Hz		33s	30s	<1s		NMEA or M12 Binary	4800 - 230400	-40 to +85	ext		Passive or Active	Multi - GNSS, Dead Reckoning or Timing software available For timing, Time Pulse output (1PPS) and Clock output (configurable, e.g. 10MHz)
	GF8557	14	GPS L1 C / A, SBAS L1 C / A	12 GPS, 2 SBAS	LT2	100 x 100 x 19.9mm	<120g		30ns @ 2 sigma	1Hz					2	10MHz, 1PPS, NMEA, TOD	38400	-20 to +80	ext	Warm up: <14W Steady state : <10W	Active	GPS Disciplined 10MHz via OXCO oscillator Hold Over: <±8usec / 24h
	GF8701	26	GPS L1 C / A, SBAS L1 C / A, GLONASS L1OF, QZSS L1 C / A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LT2	34 x 27 x 11mm			15ns @1 sigma	1Hz					1	10MHz, 1PPS, NMEA	4800 - 460800	-40 to +85	ext	Steady state: <0.6W	Active	Multi - GNSS Disciplined 10MHz via TCXO oscillator
	GF8702	26	GPS L1 C / A, SBAS L1 C / A, GLONASS L1OF, QZSS L1 C / A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LT2	34 x 27 x 15.5mm			15ns @1 sigma	1Hz					1	10MHz, 1PPS, NMEA	4800 - 460800	-40 to +85	ext	Steady state: <1.7W	Active	Multi - GNSS Disciplined 10MHz via OXCO oscillator Hold Over: <±50usec / 24h
	GF8703	26	GPS L1 C / A, SBAS L1 C / A, GLONASS L1OF, QZSS L1 C / A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LT2	34 x 27 x 20mm			15ns @1 sigma	1Hz					1	10MHz, 1PPS, NMEA	4800 - 460800	-40 to +85	ext	Steady state: <2.2W	Active	Multi - GNSS Disciplined 10MHz via OXCO oscillator Hold Over: <±10usec / 24h
	GF8704	26	GPS L1 C / A, SBAS L1 C / A, GLONASS L1OF, QZSS L1 C / A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LT2	100 x 52 x 20mm			15ns @1 sigma	1Hz					1	10MHz, 1PPS, NMEA	4800 - 460800	-40 to +85	ext	Steady state: <2.8W	Active	Multi - GNSS Disciplined 10MHz via OXCO oscillator Hold Over: <±5usec / 24h
	GF8705	26	GPS L1 C / A, SBAS L1 C / A, GLONASS L1OF, QZSS L1 C / A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LT2	100 x 52 x 20mm			15ns @1 sigma	1Hz					1	10MHz, 1PPS, NMEA	4800 - 460800	-40 to +85	ext	Steady state: <2.8W	Active	Multi - GNSS Disciplined 10MHz via OXCO oscillator Hold Over: <±1.5usec / 24h
	GF8648	26	GPS L1 C / A, QZSS L1 C / A	12 GPS, 2 QZSS	LT2	480 x 600 x 149mm			15ns @1 sigma	1Hz					11	10MHz x9, 1PPS, NMEA	38400	-10 to +45	ext	Warm up: <63W Steady state : <30W	Active	Digital Broadcasting Base Station Rubidium Oscillator
Galileo Satellite Navigation Ltd **www.galileo-nav.com**	GSN - 7100 GNSS Software Receiver	unlimited, user defined	GPS L1 C / A code, GPS, GLONASS, BeiDou	all in view	ACDGHLMNRSTV12	not applicable for Software Receiver	not applicable for Software Receiver	3 m	<<50ns	User defined - up to 1000 times in 1s		30s	2s	1s	not applicable for Software Receiver	defined by system designer	defined by system designer	not applicable for Software Receiver	not applicable for Software Receiver	not applicable for Software Receiver ~ 40mW	defined by system designer	GNSS Software Receiver can run on any DSP / RISK (CEVA, Cadense, ARM, other) . Can use any RF front end Needs about 128Kbyte RAM and 100 - 150 MHz of CPU resources
Geneq inc. **www.sxbluegps.com**	SXBlue GNSS	117 channel	L1 C / A code & phase, GPS + GLONASS + GALILEO, SBAS	27	DGLMNR1	8.5 x 3.5 x 11.2cm	.6lb	2.5m / 60cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	2	Bluetooth, RS - 232 (all independent)	4, 800 - 115, 200	-40 to +85	Ext (5V, 12V or 24V)	3.2W	L1 GNSS Active	High - accuracy receiver for base station or machine control
	SXBlue II + GPS	372 channel	L1 C / A code & phase GPS, SBAS	27	DGHLMNR1	8.0 x 4.7 x 14.1cm	1lb (w / batt.)	2.5m / 60cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS - 232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	1.9W	L1 GPS Active	Affordable submeter receiver for realtime positioning
	SXBlue II + GNSS	372 channel	L1 GPS C / A code & phase, GPS + GLONASS + GALILEO, SBAS	27	DGHLMNR1	8.0 x 4.7 x 14.1cm	1lb (w / batt.)	2.5m / 60cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS - 232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.3W	L1 GNSS Active	High - accuracy receiver to provide submeter realtime positioning all the time with low power consumption
	iSXBlue II + GNSS	372 channel	L1 GPS C / A code & phase, GPS + GLONASS + GALILEO, SBAS	27	DGHLMNR1	8.0 x 4.7 x 14.1cm	1lb (w / batt.)	2.5m / 60cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS - 232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.3W	L1 GNSS Active	Apple iOS Bluetooth compatible receiver for submeter applications
	SXBlue II - L GPS	372 channel	L1 C / A code & phase GPS, SBAS, OmniSTAR VBS	12 + 1	DGHLMNR1	8.0 x 5.6 x 14.1cm	1lb (w / batt.)	2.5m / 80cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS - 232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	2.9W	L1 GPS / LBand Active	Single frequency GPS receiver, Worldwide 10cm accuracy with OmniSTAR HP, XP service
	SXBlue II - B GPS	372 channel	L1 C / A code & phase GPS, SBAS, DGPS Beacon	12 + 1	DGHLMNR1	8.0 x 5.6 x 14.1cm	1, 2lb (w / batt.)	2.5m / 60cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS - 232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	2.5W	Combined L1 GPS / DGPS Beacon	Portable DGPS Beacon receiver for marine navigation

RECEIVER SURVEY 2016

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Manufacturer	Model	Channels/ tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real -time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	SXBlue GNSS L1 / L2	372 channel	L1 / L2 / (L2C) C / A & P code, GPS + GLONASS + GALILEO, CP, SBAS	27	DGLMNR1	8.5 x 3.5 x 11.2cm	.6lb	2.5m / 60cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	2	Bluetooth, RS - 232 (all independent)	4, 800 - 115, 200	-40 to +85	Ext (5V, 12V or 24V)	3.3W	L1 / L2 GNSS Active	Dual frequency GNSS high - accuracy receiver for base station or machine control
	SXBlue III + GNSS	372 channel	L1 / L2 / (L2C) C / A & P code, GLONASS + GALILEO, CP, SBAS	27	DGHLMNR1	8.0 x 4.7 x 14.1cm	1lb (w / batt.)	2.5m / 60cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS - 232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.3W	L1 / L2 GNSS Active	RTK & GNSS Dual frequency receiver with low power consumption
	iSXBlue III + GNSS (New)	372 channel	L1 / L2 / (L2C) C / A & P code, CP, GPS + GLONASS + GALILEO, SBAS	27	DGHLMNR1	8.0 x 4, 7 x 14.1cm	1lb (w / batt.)	2.5m / 60cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS - 232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.9W	L1 / L2 / LBand GNSS Active	Apple iOS Bluetooth compatible receiver for centimeter applications
	SXBlue III - L GNSS	372 channel	L1 / L2 / (L2C) C / A & P code, CP, GPS + GLONASS + GALILEO, SBAS, OmniSTAR VBS / XP / HP / G2	27	DGHLMNR1	8.0 x 5.6 x 14.1cm	1, 2lb (w / batt.)	2.5m / 60cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS - 232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.9W	L1 / L2 / LBand GNSS Active	Dual Frequency GNSS, Worldwide 10cm with OmniSTAR G2 service
	iSXBlue II + GPS (New)	372 channel	L1 GPS C / A code & phase, GPS, SBAS	27	DGHLMNR1	8.0 x 4.7 x 14.1cm	1lb (w / batt.)	2.5m / 60cm / 3cm / 1cm , 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS - 232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.3W	L1 GPS Active	Apple iOS Bluetooth compatible receiver for affordable submeter applications
Geodetics Inc. **www.geodetics.com**	Geo - iNAV	All in view	GPS L1 C / A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADGLMMetNRTV12	4.74 x 1.81 x 3.95in (tactical version)	20oz (tactical version)	< 1.5 meter CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.01		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40c to +85	External 10 - 30 VDC @2 AMPS	5 (tactical version)	External	Fully Integrated Inertial Navigation System for Low - High Dynamic Platforms, UAV, UGV, USV
	Geo - RelNAV	All in view	GPS L1 C / A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADLMOPNRTV1	4.74 x 1.81 x 3.95in (tactical version)	20oz (tactical version)	< 1.5 meter CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.01		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40c to +85	External 10 - 30 VDC @2 AMPS	5 (tactical version)	External	Relative navigation system for applications requiring relative platform data i.e. aerial refueling, shipboard landing
	Geo - Pointer	All in view	GPS L1 C / A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADGLMMetNORTV12	4.74 x 2.2 x 3.95in	1lb 7oz	< 1.5 meter CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.1		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40c to +85	External 10 - 30 VDC @2 AMPS	5 (tactical version)	External	Dual - GPS based attitude determination system
	Geo - hNAV	All in view	GPS L1 C / A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADGLMMetNRTV12	4.74 x 1.81 x 3.95in (tactical version)	20oz (tactical version)	< 1.5 meter CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.01		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40c to +85	External 10 - 30 VDC @2 AMPS	5 (tactical version)	External	Hybrid dual - GPS / IMU navigation system for stationary or slowly moving platforms i.e. aerostat
	Geo - PNT	All in view	GPS L1 C / A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADGLMMetNRTV12	4.74 x 2.2 x 3.95in (tactical version)	1lb 7oz (tactical version)	< 1.5m CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.01		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40c to +85	External 10 - 30 VDC @2 AMPS	9 (tactical version)	External	Accurate timing, position and attitude in a single box combining a high performance, versatile, GPS master clock with an accurate inertial navigation system in a single box solution.
GEOsat **www.geosat.de** **www.geosat.eu**	MXbox GNSS	372 L1 GNSS (GPS, Glonass, Galileo, Beidou) code and carrier phase tracking, 3 SBAS	L1, C / A CP smoothed, Glonass L1, SBAS, Beacon	All in view	GHLR1	115 x 115 x 40mm	0, 35kg	1.2m / 0.3m / nr / nr RMS	nr	1Hz		60s	30s	0.5s	2	RS - 232, USB, BT	9.600 - 115.200	-40 to +85	ext, 12 V	1	L1 GNSS (E) Beacon	SBAS and / or beacon and / or GPRS (NTRIP)
	GEOmeter MX	372 L1 GNSS (GPS, Glonass, Galileo, Beidou) code and carrier phase tracking, 3 SBAS	L1, C / A CP smoothed, Glonass L1, SBAS, Beacon	All in view	GHLR1	180 x 100 x 40mm	1.2kg	1.2m / 0.3m / nr / nr RMS	nr	1Hz		60s	30s	2s	2	RS - 232, USB, BT	38, 400	-40 to +85	ext, 12 V	1	L1 GNSS (E) Beacon	SBAS and / or beacon and / or GPRS, PDA - unit
	GEObox smart	65 L1 (GPS / Glonass)	L1, C / A	All in view	NV1	120 x 60 x 40mm	0.15kg	5m / 1m / nr / nr CEP	nr	1Hz		45s	38s	1s	7	3 digital, 1 analog	19, 200	-10 to +85	ext. 8 -30 V	0.2	L1 (E)	SBAS, GPRS modem, CAN - Interface
GlobalTop Technology **www.gtop-tech.com**	Ivory3	66 Channels All in View Tracking	GPS L1 C / A code	22	12.7 x 9 x 2.1mm	1g	Without aid: 3.0m (50% CEP) DGPS: 2.5m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART, I2C	4, 800-115, 200	-40 to +85	ext	13 / 19 / 24mA (Power Tracking) 6 / 14 / 18 mA (GLP mode)	ext	Ultra - low power Standalone GPS - Only Module based on MT3339
	LadyBird 1	66 Channels All in View Tracking	GPS L1 C / A code	22	16 x 16 x 4.7mm	4g	Without aid: 3.0m (50% CEP) DGPS: 2.5m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART, I2C, External Antenna	4, 800-115, 200	-40 to +85	ext	19 / 24 / 36mA (Power tracking) 6 / 14 / 22 mA (GLP mode)	Ceramic Patch Antenna	Advanced GPS - Only Patch Antenna Module based on MT3339
	LadyBird 3	66 Channels All in View Tracking	GPS L1 C / A code	22	16 x 16 x 6.2mm	6g	Without aid: 3.0m (50% CEP) DGPS: 2.5m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART	4, 800-115, 200	-40 to +85	ext	16 / 23 / 30mA	Ceramic Patch Antenna	Ultra - low power GPS - Only Patch Antenna Module based on MT3339
	Firefly X1	99 channels	GPS + Glonass, GPS + Galieo (on request), GPS + Beidou (on request)	33	9.0 x 9.5 x 2.1mm	0.7g	Without aid: 2.5m (50% CEP) DGPS: 2.0m (50% CEP) RTCM : <2.0m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART, I2C, SPI,	4, 800-115, 200	-40 to +85	ext	18 / 24 / 30mA	ext	Advanced Multi - GNSS , Multi - Interface Standalone Module based on MT3333
	FireFly 1	99 channels	GPS + Glonass, GPS + Galieo (on request), GPS + Beidou (on request)	33	11.5 x 13 x 2.1mm	1g	Without aid: 3.0m (50% CEP) DGPS: 2.5m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART, I2C	4, 800-115, 200	-40 to +85	ext	24 / 31 / 36mA	ext	Multi - GNSS Standalone Module based on MT3333
	Titan 2	99 channels	GPS + Glonass, GPS + Galieo (on request), GPS + Beidou (on request)	33	16 x 16 x 6.8mm	6g	Without aid: 3.0m (50% CEP) DGPS: 2.5m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART, I2C	4, 800-115, 200	-40 to +85	ext	18 / 23 / 28mA	Ceramic Patch Antenna	Multi - GNSS Patch Antenna Module based on MT3333
Hemisphere GNSS **www.hemispheregnss.com**	Crescent P102 OEM Board	24 par	L1 only, C / A-code & CP (SBAS)	12	AGLMNPRV2	1.6 x 0.5 x 2.9in	<0.7oz	1.2m / 0.3m / 1cm / 5mm (RMS)	50	0.05		60s	30s	<10s	4	3.3 V HCMOS	4, 800-115, 200	-40 to +85	External	<1.0	GPS + SBAS (ER)	GPS and SBAS receiver module
	Eclipse P206 OEM Module	158 par	L1 C / A, (SBAS) , GLONASS G1, BeiDou B1, Galileo E1, and QZSS L1 C / A	27	AGLMNPRV2	1.6 x 0.5 x 2.9in	<0.8oz	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	30s	<10s	6	3.3 V HCMOS, USB	4, 800-115, 200	-40 to +85	External	<3.2	GPS + SBAS + GLONASS + Galileo + BeiDou (ER)	Single frequency GPS, GLONASS, BeiDou, Galileo, QZSS and SBAS receiver module
	Eclipse P306 OEM Module	372 par	L1 / L2 C / A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, and QZSS L1 C / A & L2C	89	AGLMNPRV2	1.6 x 0.5 x 2.9in	<0.8oz	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		60s	30s	<10s	6	3.3 V HCMOS, USB	4, 800-115, 200	-40 to +85	External	<3.9	GPS + SBAS + GLONASS + Galileo + BeiDou (ER)	Dual / Triple frequency GPS, GLONASS, BeiDou, Galileo, QZSS and SBAS receiver module
	A101 Smart Antenna	24 par	L1 only, C / A-code & CP (SBAS)	12	AGLMNPRV1	5.7 x 4.1in	1.23lb	1.2m / 0.3m / 1cm / 5mm (RMS)	50	0.05		60s	30s	<10s	2	RS - 232, CAN	4, 800-115, 200	-40 to +70	External	<3	Integrated GPS + SBAS	GPS and SBAS smart antenna
	A325 GNSS Smart Antenna	114 par	L1 / L2, C / A & P code & CP, (SBAS) , and GLONASS G1 / G2	27	AGLMNPRV1	4.1 x 5.7in	1.23lb	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	30s	<10s	2	RS - 232, Bluetooth, CAN	4, 800-115, 200	-40 to +70	External	<4.6	Integrated GPS + SBAS + GLONASS (ER) (inc.)	L1 / L2 GPS & GLONASS, SBAS and Bluetooth smart antenna
	S320 GNSS Survey Receiver	114 par	L1 / L2, C / A & P code & CP, (SBAS) , and GLONASS G1 / G2	27	AGLMNPRV1	4.5 x 7.8in	3.3lb	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	30s	<10s	6	RS - 232 (Multi - Use) , RS - 232, Bluetooth, USB, Bluetooth, SD, UHF, GSM	4, 800-38, 400	-40 to +70	Internal w / Option of External	Rover: 4.4 Base Tx UHF: 7	Integrated GPS + SBAS + GLONASS (ER)	L1 / L2 GPS & GLONASS, SBAS, UHF radio, GSM, SD & USB logging, Bluetooth smart antenna
	R330 GNSS Receiver	372 par	L1 / L2, C / A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, QZSS L1 C / A & L2C, L - Band, and Beacon	89	AGLMNPRV1	4.7 x 1.8 x 7.0in	1.42lb	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		60s	30s	<15s	2	RS - 232	4, 800-115, 200	-40 to +70	External	<4.7	L1 / L2 GPS + SBAS + Lband + GLONASS (ER) (inc.) + Beacon	L1 / L2 GPS, GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo, QZSS, Atlas L - band, Beacon, SBAS and USB logging receiver
	AtlasLink	372 par	L1 / L2, C / A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, QZSS L1 C / A & L2C, and L - Band	89	AGLMNPRV1	6.2 x 3.2 x 6.2in	<2.53lb	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		60s	20s	<5s	5	RS - 232, CAN, Bluetooth, Wi - Fi	4, 800-115, 200	-40 to +70	External	<4.5	Integrated GPS + SBAS + GLONASS + Galileo + BeiDou (ER)	L1 / L2 GPS, GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo, QZSS, Atlas L - band, and SBAS Smart Antenna
	Vector H200 GNSS Compass Module	108 par.	L1 C / A, (SBAS) , and GLONASS G1	27	AGLMNOPRV2	2.8 x 0.2 x 4.3in	<1.8oz	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		40s	20s	<10s	6	3.3 V HCMOS, USB	4, 800-115, 200	-40 to +85	External	<2.1	GPS + GLONASS + SBAS (ER)	GPS & GLONASS, SBAS compass receiver module
	Vector H321 GNSS Compass Module	744 par	L1 / L2, C / A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, QZSS L1 C / A & L2C, and L - Band	89	AGLMNOPRV2	2.8 x 0.6 x 6.0in	<3.7oz	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		60s	30s	<10s	5	3.3 V HCMOS, USB	4, 800-115, 200	-40 to +85	External	<4.7	L1 / L2 GPS + GLONASS + BeiDou + Galileo + QZSS + Lband + SBAS (ER)	L1 / L2 GPS, GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo, QZSS, Atlas L - band, and SBAS receiver module
	Vector V102 GPS Compass	48 par	L1 only, C / A-code & CP (SBAS)	12	AGLMNOPV1	6.2 x 2.7 x 16.4in	3.3lb	1.2m / 0.3m / 1cm / 5mm (RMS)	50	0.05		60s	30s	<10s	2	RS - 232, NMEA2000	4, 800-115, 200	-40 to +70	External	<3	Integrated GPS + SBAS	GPS and SBAS smart antenna
	Vector V103 GPS Compass	108 par.	L1 C / A, (SBAS), and GLONASS G1	27	AGLMNOPV1	8.2 x 5.7 x 26.1in	5.4lb	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	30s	<10s	2	RS - 232, RS - 422	4, 800-115, 200	-40 to +70	External	<4.6	Integrated GPS + SBAS + GLONASS (optional Beacon)	GPS, GLONASS and SBAS smart antenna (optional beacon differential)
	Vector V104 GPS Compass	48 par	L1 only, C / A-code & CP (SBAS)	12	AGLMNOPV1	5.1 x 1.8 x 10.2in	0.9lb	1.2m / 0.3m / 1cm / 5mm (RMS)	50	0.05		60s	30s	<10s	2	RS - 232, or NMEA2000	4, 800-115, 200	-40 to +70	External	<2	Integrated GPS + SBAS	GPS and SBAS smart antenna
	Vector VS131 GNSS Compass	108 par.	L1 C / A, (SBAS) , GLONASS G1, and Beacon	27	AGLMNOPV1	4.7 x 3.0 x 8.0in	2.5lb	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	20s	<10s	3	RS - 232, USB	4, 800-115, 200	-30 to +70	External	<5.5	GPS + SBAS + GLONASS + Beacon (ER)	GPS and GLONASS, SBAS and Beacon receiver
	Vector VS330 GNSS Compass	744 par	L1 / L2, C / A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, QZSS L1 C / A & L2C, and L - Band	89	AGLMNOPV1	4.7 x 3.0 x 8.0in	2.5lb	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		40s	20s	<10s	3	RS - 232, RS - 422, USB	4, 800-115, 200	-30 to +70	External	<7	L1 / L2 GPS, GLONASS, BeiDou, QZSS compass receiver with Atlas L - Band, SBAS and Beacon differential, USB logging receiver	
IFEN GmbH **www.ifen.com**	SX3	user - defined, 490 par. tested on Intel i7 - 4790K	up to 8 signal chains tracked in real - time GPS L1 C / A, L2 P, L2C, L5 Galileo E1, E5a, E5b, E5 AltBOC, E6 GLONASS G1 C / A, G2 C / A BeiDou B1, B2, SBAS IRNSS SPS L - band, S - band	user - defined, up to 490 tested	AGLMMetNOPSTV1	13.5 x 3.5 x 20.0cm	0.9kg (+ PC or notebook)	~10m (95%) ; Code accuracy: <20cm; Carrier accuracy: < 1mm	<10	up to 25Hz PVT		<55s	<10s	<1s	1	1 USB 3.0		-0 to +40	ext.	<20W	Active, external	Multi - frequency real - time software receiver with opt. dual antenna feature, external sensor data interface. For scientific applications, fully flexible and open system. Includes external notebook.
	NavX - NTR	120 par. Narrow correlator	GPS L1 C / A, L2 P, L2C, L5 Galileo E1, E5ab, E6 GLONASS G1 C / A & P GLONASS G2 IRNSS L + S - Band BeiDou B1, B2, SBAS	all in view	NP1	19" x 1HU x 22cm	2.5kg	~10m (95%)	<10	10Hz PVT		<60s	<30s	<1s	1	1 Ethernet		-20 to +60	ext. (AC / DC)	<30W	Active, external	Monitoring and reference station applications
Interstate Electronics Corporation **www.iechome.com**	TruTrak Munitions	12 dedicated or multiplexed	L1 / L2 C / A and P (Y)	12	D	3.42 x 3.42 x 0.495in	<0.25lb	ITAR Controlled - Data available upon request	100	0.5 or 1		120s	35s	5s	2	Serial RS - 422 Serial TTL - CDU (debug)	as above	as above	ext	3 (typ)	E	
	TruTrak Evolution SS	12 dedicated	L1 C / A and P (Y)	12	D	3.07 x 0.93in with tabs to 1.49in	23g	ITAR Controlled - Data available upon request	as above	as above		as above	as above	as above	3	1 x RS 232 and 2 x CMOS serial ports, DS - 101, TOD and 1 - 10PPS			as above	as above	Passive	as above
	TruTrak Type II	24 dedicated	L1 / L2 C / A and P (Y)	12	D	1.76 x 0.368 x 2.45	35g	ITAR Controlled - Data avliable upon request	40 ns			<120s	<60	Data Avaliable on request		8 serial data ports, 2RS - 232 2 SPI (7 slaves) 2 SDLC AMRAAM IMU Ports 21 general purpose I / O Extrenal 10MHz input		-40 to +85	3.3	1.5	Passive and Active	
Jackson Labs Technologies, Inc. **www.jackson-labs.com**	SAASM FireFly - IIA DOCXO GPSDO	12 par.	L2, L1, Y (P) , C / A, SAASM	12	ADLMMETNOT2	2.85 x 2.0 x 0.5	<2.5oz	<2m RMS	<30ns RMS	1Hz		<60s	<1s	<1s	1	RS - 232 NMEA - 0183, SCPI, 10MHz, DS - 101 KeyFill Port	9, 600 - 115, 200	-45 to +85	11V - 14V	<4.0W	3.3V	Very Low Phase Noise and very good ADEV, with Small and Ultra Low Power MicroGRAM SAASM GPS with Y (P) , C / A code
	Motorola / iLotus M12M / M12 + compatible GNSS Replacement Receiver Module	72	L1, C / A, GPS, GLONASS, BeiDou, QZSS, WAAS, EGNOS, SBAS	72	ADLMMETNOTV2	2.362 x 1.575 x 0.6	<2oz	<0.7m RMS	<5ns RMS quantization corrected	1Hz / 5Hz		<35s	<1s	<1s	3	TTL, USB, Motorola Binary, SCPI, NMEA, Status, 10MHz, 1PPS	9, 600 - 115, 200	-40 to +85	3V / 5V	180mW	3V to 5V	Form, Fit, Function compatible replacement and upgrade for Motorola / iLotus M12M and M12 + GPS receiver. Adds GLONASS, BeiDou, and SBAS capability
	HD CSAC SAASM GPSDO	12 par.	L2, L1, Y (P), C / A, SAASM	12	ADLMMETNOT2	2.85 x 2.0 x 0.5	<2oz	<2m RMS	<30ns RMS	1Hz		<60s	<1s	<1s	1	RS - 232 NMEA - 0183, SCPI, 10MHz, DS - 101 KeyFill Port	9, 600 - 115, 200	-45 to +85	8.V - 16V	<1.0W	3.3V	Ultra Small and Ultra Low Power SAASM GPS with Y (P) , C / A code, and Chip Scale Cesium Atomic Clock.

RECEIVER SURVEY 2016

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Manufacturer	Model	Channels/ tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real -time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)	Cold start[3]	Warm start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	Low Noise Rubidium GNSDO	72 par.	L1, C / A, GPS, GLONASS, BeiDou, QZSS, WAAS, EGNOS, SBAS	72	ADLMMETNOTV2	3.40 x 4.4 x 1.0	<400g	<0.7m RMS	<5ns RMS	1Hz	<35s	<1s	<1s	3	RS - 232, RS - 422, USB, NMEA, Status, 10MHz, 1PPS	9, 600 - 115, 200	-40 to +70	8V to 36V	5.6W	5V	Ruggedized, enclosued Disciplined Rubidium Concurrent - GNSS Oscillator with ultra low Phase Noise and ADEV performance
	LTE - Lite 10 / 15.36 / 19.2 / 20 / MHz SMT Module GPSDO	65 par.	L1, C / A, GPS / QZSS, WAAS, EGNOS, SBAS	65	ADLMMETNOTV2	0.7 x 1.2 x 0.1in	0.1oz	<2m RMS	<30ns RMS	1Hz and 5Hz	<35s	<1s	<1s	2	TTL NMEA, Status, 10MHz, 1PPS	38400	-20 to +85'	3.3V	<0.2W	3.3V to 5V	LTE Small Cell optimized SMT frequency / timing and GPS module, very low cost, Size, Weight, and Power,
	Low Power HD CSAC (Chip Scale Cesium Atomic Clock) SWAP optimized GPSDO	50 par.	L1, C / A, WAAS, EGNOS, SBAS	50	ADLMMETNOT2	2 x 2.5 x 0.5in	<2oz	<2m RMS	<15ns RMS	1Hz	<45s	<1s	<1s	2	RS - 232, Alarm, 10MHz, 1PPS	9, 600 - 115, 200	-20 to +85'	5V	<0.45W	5V	Very Low Power Chip Scale Cesium Atomic Clock with GPS Disciplining
	FireFly - IIA 10MHz GPSDO	50 par.	L1, C / A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.5 x 3 x 1in	1.74oz	<2m RMS	<30ns RMS	1Hz	<45s	<1s	<1s	1	RS - 232, Alarm, 10MHz, 1PPS	9, 600 - 115, 200	-20 to +85'	11.0 - 14.0 V	<3.5W	5V	Built - In 10MHz Distribution Amplifier, 3 - Axis Accelerometer, low - g option
	FireFly - 1A 10MHz GPSDO	50 par.	L1, C / A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.0 x 2.5 x 0.5in	0.64oz	<2m RMS	<30ns RMS	1Hz	<45s	<1s	<1s	1	RS - 232, Alarm, 10MHz, 1PPS	9, 600 - 115, 200	-20 to +85'	8.0 - 14.0 V	<1.4W	3.3V	Ultra small and light GPS Disciplined Oscillator
	ULN - 2550 25MHz / 100MHz / 10MHz GPSDO	50 par.	L1, C / A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.5 x 3.5 x 0.8in	1.8oz	<2m RMS	<30ns RMS	1Hz	<45s	<1s	<1s	1	RS - 232, Alarm, 10 / 25 / 50 / 100MHz, 1PPS	115, 200	-20 to +85'	11.0 - 14.0 V	<3.5W	5V	Adds four 25MHz LVDS outputs (50MHz option) , a 100MHz output, and a 10MHz output
	Mini - JLT GPSDO	50 par.	L1, C / A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	5.05 x 1.38 x 0.7in	2oz	<2m RMS	<15ns RMS	1Hz	<45s	<1s	<1s	2	TTL / USB NMEA - 0183, SCPI, 10MHz	9600bps async	-30 to +70	5V	<2.5W	3.3V / 5V	Trimble Mini - T Legacy Replacement unit with improved phase noise, ADEV, and wider temp - range
	LC_XO GPSDO 10MHz	50 par.	L1, C / A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	0.97 x 0.97 x 0.5	<1oz	<2m RMS	<30ns RMS	1Hz	<45s	<1s	<1s	1	TTL NMEA - 0183, SCPI, 10MHz	9, 600 - 115, 200	-35 to +75	3.3V	<0.55W	5V	Socketable Low Cost GPSDO module with 1 inch square footprint and 10MHz output
Japan Radio Co., Ltd. www.jrc.co.jp/eng/	GPS9 Series: CCA - 700	16 channels + search channel	GPS / QZSS / Galileo	16	CHLMNPV2	12.4 x 2.5 x 12.4mm	0.7g (approx)	2.3m typ. / 2.0m typ. / na (CEP)	na	1Hz	35s typ.	33s typ.	3s typ. (within 5s block out)	1	1 UART	480 Mbps 480 Mbps 10 / 100 Mbps 54 Mps 2 Mbps	-40 to +85	ext	140mW @3.3V	Active, Includes Pre - amplifier	Galileo: Hardware Ready
	GPS10Series: CCA - 800	23channels + search channel	GPS / QZSS / GLONASS / BeiDou / Galileo	23	CHLMNPV2	12.4 x 2.5 x 12.4mm	0.7g (approx)	2.3m typ. / 2.0m typ. / na (CEP)	na	1Hz	35s typ.	8s typ.	2s typ.	1	1 UART	2400bps 4800bps 9600bps 19200bps 38400bps	-40 to +85	ext	150mW @3.3V	Active, Includes Pre - amplifier	
JAVAD GNSS www.javad.com	TRIUMPH - LS	864	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B / AltBoc GLONASS CA / L2C / P1 / P2 / L3 SBAS L1 / L5 QZSS CA / L1C / L2C / L5 / SAIF BeiDou B1 / B2	all in view	1GHLMTNPROMet	183 x 124 x 106mm	2100g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	11111111111	USB 2.0 Host, USB 2.0 Device Ethernet, Wi - Fi, Bluetooth; 1PPS (optional) , Event Marker (optional) , Ext. Frq In / Out (optional)	480 Mbps 480 Mbps 10 / 100 Mbps 65 Mps 2 Mbps	-30 to +55	ext / int	8	I / E	16GB internal memory, microSD card slot, UHF / FH radio, 4G / LTE card, 800x480 colour TFT LCD, J - FIELD SOFTWARE
	TRIUMPH - 1M	864	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B / AltBoc GLONASS CA / L2C / P1 / P2 / L3 SBAS L1 / L5 QZSS CA / L1C / L2C / L5 / SAIF BeiDou B1 / B2	all in view	1AGLMTNPROMet	178 x 96 x 178mm	1700g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	2111111111	RS - 232, USB 2.0, Ethernet, Wi - Fi, Bluetooth, 1PPS (optional) , Event Marker (optional) Ext. Ant. (optional)	480 kbps 480 Mbps 10 / 100 Mbps 54 Mps 2 Mbps	-40 to +60	ext / int	4.5	I / E	16GB internal memory, microSD card slot, UHF / FH radio 4G / LTE card
	TRIUMPH - NT	864	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B / AltBoc GLONASS CA / L2C / P1 / P2 / L3 SBAS L1 / L5 QZSS CA / L1C / L2C / L5 / SAIF BeiDou B1 / B2	all in view	1GHLMTNPROMet	176 x 126 x 62mm	1100g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	1111111	USB OTG, Wi - Fi; Bluetooth; 1PPS (optional) ; Event Marker optional) Ext. Freq In / Out (optional)	480 Mbps 65 Mbps 2 Mbps	-30 to +55	ext / int	7.5	E	16GB internal memory, microSD card slot, UHF / FH radio, 4G / LTE card, 800x480 colour TFT LCD, J - FIELD SOFTWARE
	TRIUMPH - 2	216	GPS CA / P1 / P2 / L2C GLONASS CA / L2C / P1 / P2 SBAS L1	all in view	1AGLMTNPROMet	85 x 61 x 132mm	560g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	111	USB; Wi - Fi; Bluetooth	12 Mbps 54 Mps 2 Mbps	-40 to +60	ext / int	2.5	I	2048MB memory
	Delta - 3	864	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B / AltBoc / E6 GLONASS CA / L2C / P1 / P2 / L3 SBAS L1 / L5 QZSS CA / L1C / L2C / L5 / SAIF / LEX BeiDou B1 / B2 / B3	all in view	1AGLMTNPROMet	109 x 35 x 160mm	420g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	32111221	RS232; RS422; USB; Ethernet; CAN (optional) ; 1PPS (optional) ; Event Marker (optional) ; IRIG (optional) ; Ext. Freq In / Out (optional)	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 1 Mps	-40 to +70	ext	8	E	16GB memory
	TRE - 3	864	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B / AltBoc / E6 GLONASS CA / L2C / P1 / P2 / L3 SBAS L1 / L5 QZSS CA / L1C / L2C / L5 / SAIF / LEX BeiDou B1 / B2 / B3	all in view	1AGLMTNPROMet	100 x 80mm	87g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	32111221	RS232; RS422; USB; Ethernet; CAN (optional) ; 1PPS (optional) ; Event Marker (optional) ; IRIG (optional) ; Ext. Freq In / Out (optional)	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 1 Mps	-40 to +70	ext	8	E	16GB memory
	TRUIMPH - 4X	216	4x GPS CA / P1 / P2 / L2C / L5 4x Galileo E1 / E5A 4x SBAS L1 / L5 4x QZSS CA / SAIF / L2C / L5 / L1C 4x BeiDou E1	all in view	1AGLMTNPROMet	178 x 93 x 178mm	1850g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	20Hz	<35 s	<5 s	<1s	21111	RS232; USB; Ethernet; Wi - Fi; Bluetooth	460.8 kbps 12 Mbps 2 Mbps	-35 to +75	ext / int	6.2	I / E	2048MB memory UHF / FH radio GSM / GPRS / EDGE / CDMA modem
	Alpha G3	216	GPS CA Galileo E1 GLONASS CA SBAS L1 QZSS CA / SAIF / L1C BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	430g	<2m / <0.5m / 1.5cm + 2 ppm / 0.5cm + 1.5ppm	3	100Hz				11111	RS232 USB / RS232 Bluetooth 1PPS / IRIG Event Marker	460.8 kbps 12 Mbps 2 Mbps	-35 to +75	ext / int	1.8	E	256MB memory GSM / GPRS modem
	Alpha G2T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	435g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz				11111	RS232 USB / RS232 Bluetooth 1PPS / IRIG Event Marker	460.8 kbps 12 Mbps 2 Mbps	-35 to +75	ext / int	1.9	E	256MB memory GSM / GPRS modem
	Alpha G3T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A GLONASS CA / P1 / P2 / L2C SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	448g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz				11111	RS232 USB / RS232 Bluetooth 1PPS / IRIG Event Marker	460.8 kbps 12 Mbps 2 Mbps	-35 to +75	ext / int	2.6	E	256MB memory GSM / GPRS modem
	Alpha2 - G3	216	GPS CA Galileo E1 GLONASS CA SBAS L1 QZSS CA / SAIF / L1C BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	430g	<2m / <0.5m / 1.5cm + 2 ppm / 0.5cm + 1.5 ppm	3	100Hz				11111	RS232 USB / RS232 Bluetooth 1PPS / IRIG Event Marker	460.8 kbps 12 Mbps 2 Mbps	-35 to +75	ext	1.6	E	256MB memory
	Alpha2 - G2	216	GPS CA Galileo E1 SBAS L1 QZSS CA / SAIF / L1C BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	415g	<2m / <0.5m / 1.5cm + 2 ppm / 0.5cm + 1.5 ppm	3	100Hz	<35s	<5s	<1s	11111	RS232 USB / RS232 Bluetooth 1PPS / IRIG Event Marker	460.8 kbps 12 Mbps 2 Mbps	-35 to +75	ext	1.4	E	256MB memory
	Alpha2 - G2T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	435g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.5 ppm	3	100Hz				11111	RS232 USB / RS232 Bluetooth 1PPS / IRIG Event Marker	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 1 Mps	-35 to +75	ext	1.7	E	256MB memory
	Alpha2 - G3T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A GLONASS CA / P1 / P2 / L2C SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	448g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.5 ppm	3	100Hz				11111	RS232 USB / RS232 Bluetooth 1PPS / IRIG Event Marker	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 1 Mps	-35 to +75	ext	2.4	E	256MB memory
	Delta G2T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1	all in view	1AGLMTNPROMet	109 x 35 x 169mm	394g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 1 Mps	-35 to +75	ext	2.5	E	2048MB memory
	Delta G3T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B GLONASS CA / P1 / P2 / L2C / L3 SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1 / E5B	all in view	1AGLMTNPROMet	109 x 35 x 169mm	401g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 1 Mps	-35 to +75	ext	3.4	E	2048MB memory
	Delta - G3TAJ	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B GLONASS CA / P1 / P2 / L2C / L3 SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1 / E5B	all in view	1AGLMTNPROMet	109 x 35 x 169mm	401g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 1 Mps	-35 to +75	ext	4.2	E	2048MB memory; In Band Interference Rejection
	Delta D - G2	216	2x GPS CA 2x Galileo E1 2x SBAS L1 2x QZSS CA / SAIF / L1C 2x BeiDou E1	all in view	1AGLMTNPROMet	109 x 35 x 169mm	414g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 1 Mps	-35 to +75	ext	2.2	E	2048MB memory
	Delta D - G2D	216	2x GPS CA / P1 / P2 / L2C 2x Galileo E1 2x SBAS L1 2x QZSS CA / SAIF / L2C / L1C 2x BeiDou E1	all in view	1AGLMTNPROMet	109 x 35 x 169mm	414g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 1 Mps	-35 to +75	ext	2.2	E	2048MB memory
	Delta D - G3D	216	2x GPS CA / P1 / P2 / L2C 2x Galileo E1 2x Glonass CA / P1 / P2 / L2C 2x SBAS L1 2x QZSS CA / SAIF / L2C / L1C 2x BeiDou E1	all in view	1AGLMTNPROMet	109 x 35 x 169mm	414g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 2 Mbps, 1 Mps	-35 to +75	ext	3.9	E	2048MB memory
	Delta Q - G3D	216	4x GPS CA / P1 / P2 / L2C 4x Galileo E1 1x Glonass CA / P1 / P2 / L2C 4x SBAS L1 4x QZSS CA / SAIF / L2C / L1C 4x BeiDou E1	all in view	1AGLMTNPROMet	109 x 35 x 169mm	454g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8kbps, 460.8kbps, 480Mbps, 10 / 100 Mbps, 2 Mbps, 1Mps	-35 to +75	ext	5.2	E	2048MB memory
	Sigma G2T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1270g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 2 Mbps, 1 Mps	-35 to +75	ext / int	3.3	E	2048MB memory UHF / FH radio GSM / GPRS / EDGE modem
	Sigma G3T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B GLONASS CA / P1 / P2 / L2C / L3 SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1 / E5B	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1277g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 2 Mbps, 1 Mps	-35 to +75	ext / int	4.2	E	2048MB memory UHF / FH radio GSM / GPRS / EDGE modem
	Sigma G3TAJ	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B GLONASS CA / P1 / P2 / L2C / L3 SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1 / E5B	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1270g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8kbps, 460.8kbps, 480Mbps, 10 / 100 Mbps, 2 Mbps, 1Mps	-35 to +75	ext / int	5	E	2048MB memory UHF / FH radio GSM / GPRS / EDGE modem In Band Interference Rejection
	Sigma D - G2	216	2x GPS CA 2x Galileo E1 2x SBAS L1 2x QZSS CA / SAIF / L1C 2x BeiDou E1	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1290g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 2 Mbps, 1 Mps	-35 to +75	ext / int	3	E	2048MB memory UHF / FH radio GSM / GPRS / EDGE modem
	Sigma D - G2D	216	2x GPS CA / P1 / P2 / L2C 2x Galileo E1 2x SBAS L1 2x QZSS CA / SAIF / L2C / L1C 2x BeiDou E1	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1290g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 460.8 kbps, 480 Mbps, 10 / 100 Mbps, 2 Mbps, 1 Mps	-35 to +75	ext / int	3	E	2048MB memory UHF / FH radio GSM / GPRS / EDGE modem
	Sigma D - G3D	216	2x GPS CA / P1 / P2 / L2C 2x Galileo E1 2x Glonass CA / P1 / P2 / L2C 2x SBAS L1 2x QZSS CA / SAIF / L2C / L1C 2x BeiDou E1	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1290g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	2 Mbps	-35 to +75	ext / int	4.7	E	2048MB memory UHF / FH radio GSM / GPRS / EDGE modem
	Sigma Q - G3D	216	4x GPS CA / P1 / P2 / L2C 4x Galileo E1 1x Glonass CA / P1 / P2 / L2C 4x SBAS L1 4x QZSS CA / SAIF / L2C / L1C 4x BeiDou E1	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1330g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG / Ext. Freq In / Out	460.8 kbps, 12 Mbps 1 Mps	-35 to +75	ext / int	6	E	2048MB memory UHF / FH radio GSM / GPRS / EDGE modem
	GISmore	216	GPS CA Galileo E1 GLONASS CA SBAS L1 QZSS CA / SAIF / L1C BeiDou E1	all in view	1GORPV	79 x 36 x 131mm	303g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	1	Bluetooth	460.8 kbps, 460.8 kbps 12 Mbps 1 Mps	-35 to +75	ext / int	1.4	I	GSM / GPRS modem
	TR - G2	216	GPS CA Galileo E1 SBAS L1 QZSS CA / SAIF / L1C BeiDou E1	all in view	2AGLMTNPROMet	55 x 40 x 13mm	21g	<2m / <0.5m / 1.5cm + 2 ppm / 0.5cm + 1.5 ppm	3	100Hz	<35s	<5s	<1s	211111	RS232; USB; CAN; 1PPS; Event Marker; IRIG	460.8 kbps, 460.8 kbps 12 Mbps 1 Mps	-35 to +75	ext	1.2	E	256MB memory
	TR - G3	216	GPS CA Galileo E1 GLONASS CA SBAS L1 QZSS CA / SAIF / L1C BeiDou E1	all in view	2AGLMTNPROMet	57 x 66 x 12mm	34g	<2m / <0.5m / 1.5cm + 2 ppm / 0.5cm + 1.5 ppm	3	100Hz	<35s	<5s	<1s	211111	RS232; RS422; USB; CAN; 1PPS; Event Marker; IRIG	460.8 kbps, 460.8 kbps 12 Mbps 1 Mps	-35 to +75	ext	1.4	E	256MB memory
	TR - G2T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1	all in view	2AGLMTNPROMet	57 x 66 x 12mm	34g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz	<35s	<5s	<1s	211111	RS232; RS422; USB; CAN; 1PPS; Event Marker; IRIG	460.8 kbps, 460.8 kbps 480 Mbps 1 Mps 10 / 100 Mbps	-35 to +75	ext	1.5	E	256MB memory

RECEIVER SURVEY 2016

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Manufacturer	Model	Channels/ tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real -time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	TR - G3T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A GLONASS CA / P1 / P2 / L2C SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1	all in view	2AGLMTNPROMet	57 x 88 x 12mm	47g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz		<35s	<5s	<1s	211111	RS232; RS422; USB; CAN; 1PPS; Event Marker; IRIG	460.8 kbps, 460.8 kbps 480 Mbps 1 Mps 10 / 100 Mbps	-35 to +75	ext	2.2	E	256MB memory
	TRE - G2T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1	all in view	2AGLMTNPROMet	100 x 80 x 14mm	70g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz		<35s	<5s	<1s	22122211	RS232; RS232 / RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet; Ext. Freq In / Out	460.8 kbps, 460.8 kbps 480 Mbps 1 Mps 10 / 100 Mbps	-35 to +75	ext	2.5	E	2048MB memory
	TRE - G3T	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B GLONASS CA / P1 / P2 / L2C / L3 SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1 / E5B	all in view	2AGLMTNPROMet	100 x 80 x 14mm	77g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz		<35s	<5s	<1s	221222111	RS232; RS232 / RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet; Ext.Reference; Frequency input	460.8 kbps, 460.8 kbps 480 Mbps 1 Mps 10 / 100 Mbps	-35 to +75	ext	3.4	E	2048MB memory
	TRE - G3TAJ	216	GPS CA / P1 / P2 / L2C / L5 Galileo E1 / E5A / E5B GLONASS CA / P1 / P2 / L2C / L3 SBAS L1 / L5 QZSS CA / SAIF / L2C / L5 / L1C BeiDou E1 / E5B	all in view	2AGLMTNPROMet	100 x 80 x 14mm	77g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz		<35s	<5s	<1s	221222111	RS232; RS232 / RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet; Ext. Freq In / Out	460.8 kbps, 460.8 kbps 480 Mbps 1 Mps 10 / 100 Mbps	-35 to +75	ext	4.2	E	2048MB memory; In Band Interference Rejection
	Duo - G2	216	2x GPS CA 2x Galileo E1 2x SBAS L1 2x QZSS CA / SAIF / L1C 2x BeiDou E1	all in view	2AGLMTNPROMet	100 x 80 x 14mm	90g	<2m / <0.5m / 1.5cm + 2 ppm / 0.5cm + 1.5 ppm	3	100Hz		<35s	<5s	<1s	22122211	RS232; RS232 / RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet	460.8 kbps, 460.8 kbps 480 Mbps 1 Mps 10 / 100 Mbps	-35 to +75	ext	2.2	E	2048MB memory
	Duo - G2D	216	2x GPS CA / P1 / P2 / L2C 2x Galileo E1 2x SBAS L1 2x QZSS CA / SAIF / L2C / L1C 2x BeiDou E1	all in view	2AGLMTNPROMet	100 x 80 x 14mm	90g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz		<35s	<5s	<1s	22122211	RS232; RS232 / RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet	460.8 kbps, 460.8 kbps 480 Mbps 1 Mps 10 / 100 Mbps	-35 to +75	ext	2.2	E	2048MB memory
	Duo - G3D	216	2x GPS CA / P1 / P2 / L2C 2x Galileo E1 2x Glonass CA / P1 / P2 / L2C 2x SBAS L1 2x QZSS CA / SAIF / L2C / L1C 2x BeiDou E1	all in view	2AGLMTNPROMet	100 x 80 x 14mm	90g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz		<35s	<5s	<1s	22122211	RS232; RS232 / RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet	Up to 115.2 k	-40 to +85	ext	3.9	E	2048MB memory
	Quattro - G3D	216	4x GPS CA / P1 / P2 / L2C 4x Galileo E1 1x Glonass CA / P1 / P2 / L2C 4x SBAS L1 4x QZSS CA / SAIF / L2C / L1C 4x BeiDou E1	all in view	2AGLMTNPROMet	100 x 120 x 14mm	130g	<2m / <0.5m / 1cm + 1 ppm / 0.3cm + 0.1 ppm	3	100Hz		<35s	<5s	<1s	221222111	RS232; RS232 / RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet; Ext. Freq In / Out	2, 400-115, 200	-40 to +65	ext	5.2	E	2048MB memory
John Deere www.JohnDeere.com	StarFire 3000	66 par.	L1, L2, G1, & G2 full wavelength carrier phase tracking C/A, P1, P2, G1 & G2 code tracking	66 GNSS 1 StarFire	WP, LNOPR1, Precision Ag, Construction	22.3 x 16.5 x 22.3	1.6kg	SF1: 1m 95%, SF2: 7cm 95%, RTK (<40km) 2cm + 0.5ppm 95% 1 - D	na	1Hz , 5Hz, 10Hz (user programmable)		na	na	na		3 x RS232 1 x Can Bus, simulated ground - speed radar	2, 400-115, 200	-40 to +70	9 to 26V DC	8W	Internal dipole, Ext	6-axis terrain compensation, RTK-Extend operating mode, compatible w/space based differential corrections network (StarFire)
Leica Geosystems AG www.leica-geosystems.com	iCON gps 60	120	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, BeiDou B1, B2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	197 x 197 x H 130mm	1.45kg	2 - 3m / 25cm / 8mm + 1ppm / 3mm + 0.1ppm	< 20	20Hz		<80s	<80s	0.5s	6	1 combined RS - 232 / PWR in / PWR out, 1 UART &USB, 1 TNC, 1 QN, 1 USB Host 1 UART&USB 1 Bluetooth	2, 400-115, 200	-40 to +65	ext / int	6.0	Internal or external (e.g. CGA60)	Triple frequency RTK GNSS receiver; build in Display, Keyboard; external antenna support for use on construction machine
	iCON gps 80	120	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, BeiDou B1, B2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNRV1	180 x 153 x 85 mm	2.25kg	2 - 3m / 25cm / 8mm + 1ppm / 3mm + 0.1ppm	< 20	20Hz		<80s	<80s	0.5s	8	2 CAN combined Data / PWIR in 1 combined RS - 232 / PWR in / t, 1 combined RS - 232 / PWR out 1 Ethernet, 4 TNC, 1 USB Host 1 UART&USB 1 Bluetooth 1 PPS	2, 400-115, 200	-40 to +65	ext	8.0	External (e.g. CGA60)	Triple Frequency Dual Position / Heading GNSS RTK Receiver for Machine Control. High speed 4G modem, display, keyboard.
	Viva GS08plus	120	GPS: L1, L2, L2C, GLONASS: L1, L2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	D 186mm x H 71mm	0.7kg	2 - 3m / 25cm / 10mm + 1ppm / 3mm + 0.5ppm	< 20	5Hz		50s	35s	0.5s	2	Combined (RS - 232, Power, USB) , 1 Bluetooth	2, 400-115, 200	-40 to +65	ext / int	2.0	Internal	Dual frequency geodetic and RTK GNSS receiver
	Viva GS12	120	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	D 186mm x H 89mm	0.95kg	2 - 3m / 25cm / 8mm + 1ppm / 3mm + 0.1ppm	< 20	20Hz		50s	35s	0.5s	2	Combined (RS - 232, Power, USB) , 1 Bluetooth	2, 400-115, 200	-40 to +65	ext / int	1.8	Internal	Triple frequency geodetic and RTK GNSS receiver
	Viva GS10	120, upgradable >500	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, BeiDou B1, B2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	166 x 79 x 212mm	1.20kg	2 - 3m / 25cm / 8mm + 1ppm / 3mm + 0.1ppm	< 20	20Hz		50s	35s	0.5s	4	2 RS - 232, 1 Combined (RS - 232, USB) , 1 Power, 1 TNC, 1 Bluetooth	2, 400-115, 200	-40 to +65	ext / int	3.2	AR10 / AS10 triple frequency or AR25 / AR20 choke ring	Triple frequency geodetic and RTK GNSS receiver
	Viva GS14	120, upgradable >500	GPS: L1, L2, L2C, GLONASS: L1, L2, Galileo: E1, E5b, BeiDou B1, B2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	D 190mm x H 119mm	0.93kg	2 - 3m / 25cm / 8mm + 1ppm / 3mm + 0.1ppm	< 20	20Hz		50s	35s	0.5s	2	1 RS - 232, 1 combined (RS - 232, Power, USB) , 1 Bluetooth	2, 400-115, 200	-40 to +65	ext / int	2.0	Internal	Triple frequency geodetic and RTK GNSS receiver
	Viva GS15	120, upgradable >500	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, BeiDou B1, B2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	D 198mm x H 196mm	1.34kg	2 - 3m / 25cm / 8mm + 1ppm / 3mm + 0.1ppm	< 20	20Hz		50s	35s	0.5s	4	1 RS - 232, 1 combined (RS - 232, Power, USB) , 1 UART &USB, 1 Bluetooth	2, 400-115, 200	-40 to +65	ext / int	3.2	Internal	Triple frequency geodetic and RTK GNSS receiver
	Viva GS25	120, upgradable >500	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, BeiDou B1, B2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	200 x 94 x 220mm	1.84kg	2 - 3m / 25cm / 8mm + 1ppm / 3mm + 0.1ppm	< 20	20Hz		50s	35s	0.5s	9	2 RS - 232, 1 Combined (RS - 232, Power, USB) , 1 UART&USB, 1 USB A, 1 Mini USB, 1 PPS, 1 Event, 1 Power, 1 TNC, 1 Bluetooth	2, 400-115, 200	-40 to +65	ext / int	3.4	AR10 / AS10 triple frequency or AR25 / AR20 choke ring	Triple frequency geodetic and RTK GNSS receiver
	Zeno 5	48	GPS: L1, SBAS	48	AGHLMNR1	158 x 78 x 38mm	0.375kg	2 - 5m / - / - / < 2.0 m	< 20	1Hz		<120s *	<35s*	<10s	2	1 Bluetooth, 1 USB (SnapOn module)			ext / int	1.3	Internal	Single Frequency Handheld GPS receiver
	Zeno 20	120	GPS: L1, L2, L2C, GLONASS: L1, L2, Galileo E1, BeiDou B1, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGHLMNR1	269 x 99 x 55mm	0.88kg	2 - 5m / 50cm / 5cm / 10mm + 2ppm	< 20	5Hz		50s	35s	0.5s	4	1 Bluetooth, Wireless LAN, Combined (MicroUSB client, Power) , USB A Host	2, 400-115, 200	-30 to +60	ext / int	1.6	Internal / External	Dual Frequency Handheld GNSS receiver
	Zeno GG03	120	GPS: L1, L2, L2C, GLONASS: L1, L2, Galileo E1, BeiDou B1, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	D 186mm x H 71mm	0.7kg	2 - 5m / 40cm / 10mm + 2ppm / 10mm + 2ppm	< 20	5Hz		50s	35s	0.5s	2	Combined (RS - 232, Power, USB) , 1 Bluetooth	100 Kbps ARINC	-55 to +80	ext / int	2.0	Internal	Dual frequency geodetic and RTK GNSS receiver
	Zeno CS25 GNSS	120	GPS: L1, L2, L2C, GLONASS: L1, L2, Galileo E1, BeiDou B1, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGHLMNR1	144 x 242 x 40mm	1.4kg	2 - 5m / 50cm / 10cm / 10mm + 2ppm	< 20	5Hz		50s	35s	0.5s	5	2 USB, 1 RS - 232, LAN, Power, 1 Bluetooth	RS232: 9.6kbps - 115kbps; USB: up to 12Mbps; Ethernet: up to 100Mbps; Bluetooth: up to 230.4kbps	-40 to +85	ext / int	7 - 10	Internal / External	Dual frequency geodetic and RTK GNSS receiver
	GR10	120, upgradable >500	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, BeiDou, QZSS, SBAS; up to 7 signals per satellite	Flexible configuration: 120 L1, 60 L1 / L2; upgradable to ≥240 L1 / L2	AGLMetORT1	190 x 78 x 210mm	1.50kg	2 - 3m / 25cm / 8mm + 1ppm / 3mm + 0.1ppm	< 20	20Hz		50s	35s	0.5s	5	1 (2 port) power, 1 RS - 232, UART, USB, TNC, Ethernet, ext oscillator	4800 - 115'200	-40 to +65	ext	3.1 to 3.5	AR10 / AS10 triple frequency or AR25 / AR20 choke ring	Permanent triple frequency GNSS receiver w / Ethernet.
	GR25 BT	120, upgradable >500	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, BeiDou, QZSS, SBAS; up to 7 signals per satellite	Flexible configuration: 120 L1, 60 L1 / L2; upgradable to ≥240 L1 / L2	AGLMetORT1	190 x 78 x 210mm	1.84kg	2 - 3m / 25cm / 8mm + 1ppm / 3mm + 0.1ppm	< 20	20Hz		50s	35s	0.5s	8	1 (2 port) power, 2 RS - 232, 1 UART, 2 USB (client / host) , 1 Ethernet with POE, 1 Bluetooth (plus TNC, PPS, Event, Oscillator)	2, 400-230, 400	-40 to +65	ext / int / poe	3.1 to 3.3	AR10 / AS10 or AR25 / AR20 choke ring triple frequency	Reference station and scientific triple frequency GNSS receiver w / Ethernet
	GR25 WLAN	120, upgradable >500	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, BeiDou, QZSS, SBAS; up to 7 signals per satellite	Flexible configuration: 120 L1, 60 L1 / L2; upgradable to ≥240 L1 / L2	AGLMetORT1	190 x 78 x 210mm	1.84kg	2 - 3m / 25cm / 8mm + 1ppm / 3mm + 0.1ppm	< 20	20Hz		50s	35s	0.5s	8	1 (2 port) power, 2 RS - 232, 1 UART, 2 USB (client / host) , 1 Ethernet with POE, 1 WLAN (plus TNC, PPS, Event, Oscillator)	2, 400-230, 400	-40 to +65	ext / int / poe	3.1 to 3.3	AR10 / AS10 or AR25 / AR20 choke ring triple frequency	Reference station and scientific triple frequency GNSS receiver w / Ethernet & WLAN
	GMX901plus	120	GPS: L1, SBAS Optional: GPS L2, L2C, GLONASS: L1, L2,	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	D 186mm x H 71mm	0.7kg	2 - 3m / 25cm / 10mm + 1ppm / 3mm + 0.5ppm	< 20	5Hz		50s	35s	0.5s	1	Combined (RS - 232, Power)	2, 400-115, 200	-40 to +65	ext / int	1.7	Internal	Single or Dual frequency geodetic and RTK GNSS SmartAntenna for structural monitoring
	GMX902 GNSS	120	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, BeiDou, QZSS, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	MetOP1	167 x 123 x 40mm	0.8kg	na / na / na / na	< 20	20Hz		50s	35s	0.5s	2	2 RS - 232, 2 Power, 1 TNC, 1 PPS output	2, 400-115, 200	-40 to +65	ext	1.7	AR10 / AS10 triple frequency or AR25 / AR20 choke ring	Triple frequency GNSS receiver for structural monitoring
	GM10	120, upgradable >500	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt - BOC, BeiDou, QZSS, SBAS; up to 7 signals per satellite	Flexible configuration: 120 L1, 60 L1 / L2; upgradable to ≥240 L1 / L2	AGLMetORT1	190 x 78 x 210mm	1.50kg	5m / 25cm / 10mm + 1ppm / 5mm + 0.5ppm	< 20	20Hz		50s	35s	0.5s	5	1 (2 port) power, 1 RS - 232, UART, USB, TNC, Ethernet, ext osc	2, 400-115, 200	-40 to +65	ext	3.1 to 3.5	AR10 / AS10 triple frequency or AR25 / AR20 choke ring	Permanent triple frequency GNSS receiver w / Ethernet for monitoring
Microwave Photonic Systems www.b2bphotonics.com	OFW 3478 / GPS - RF Fiber Optic Antenna for GPS	ALL Satellites in View	GLONASS, Galileo, GPS L1C / A, L2, L5 GPS	ALL Satellites in View	Ship, Aircraft, & Land Based	12 x 10 x 6in	12lb	~10m / LAAS: <0.5m	<<50ns	10Hz PVT, 1Hz ARINC		<<75s	<20s	<1s	1	8 I / P, 3 O / P ARINC H / L, 1 RS - 232	RS232: 9.6kbps - 115kbps; USB: up to 12Mbps; Ethernet: up to 100Mbps; Bluetooth: up to 230.4kbps	-40 to +70	ext	14W	Active, RTCA DO - 228 Change 1 compliant	ARINC - 743 Compliant sensor
NavCom Technology, Inc. www.navcomtech.com	Sapphire	66 par.	L1, L2, L5, G1 & G2	66 GNSS + 1 StarFire	DAGLMNPRTV2	4.73 x 3.94 x 0.43in	4oz	2m / 45cm + ppm / 1cm + 0.5ppm / 0.5cm + 0.5ppm)	+ / - 13ns (1PPS)	1Hz - 100Hz (user programmable)		<60s	<50s	<20s	5	4 x RS232	RS232: 9.6kbps - 115kbps;	-40 to +85	ext	4W typical	Crossed dipole (ER)	Latest generation of John Deere technology
	SF - 3050	66 par.	L1, L2, L5, G1 & G2	66 GNSS + 1 StarFire	DAGLMNPRTV1	6.47 x 4.60 x 2.37in	1.1lb	as above	+ / - 13ns (1PPS)	1Hz - 100Hz (user programmable)		<60s	<50s	<20s	5	2 x RS232 (1 configurable to RS422) ; 1 x USB 2.0 (host or device) ; 1 x Ethernet (10T / 100T) ; 1 x Bluetooth	RS232: 9.6kbps - 115kbps; USB: up to 12Mbps; Ethernet: up to 100Mbps; Bluetooth: up to 230.4kbps	-40 to +71	ext	<6W	Crossed dipole (ER)	Integrated StarFire / RTK Extend multi - frequency receivers
	SF - 3040	66 par.	L1, L2, L5, G1 & G2	66 GNSS + 1 StarFire	DAGLMNPRTV1	8 x 4.36in	3.2lb	as above	na	1Hz - 10Hz (user programmable)		<60s	<50s	<20s	5	2 x RS232 (1 configurable to RS422) ; 1 x USB 2.0 (device) ; 1 x Bluetooth	RS232: 4.8kbps - 115kbps; USB: up to 12Mbps; Bluetooth: up to 230.4kbps	-10 to +60	hot swappable batteries	<6W	Crossed dipole (ER)	Integrated StarFire / RTK Extend multi - frequency receivers
Nottingham Scientific Ltd www.nsl.eu.com	Stereo	Arch. dependent, configurable	Dual frequency: L1 / E1 / B1 / L1OC or L1OF plus L5 / E5A / B2 or E5B / L3OC or E6 / B3 or L2C / L2OC or L2OF or QZSS LEX	Arch. Dependent	HNVCMD2	12.5 x 8 x 3cm	0.15kg	~10m / na / na	~50ns	configurable, 50Hz max		<40s	<35s	<2s	Arch. dependent	IP, USB	Fully configurable		ext	Arch. dependent	E	Dual frequency GNSS front end covering all signals and frequencies to be used with software defined radio GNSS receiver (eg GNSS - SDR and GNSS - SDRLIB) . interference detection and profiling receiver. for threat analysis, impact analysis and injection into live or simulated signals.
	Detector	Arch. dependent, configurable	L1 / E1 / B1 / L1OC as standard. Configurable to E1 PRS, L5 / E5A / B2, E5B / L3OC E6 / B3, E6 PRS, L2C / L2OC, L2OF, QZSS LEX	16	DGMPT2	22 x 12 x 8cm	1kg	na	na	na		<40s	<35s	<2s	Arch. dependent	IP, USB, 3G	Fully configurable		ext	Arch. dependent	E	
NovAtel www.novatel.com	OEMStar	14	GPS: L1 GLONASS: L1 SBAS	14 channels configurable between GPS, GLONASS & SBAS	ADGLMMetNOPRTV2	46 x 71 x 13mm	18g	1.5m / 0.5m DGPS / 0.7m SBAS	20	10Hz max		65s	35s	<1.0s	3	2 x LV - TTL; 1 x USB2.0	300 to 921, 600 bps; 300 to 230, 400 bps; 12 Mbps	-40 to +85	3.15 to 5.25 VDC	0.36W GPS 0.45W GLONASS	Active (E)	RoHS - compliant; GL1DE and PDP software features available
	OEM615	120	GPS: L1, L2, L2C, GLONASS: L1, L2 Galileo: E1 BeiDou, B1 SBAS, QZSS	Flexible configuration: 120 L1, 60 L1 / L2	ADGHLMMetNOPRTV2	46 x 71 x 11mm	24g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	50Hz max GNSS only, 200Hz max GNSS + INS		50s	35s	0.5s	6	3 x LV - TTL, 2 x CAN 1 x USB2.0 1 x PPS 2 x Event In	300 to 921, 600 bps; 1 Mbps; 12 Mbps	-40 to +85	3.3 V DC	1W (typical)	Active (E)	RoHS - compliant; RT - 2, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM617	120	GPS: L1, L2, L2C, GLONASS: L1, L2 Galileo: E1, E5b BeiDou, B1, B2 SBAS, QZSS	Flexible configuration: 120 L1, 60 L1 / L2	ADGHLMMetNOPRTV2	46 x 71 x 11mm	24g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	50Hz max GNSS only, 200Hz max GNSS + INS		50s	35s	0.5s	6	3 x LV - TTL, 2 x CAN 1 x USB2.0 1 x PPS 2 x Event In	300 to 921, 600 bps; 1 Mbps; 12 Mbps	-40 to +85	3.3 V DC	1W (typical)	Active (E)	RoHS - compliant; RT - 2, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM617D	120	GPS: L1, L2, L2C, GLONASS: L1, L2 Galileo: E1, E5b BeiDou, B1, B2 SBAS, QZSS	Flexible configuration: 120 L1, 60 L1 / L2	ADGLMMetNOPRTV2	46 x 71 x 11mm	24g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	50Hz max GNSS only, 200Hz max GNSS + INS		50s	35s	0.5s	6	3 x LV - TTL, 2 x CAN 1 x USB2.0 1 x PPS 2 x Event In	300 to 921, 600 bps; 1 Mbps; 12 Mbps	-40 to +85	3.3 V DC	1W (typical)	Active (E)	Dual Antenna Heading / ALIGN RoHS - compliant; RT - 2, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM628	120	GPS: L1, L2, L2C, L5 GLONASS: L1, L2 Galileo: E1, E5a, E5b AltBOC BeiDou, B1, B2 SBAS, QZSS L - band	Flexible configuration: 120 L1, 60 L1 / L2	ADGLMMetNOPRTV2	60 x 100 x 9.1mm	37g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS + INS		50s	35s	0.5s	7	1 x RS - 232 or RS - 422, 2 x LV - TTL 2 x CAN 1 x USB2.0 1 x Ethernet 1 x PPS 2 x Event In	300 to 921, 600 bps; 300 to 921, 600 bps; 300 to 230, 400 bps; 12 Mbps; 5 Mbps	-40 to +85	3.3 V DC	1.3W (typical)	Active (E)	RoHS - compliant; RT - 2, L - Band, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM628E	120	GPS: L1, L2, L2C GLONASS: L1, L2 Galileo: E1, E5b BeiDou, B1, B2, B3 SBAS, QZSS L - band	Flexible configuration: 120 L1, 60 L1 / L2	ADGLMMetNOPRTV2	60 x 100 x 9.1mm	37g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS + INS		50s	35s	0.5s	7	1 x RS - 232 or RS - 422, 2 x LV - TTL 2 x CAN 1 x USB2.0 1 x Ethernet 1 x PPS 2 x Event In	300 to 921, 600 bps; 300 to 921, 600 bps; 300 to 230, 400 bps; 12 Mbps; 5 Mbps	-40 to +85	3.3 V DC	1.3W (typical)	Active (E)	RoHS - compliant; RT - 2, L - Band, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM638	240	GPS: L1, L2, L2C, L5 GLONASS: L1, L2 Galileo: E1, E5a, E5b AltBOC BeiDou B1, B2 SBAS, QZSS L - band	Flexible configuration: 240 L1, 120 L1 / L2	ADGLMMetNOPRTV2	85 x 125 x 14.3mm	37g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS + INS		50s	35s	0.5s	12	2 x RS - 232 or RS - 422, 3 x LV - TTL, 2 x CAN 2 x USB2.0 1 x Ethernet, 1 x IMU 1 x PPS 4 x Event In, 7 x Event Out	300 to 921, 600 bps; 300 to 921, 600 bps; 300 to 230, 400 bps; 1 Mbps; 12 Mbps; 5 Mbps	-40 to +85	3.3 V DC or 4.5 - 36VCD	2.8W (typical)	Active (E)	RoHS - compliant; RT - 2, L - Band, GL1DE, PDP, RAIM, ALIGN and SPAN software features available

RECEIVER SURVEY 2016

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Manufacturer	Model	Channels/ tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real -time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	OEM625S	144	GPS SPS: L1 (C / A) , L2 (semi - codeless) , L2C GLONASS: L1, L2 SBAS GPS PPS: L1 (Y) , L2 (Y)	Flexible configuration: 60 L1 / L2 SPS, 24 L2 / L2 PPS	ADGLMMetNOPRTV2	60 x 100 x 15.1mm	56g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	20Hz max		50s	35s	0.5s	5	2 x RS - 232, 2 x LV - TTL, 1 x USB2.0, 1 x key fill	300 to 921, 600 bps, 12 Mbps	-40 to +85	3.3 V DC	2.2W (typical)	Active (E)	RT - 2, RAIM, and ALIGN software features available
	ProPak6	240	GPS: L1, L2, L2C, L5 GLONASS: L1, L2, L2C Galileo: E1, E5a, E5b AltBOC BeiDou B1, B2 SBAS, QZSS L - band	Flexible configuration: 240 L1, 120 L1 / L2	ADGLMMetNOPRTV12	190 x 185 x 75 mm	1.79kg	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS + INS		50s	35s	0.5s	7	3 x RS - 232 / RS - 422 1 x IMU, 1 x USB 2.0 host, 1x USB 2.0 device (high speed only) , 1 x Ethernet, 1x CAN Bus 2, 4 x Event input, 4 x Event output, 1 x Bluetooth, 1x Wi - Fi, 1 x Radio GPRS / HSPA (optional)	300 to 921, 600 bps; 300 to 921, 600 bps; 300 to 230, 400 bps; 1 Mbps; 12 Mbps; 5 Mbps	-40 to +75 (typical)	+ 9 to + 36 VDC	3.5W (typical)	Active (E)	RoHS - compliant; RT - 2, L - Band, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	FlexPak6	120	GPS: L1, L2, L2C, L5 GLONASS: L1, L2, L2C Galileo: E1, E5a, E5b AltBOC BeiDou B1, B2 SBAS L - band	Flexible configuration: 120 L1, 60 L1 / L2	ADGLMMetNOPRTV12	45 x 147 x 113mm	337g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS + INS		50s	35s	0.5s	5	1 x RS - 232, 1 x RS - 232 or RS - 422, 1 x USB2.0, 1 x CAN, 1 x Ethernet	300 to 921, 600 bps; 300 to 230, 400 bps; 300 to 230, 400 bps; 5 Mbps, 10 / 100 Mbps	-40 to +75	6 to 36 V DC	1.8W (typical)	Active (E)	RoHS - compliant; RT - 2, L - Band, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	FlexPak6D	120	GPS: L1, L2, L2C, GLONASS: L1, L2 Galileo: E1, E5b BeiDou, B1, B2 SBAS, QZSS	Flexible configuration: 120 L1, 60 L1 / L2	ADGLMMetNOPRTV12	147 x 113 x 45 mm	337g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	50Hz max GNSS only, 200Hz max GNSS + INS		50s	35s	0.5s	4	1 x RS - 232, 1 x RS - 232 or RS - 422, 1 USB port	300 to 921, 600 bps; 1 Mbps; 12 Mbps	-40 to +85	+ 6 to + 36 VDC	1.9 W (typical)	Active (E)	Dual Antenna Heading / ALIGN RoHS - compliant; RT - 2, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	FlexPak - S	120	GPS SPS: L1 (C / A) , L2 (semi - codeless), L2C GLONASS: L1, L2 SBAS GPS PPS: L1 (Y) , L2 (Y)	Flexible configuration: 60 L1 / L2 SPS, 24 L2 / L2 PPS	ADGLMMetNOPRTV12	147 × 113 × 45 mm	<400g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	20Hz max		50s	35s	0.5s	4	RS - 232 up to 921, 600 bps, 1 RS - 232 or RS - 422 up to 921, 600 bps, I / O Port (PPS, Event1, PV, VARF) , DS - 101 for key loading	300 to 921, 600 bps, 12 Mbps	-40 to +65	+ 9 to 36 VDC	3.8W (typical)	Active (E)	RT - 2, RAIM, and ALIGN software features available
	FlexPak - G2 - Star	14	GPS: L1 GLONASS: L1 SBAS	14 channels configurable between GPS, GLONASS & SBAS	ADGLMMetNOPRTV12	45 x 147 x 113mm	313g	1.5m / 0.5m DGPS / 0.7m SBAS	20	10Hz max		65s	35s	<1.0s	3	1 x RS - 232; 1 x RS - 232 or RS - 422, 1 x USB1.1	300 to 921, 600 bps; 300 to 230, 400 bps; 300 to 230, 400 bps; 5 Mbps	-40 to +75	6 to 18 V DC	0.6W (typical)	Active (E)	RoHS - compliant; GL1DE and PDP software features available
	GPStation - 6	120	GPS: L1, L2, L2C, L5 GLONASS: L1, L2 Galileo: E1, E5a, E5b AltBOC BeiDou SBAS QZSS	40 L1 / L2 / L5	ALMetOT12	235 x 154 x 71mm	1.4kg	1.2m	20	50Hz max		60s	35s	0.5s	4	3 x RS - 232 or RS - 422, 1 x USB2.0	300 to 230, 400 bps; 1 Mbps;	-40 to +70	4.5 to 18 V DC	6W (typical)	Active (E)	Multi - frequency multi - constellation GNSS Ionospheric Scintillation and TEC Monitor (GISTM) receiver. Provides 50Hz phase and amplitude scintillation measurements (S4, σϕ) , TEC and TEC phase.
	AG - STAR	14	GPS: L1 GLONASS: L1 SBAS	14 channels configurable between GPS, GLONASS & SBAS	DGLMMetNOPRTV12	155 (D) x 68mm (H)	490g	1.5m SP / 0.5m DGPS / 0.7m SBAS (All values in Horiz. RMS)	20	10Hz max		85s	55s	<1.0s	2	2 x RS - 232; 1 x CAN NMEA2000; 1 x Bluetooth (optional)	300 to 230, 400 bps	-40 to +75	8 to 36 V DC	2.5W (typical)	Patch	RoHS - compliant; GL1DE software feature available
	SMART6 - L	120	GPS: L1, L2, L2C GLONASS: L1, L2 Galileo: E1 Beidou: B1 SBAS L - band	Flexible configuration: 120 L1, 60 L1 / L2	DGLMMetNOPRTV12	155mm (D) x 81mm (H)	550g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	50Hz max		50s	35s	<1.0s	3	3 x RS - 232; 1 x CAN NMEA2000; 1 x Emulated Radar	300 to 921, 600 bps	-40 to +75	8 to 36 VDC	2.9W (typical)	Pinwheel	RoHS - compliant; RT - 2, GLIDE, Dual Frequency GLIDE, PDP, and ALIGN software features available
	SMART6	120	GPS: L1, L2, L2C GLONASS: L1, L2 Galileo: E1 Beidou: B1 SBAS	Flexible configuration: 120 L1, 60 L1 / L2	DGLMMetNOPRTV12	155 (D) x 81mm (H)	520g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	20Hz max		50s	35s	<1.0s	3	3 x RS - 232; 1 x CAN NMEA2000; 1 x Emulated Radar; 1 x Bluetooth Serial Port (optional)	300 to 921, 600 bps;	-40 to +70	8 to 36 VDC	3.5W (typical)	Pinwheel	RoHS - compliant; Tilt Sensor and Bluetooth options, RT - 2, GLIDE, Dual Frequency GLIDE, PDP, and ALIGN software features available
	SPAN - IGM - A1	120	GPS: L1, L2, L2C GLONASS: L1, L2 SBAS	Flexible configuration: 120 L1, 60 L1 / L2	ADGLMMetNOPRTV12	152 x 142 x 51mm	515g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	20Hz max GNSS only, 200Hz max GNSS + INS		50s	35s	0.5s	4	1 x RS - 232, 1 x RS - 232 or RS - 422, 1 x USB2.0, 1 x CAN	2400 to 921, 600 bps; 12 Mbps; 1 Mbps	-40ºC to +65	10 to 30 VDC	4W (typical)	Active (E)	RoHS - compliant; RT - 2 software features available
	SPAN - IGM - S1	120	GPS: L1, L2, L2C GLONASS: L1, L2 SBAS	Flexible configuration: 120 L1, 60 L1 / L2	ADGLMMetNOPRTV12	152 x 142 x 51mm	540g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	20Hz max GNSS only, 125Hz max GNSS + INS		50s	35s	0.5s	4	1 x RS - 232, 1 x RS - 232 or RS - 422, 1 x USB2.0, 1 x CAN	2400 to 921, 600 bps; 12 Mbps; 1 Mbps	-40ºC to +65	10 to 30 VDC	6W (typical)	Active (E)	RoHS - compliant; RT - 2 software features available
	SPAN - CPT (OEM6)	120	GPS: L1, L2, L2C GLONASS: L1, L2 BeiDou: B1, B2 SBAS L - band	Flexible configuration: 120 L1, 60 L1 / L2	ADGLMMetNOPRTV12	152 x 168 x 89mm	2.28kg	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m + 1ppm RT - 2 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	20Hz max GNSS only, 100Hz max GNSS + INS		50s	35s	0.5s	4	2 x RS - 232 UART COM Port; 1 x CAN; 1 x USB2.0	2400 to 921, 600 bps; 12 Mbps; 1 Mbps	-40ºC to +65	9 to 18 VDC	16W (max)	Active (E)	RoHS - compliant; RT - 2, and PPP - D software features available
NVS Technologies AG www.nvs-gnss.com	NV08C - CSM	32 par., All - in - view	GPS L1 C / A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou (BeiDou) L1	32	ACGHLMNRTV2	20 x 26 x 2.5mm	5g	RMS: <1.5m / <1m / na	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2	2xUART; 1xSPI; 1xTWI (I2C compatible) ; 1PPS	9600 bps - 115200 bps	-40 to +85	ext.	180mW (GNSS) 120mW (GPS) 24mW (GNSS) 18mW (GPS)	Active	Fleet mgmt, Telematics & anti - theft, in - car & PNDs, asset and personal tracking, surveillance & security / LTE, WiMAX, Wi - Fi & cell. base station timing / A - GNSS,
	NV08C - Mini PCI - E	32 par., All - in - view	GPS L1 C / A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou (BeiDou) L1	32	ACDGHLMNRV2	30 x 50.95 x 4.2mm	7g	RMS: <1.5m / <1m / na	15ns	1, 2, 5, 10Hz		25s	25s	<1s	1 / NMEA (default) or binary protocol	PCI - Express standard bus / virtual COM port device	9600 bps - 115200 bps	-40 to +85	ext.	200mW (GNSS) 140mW (GPS) 0.4mA (Sleep mode)	Active & Passive (auto - switching current detector)	Rugged notebook PCs, tablets & handheld computers. Telematics & marine navigation. Surveillance, security and public safety. GIS, survey, machine control & PrecisionAg
	NV08C - RTK	32 par., All - in - view	GPS L1 C / A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou (BeiDou) L1	32	ACDGHLMNRV2	46 x 71 x 7.30mm	17g	RMS: <1.5m / <1m / 0.01m + 1ppm	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2 / NMEA 0183 v2.3 RTCM v.3.1	2xUART; 1xUSB	4800 bps - 230400 bps	-40 to +85	ext.	300mW (GNSS)	Active	Single-Frequency GNSS RTK Receiver. Applications: UAVs; Ag; Autonomous cars; Robotics; Construction; Surveying; Heading/attitude determ.; Photogrammetry;
	NV08C - RTK - A	2x32 par., All - in - view	GPS L1 C / A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou (BeiDou) L1	32	ACDGHLMNRV2	46 x 71 x 7.30mm	21g	RMS: <1.5m / <1m / 0.01m + 1ppm	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2 / NMEA 0183 v2.3 RTCM v.3.1	2xUART; 1xUSB	4800 bps - 230400 bps	-40 to +85	ext.	480mW (GNSS)	Active	Single - Frequency GNSS RTK + Heading Receiver. Applications: UAVs; Ag; Autonomous cars; Robotics; Construction; Surveying; Heading/attitude
	NV08C - CSM - BRD	32 par., All - in - view	GPS L1 C / A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou (BeiDou) L1	32	ACDGHLMNRV2	35 x 50 x 7.2mm	11g	RMS: <1.5m / <1m / na	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2 / NMEA 0183 v2.3 (IEC61162 - 1) BINR (proprietary binary protocol) RTCM SC 104 (msgs: #1, #9, #31, #34)	2xUART	4800 bps - 230400 bps	-40 to +85	ext.	200mW (GNSS) 150mW (GPS) 0.4mA (Sleep mode)	Active & Passive (auto - switching current detector)	Rugged notebook PCs, tablets & handheld computers. Telematics & marine navigation. Surveillance, security and public safety. GIS, survey, machine control & PrecisionAg
	NV08C - CSM - N24HS	32 par., All - in - view	GPS L1 C / A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou (BeiDou) L1	32	T2		20g	RMS: <1.5m / <1m / na	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2 / NMEA 0183 v2.3 (IEC61162 - 1) BINR (proprietary binary protocol) RTCM SC 104 (msgs: #1, #9, #31, #34)	2xUART	4800 bps - 230400 bps	-40 to +85	ext.	180mW (GNSS) 120mW (GPS) 0.1mA (Sleep mode)	Active	OEM module for precise timing and network synchronization needs. Applications: : WiFi, WiMAX, LTE, GSM, CDMA base station timing
ORCA Technologies, LLC www.orcatechnologies.com	GS - 101	12 parallel channels	GPS L1 C / A code	12	Time, Frequency, Position - Static or Mobile	3.07 x 1.06 x 4.72in	1lb	<9m 90% / 2m CEP 50% / na / na	<100ns	1s		<20min	<1min	<1s	3	2 serial / 1 USB		0 to 50	external	30mW	active	portable GPS Receiver: IRIG time, pulse rates, event capture and position.
	GS - 102	12 parallel channels	GPS L1 C / A code	12	Time, Frequency, Position - Static or Mobile	3.07 x 2.09 x 4.72in	1lb	<9m 90% / 2m CEP 50% / na / na	<100ns	1s		<20min	<1min	<1s	3	2 serial / 1 USB	1, 200-57, 600	0 to +50	external	30mW	active	As above, over serial and USB ports. External supply or intern. recharg. battery.
	GS - 102 - FPC	12 parallel channels	GPS L1 C / A code	12	Time, Frequency, Position - Static or Mobile	9.68 x 10.62 x 4.88in	3lb	<9m 90% / 2m CEP 50% / na / na	<100ns	1s		<20min	<1min	<1s	3	2 serial / 1 USB	1, 200-57, 600	0 to +50	external	30mW	active	As above.
	TTGM - 101	12 parallel channels	GPS L1 C / A code	12	Time and Frequency - Static or Mobile	3.07 x 1.06 x 4.72in	1lb	NA	<1us	NA		<20min	<1min				115, 200	0 to +50	external	30mW	active	portable GPS Receiver and IEEE - 1588 PTPv2 Grandmaster providing IRIG time and pulse rates over serial and USB ports.
	TS - 101	12 parallel channels	GPS L1 C / A code	12	Time and Frequency - Static or Mobile	3.07 x 2.09 x 4.72in	1lb	NA	<1us	NA		<20min	<1min				115, 200	0 to +50	external		active	portable test set to compare external PTPv2 or IRIG time code to 1PPS from integrated Receiver or external time source.
OriginGPS www.origingps.com	Hornet (ORG1415)	48	GPS L1 C / A code	All in View	CHNV2	17 x 17 x 4.8mm	3.5g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35 s	<32 s	1s	2	Uart / SPI	user selectable	-40 to 85	ext	10 - 70mW	Active	GPS / GNSS Receiver Module With Integrated Antenna
	Ultra - Sensitive Hornet (ORG1418)	48	GPS L1 C / A code	All in View	CHNV2	17 x 17 x 4.8mm	4.75g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35 s	<32 s	1 s	2	Uart / SPI	user selectable	-40 to 85	ext	10 - 70mW	Active	GPS / GNSS Receiver Module With Integrated Antenna
	Hornetella (ORG1408)	48	GPS L1 C / A code	All in View	CHNV2	17 x 17 x 2.2mm	1.4g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35 s	<32 s	1s	2	Uart / SPI	user selectable	-40 to 85	ext	10 - 66mW (during tracking)	External passive or active	modules with external antenna
	Micro Hornet (ORG1410)	48	GPS L1 C / A code	All in View	CHNV2	10 x 10 x 5.8mm	2.5g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35 s	<32 s	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	67mW (during tracking)	Active	GPS / GNSS Receiver Module With Integrated Antenna
	Multi Micro Hornet (ORG1510 - R)	52	GPS L1 C / A code / GLONASS L1	All in View	CHNV2	10 x 10 x 5.9mm	2.36g	<3m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<27s	<26	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	4 - 92mW (during tracking)	Active	GPS / GNSS Receiver Module With Integrated Antenna
	Multi Micro Hornet (ORG1510 - MK)	33	GPS L1 C / A code / GLONASS L1 / BEIDOU	All in View	CHNV2	10 x 10 x 6.1mm	2.4g	<2.5m / nr / nr / nr (95%)	nr	up to 10Hz		<31s	<29s	<3s	1	UART	user selectable	-40 to 85	ext	14.5 - 104mW (during tracking)	Active	GPS / GNSS Receiver Module With Integrated Antenna
	Nano Hornet (ORG1411)	48	GPS L1 C / A code	All in View	CHNV2	10 x 10 x 3.8mm	1.5g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35 s	<32 s	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	67mW (during tracking)	Active	GPS / GNSS Receiver Module With Integrated Antenna
	Multi SISO Hornet (ORG4502)	52	GPS L1 / GLONASS L1	All in View	CHNV2	18.5 x 28.0 x 7	8g	<3m / nr / nr / nr (95%)	nr	1Hz or 5Hz		0	<26	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	65 - 83mW (during Tracking)	Active	GPS / GNSS Receiver Module With Integrated Antenna
	Multi Hornetella (ORG1208)	32	GPS L1 / GLONASS L1	All in View	CHNV2	17 x 17 x 2.2	1.4g	<3m / nr / nr / nr (95%)	nr	up to 10Hz		<33	<31	1s	2	Uart / SPI	user selectable	-40 to 85	ext	115 - 180mW	N / R	modules with an external antenna
	Multi Hornet (ORG1218)	32	GPS L1 / GLONASS L1	All in View	CHNV2	17 x 17 x 6	5g	<3m / nr / nr / nr (95%)	nr	up to 10Hz		<33	<31	1s	2	Uart / SPI	user selectable	-40 to 85	ext	115 - 180mW	Active	GPS / GNSS Receiver Module With Integrated Antenna
	Spider (ORG4472)	48	GPS L1 C / A code	All in View	CHNV2	7 x 7 x 1.4mm	0.3g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35 s	<32 s	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	9 - 67mW (during tracking)	N / R	modules with an external antenna
	Micro Spider (ORG4475)	48	GPS L1 C / A code	All in View	CHNV2	5.6 x 5.6 x 1.4mm	0.1g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35 s	<32 s	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	59mW (during tracking)	N / R	modules with an external antenna
	Nano Spider (ORG4400)	48	GPS L1 C / A code	All in View	CHNV2	4.1 x 4.1 x 2.1mm	0.1g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35 s	<32 s	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	9 - 59mW (during tracking)	N / R	modules with an external antenna
	Multi Micro Spider (ORG 4033)	33	GPS L1 C / A code / GLONASS L1	All in View	CHNV2	5.6 x 5.6 x 2.6mm	0.2g	<2.5m / nr / nr / nr (95%)	nr	up to 10Hz		<31s	<29s	<3s	1	UART	user selectable	-40 to 85	ext	10 - 80mW (during tracking)	N / R	modules with an external antenna
	Multi Spider (4572)	52	GPS L1 / GLONASS L1	All in View	CHNV2	7 x 7 x 1.4mm	0.2g	<3m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<27s	<26	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	65 - 83mW (during Tracking)	N / R	modules with an external antenna
Racelogic www.labsat.co.uk	LabSat 3 RLLS03 - 1RP	All in View	GPS L1 C / A Code, Galileo E1, GLONASS L1, BeiDou B1, QZSS L1, SBAS - WAAS, EGNOS, GAGAN	All in View	CDGHLMNOTV1	16.7 x 12.8 x 4.3cm	910g w / out battery, 960g with battery	1.5m / na / na	50ns (RMS)	16.368MHz		na	na	na	7	3 x SMA , 2 x USB, 1 x RJ45, 1 x Expansion option for RS232 or CAN	Variable	-40 to +85	8V to 30V DC, or internal battery	7.0W (Max)	Active	RF Record and Replay:GPS L1, Galileo E1, GLONASS L1, BeiDou B1, QZSS, SBAS - Single Constellation Channel Output
	LabSat 3 RLLS03 - 2RP	All in View	GPS L1 C / A Code, Galileo E1, GLONASS L1, BeiDou B1, QZSS L1, SBAS - WAAS, EGNOS, GAGAN	All in View	CDGHLMNOTV1	16.7 x 12.8 x 4.3cm	910g w / out battery, 960g with battery	1.5m / na / na	50ns (RMS)	16.368MHz		na	na	na	7	3 x SMA , 2 x USB, 1 x RJ45, 1 x Expansion included for RS232, CAN, & Dual - CAN	Variable	-40 to +85	8V to 30V DC, or internal battery	7.0W (Max)	Active	RF Record and Replay for GPS L1, Galileo E1, GLONASS L1, BeiDou B1, QZSS, SBAS - Dual Constellation Channel Output
	LabSat 3 RLLS03 - 3RP	All in View	GPS L1 C / A Code, Galileo E1, GLONASS L1, BeiDou B1, QZSS L1, SBAS - WAAS, EGNOS, GAGAN	All in View	CDGHLMNOTV1	16.7 x 12.8 x 4.3cm	910g w / out battery, 960g with battery	1.5m / na / na	50ns (RMS)	16.368 MHz		na	na	na	7	3 x SMA , 2 x USB, 1 x RJ45, 1 x Expansion included for RS232, CAN, & Dual - CAN	Variable	-40 to +85	8V to 30V DC, or internal battery	7.0W (Max)	Active	RF Record and Replay for GPS L1, Galileo E1, GLONASS L1, BeiDou B1, QZSS, SBAS - Triple Constellation Channel Output

RECEIVER SURVEY 2016

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Manufacturer	Model	Channels/ tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real -time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
Raytheon www.raytheon.com	Anti - jam GPS Receiver (AGR)	24 / Continuous	L1 - C / A, P / (Y) , L2 - P / (Y)	8	DO1	6.5 x 2.2 x 9.0in	4lb	<16 m / na / na / na	<100	nr		nr	150s	20s	nr	nr	nr	-55 to 71	28 V DC	28 W	5 element L1 / L2 CRPA	Tomahawk Block IV Anti - Jam SAASM Receiver
	Miniature Airborne GPS Receiver MAGR 2000	24 / Continuous	L1 - C / A, P / (Y) , L2 - P / (Y)	All in View	AD1	3.21 x 6.78 x 12.82in	11.0lb	<16 m / na / na / na	37	1		<6min	24s	1s	2 mux, 5 serial	1553 / RS - 232 / RS - 422 / ARINC429		-55 to 95	115 V / 400Hz	19 W average	L1 / L2 FRPA or CRPA	Open architecture aircraft SAAASM receiver LRU, MGUE upgrade in progress
	RAPTOR Common Weapon Navigator	24 / Continuous	L1 - C / A, P / (Y) , L2 - P / (Y)	All in View	DHLMNOPV2	3.45 x 0.59 x 3.45in	100g	<16 m / na / na / na	<100	1		nr	60s	10s	3	RS - 232 / RS - 422 / CMOS	500 kbps	-32 to 70	3.3 V DC	<4.5 W max, <1 W nominal	L1 / L2	Multiple Raytheon Missile System SAASM applications
	Digital Anti - jam Receiver (DAR)	24 / Continuous	L1 - C / A, P / (Y) , L2 - P / (Y)	All in View	ADO1	8.6 x 2.27 x 13.0in	11.0lb	<16 m / na / na / na	<25	1		nr	nr	nr	2 mux / serial	1394B, Fibre channel, RS - 422	nr	nr	270 V dc	<80 W	L1 / L2 CRPA	High Anti - Jam aircraft SAASM receiver system
Rockwell Collins www.rockwellcollins.com/gs/	MPE-S, Miniature PLGR Engine (SAASM) Type II	12 channels parallel, dual frequency	L1, C / A and P or Y Code L2, P or Y Code	12	ADLMNTV2	2.45 x 0.285 x 1.76in	0.75oz	<4m CEP (WAGE) , <2m (SDGPS)	<100	1		<100s typical	<60s typical	<8s for <10s typical	3	RS - 232, CMOS, Crypto (DS - 101 and DS - 102) , HVQK, 1PPS, NMEA, ant.	Variable	-40 to +85	ext	0.7 W operating, 4 mW keep-alive	active remote (E)	U.S. Army standard; GB - GRAM; backward compatible
	MicroGRAM	12 channels parallel, dual frequency	L1, C / A and P or Y Code L2, P or Y Code	12 All in view		1.0 x 1.25 x 0.275in	0.25oz	DGPS: <2m CEP WAGE <4m CEP PPS <12m CEP	<100	1		<110s typical	<90s typical	<20s	2	Two independent serial ports (full duplex CMOS) , 1 PPS, DS - 101 and DS - 102, ant.	9, 600-230, 400	-54 to +85	ext	<0.5 W operating, <0.3 mW Keep alive	active remote (E)	The worlds smallest, lightest , lowest powered SAASM - based GPS receiver in the world
	NavFire - I, Integrated GPS - AJ System w / Digital Nulling, Gun Hard, SAASM - Based	12 / 24 par.	L1, C / A, P or Y-code L2, P-code or Y-code	all in view	ADLNO2	1.64 (D) x 0.95in	2.8oz	<3m CEP	<30	1 - 25 dependent on aiding		<60s	<30s	<15s	3	LVCMOS, DS - 101, 1PPS, 10PPS input, antenna (s)	9, 600 - 230, 400	-45 to +85	ext	<2.8W	passive, 2 - element (E)	2 - card GPS - AJ system with 2 - element digital nulling; 25k - G hardened, Deep Integration capable
	NavStorm + , Integrated GPS - AJ System w / Digital Nulling, Gun Hard, SAASM - Based	12 / 24 par.	L1, C / A, P or Y-code L2, P-code or Y-code	all in view	ADLNO2	2.8 (D) x 1.1in	8.8oz	<8m SEP	30	1-25 dependent on aiding		<60s	<8s	<15s	3	LVCMOS, DS - 101, 1PPS, 10PPS input, antenna (s)	9, 600-230, 400	-45 to +85	ext	<5.0W	passive, 2 - element (E)	2 - card GPS - AJ system with up to 5 - element digital nulling; 20k - G hardened, Deep Integration capable
	NavStrike - 24-Munitions GPS Embedded Module, SAASM - Based	12 / 24 par.	as above	all in view	ADNS2	3.5 x 3.0 x 0.75in	<0.5lb	na / 3.7m / nr	30	1-25 dependent on aiding		<60s	<8s	<15s	nr	RS - 422, RS - 232, DS - 102, DS - 101, HVQK, 1PPs, antenna	Variable	-32 to +70	ext	<4 W acquisition, <3 W tracking	passive (E)	Updated NavStrike GPS receiver using same form - factor, interfaces
	IGAS, Integ. GPS - AJ w/ digital nulling, SAASM - Based Beam-forming.	24 par.	as above	all in view	ADNS2	4.35 x 5.15 x 0.9in	<2lb	na / 2m typ. / nr	30	1-25 dependent on aiding		<60s	<8s	<15s	nr	RS - 422, DS - 102, DS - 101, HVQK, 1PPs, antenna (4)	Variable	-20 to +60	ext	<12 W continuous	active remote, 4 - element (E)	2 - card integrated GPS - AJ system with 4 - element RF interface
	Micro DAGR (Defense Adv. GPS Receiver) SAASM Based	12 channel, parallel	L1, C / A and P or Y code	all in view	ADHLMNPT1	3.9 x 2.6 x 1.4in	6.5oz with L91 batteries	<18.1m Horiz 95%	Unverified as of this date	1		Unverified as of this date	<25s	Unverified as of this date	1	RS - 232, keyfill, external power	Variable	-54 to +85	Intl 2 AA batteries	Unverified as of this date	integral	SAASM - based, small, light - weight, portable 12 - channel all - in - view, with commercial style graphical user interface
	GPS Embedded Module (GEM)	12 / 24	L1, C / A, P or Y code, L2, P-code or Y-code	all in view	ADLMNPRSTV1	5.88 x 5.7 x 0.57in	<0.8lb	na / 2m typ. / nr	30	1-25 dependent on aiding		<60s	<10s	<15s	nr	RS - 232, RS - 422, DS - 102, DS - 101, HVQK, 1PPs, DP RAM	up to 921kbaud	-40 to +71	ext	<3 W	active or passive	GRAM - S (SEM - E) module
	Airborne SAASM Reciever 3.3 (ASR 3.3)	12 / 24 Channel	L1, C / A, P or Y code, L2, P-code or Y-code	all in view		4.9 x 3.2 x 0.80in	<0.6lb	PPS: <5.6m RMS horizontal SPS: <6m RMS horizontal	PPS: <30 ns RMS, SPS: <45 ns RMS	4 - 25 dependent on aiding		<60s	<10s	<15s	nr	RS - 232, RS - 422, DS - 102, DS - 101, HVQK, 1PPs	9600 - 230400	-55 to +71	ext	<2W	Active or passive	ASR Form Factor
	DIGAR	24 channel	L1, C / A, P or Y code, L2, P-code or Y-code	all in view		8.0 x 2.27 x 12.0in	<11lb	PPS: <5m SEP; SPS: <6m horizontal	<100 nanoseconds	Unaided: once - per - second pseudorange based, delta range based, 10Hz		<60s	<10s	<15s	4	Dual redundant, RS - 422 interfaces as SHCI buses; 1553; DS101 / 102; HVQK	300-230, 400;	-40 to +85	115V / 400Hz	36	Passive 7 - element CRPA	
Septentrio www.septentrio.com	AsteRx - m OEM	136 par.	GPS + GLONASS L1, C / A and P - code & CP; L2, P - code & CP; WAAS / EGNOS	All in View GPS + GLONASS	ADGHLMMetNOPRTV2	70 x 48mm	27g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	25Hz		<45s	<15s (after reset)	<1s	3, 1, 1, 1	LVTTL, USB, event marker, PPS out	300-230, 400; 1 - 2 Mbps	-40 to +85	3.3V DC	500mW	(E)	Compact low - power dual frequency GPS / GLONASS OEM receiver
	AsteRx - m UAS	136 par.	GPS + GLONASS L1, C / A and P - code & CP; L2, P - code & CP; WAAS / EGNOS	All in View GPS + GLONASS	ADNOPV2	70 x 48mm	37g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	20Hz		<45s	<15s (after reset)	<1s	3, 1, 1, 1	LVTTL, USB, event marker, PPS out	300-230, 400; 1 - 2 Mbps	-40 to +85	5V - 30V	700mw	(E)	Centimeter accuracy and easy integration into UAS.
	AsteRx4 OEM	544 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC, E6 code & CP; GLONASS L1L2L2CA, P - Code; BeiDou (B1, B2, B3) , IRNSS (L5) QZSS, WAAS / EGNOS	All in View GPS + GLONASS + GALILEO + BEIDOU + IRNSS	ADGLMMetNOPRTV2	60 x 90mm	60g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	50Hz		<45s	<15s (after reset)	<1s	4, 1, 1, 2, 1,	RS232, Ethernet, USB, event marker, PPS out,	300-230, 400, 100 Mbps	-40 to +85	3-5.5 V DC	1.5W typ	(E)	Multi - constellation, dual antenna OEM receiver
	AsteRx - U	544 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC, E6 code & CP; GLONASS L1L2L2CA, P - Code; BeiDou (B1, B2, B3) , IRNSS (L5) QZSS, WAAS / EGNOS, L - Band (Terrastar)	All in View GPS + GLONASS + GALILEO + BEIDOU + IRNSS	ADGLMMetNOPRTV1	164 x 157 x 54mm	1.5kg	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	20Hz		<45s	<15s (after reset)	<1s	3, 1, 1, 2, 1, 1, 1, 1,	RS232, Ethernet, USB, event marker, PPS out, Bluetooth, WIFI, cellular	300-230, 400, 100 Mbps	-30 to +65	9 - 36V	7W	(E)	Multi - constellation, dual antenna receiver with integrated Cellular modem and support for TERRASTAR
	AsteRx - U UHF	544 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC, E6 code & CP; GLONASS L1L2L2CA, P - Code; BeiDou (B1, B2, B3) , IRNSS (L5) QZSS, WAAS / EGNOS, L - Band (Terrastar)		ADGLMMetNOPRTV1	164 x 157 x 54mm	1.5kg	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	20Hz		<45s	<15s (after reset)	<1s	3, 1, 1, 2, 1, 1, 1, 1, 1	RS232, Ethernet, USB, event marker, PPS out, Bluetooth, WIFI, Cellular, UHF	300-230, 400, 100 Mbps	-30 to +65	9 - 36V	7W	(E)	Multi - constellation, dual antenna receiver with integrated Cellular modem, UHF radio and support for TERRASTAR
	AsteRx - U Marine	544 par	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC, E6 code & CP; GLONASS L1L2L2CA, P - Code; BeiDou (B1, B2, B3) , IRNSS (L5) QZSS, WAAS / EGNOS, L - Band (Terrastar & Veripos)	All in View GPS + GLONASS + GALILEO + BEIDOU + IRNSS	ADGLMMetNOPRTV1	164 x 157 x 54mm	1.5kg	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	20Hz		<45s	<15s (after reset)	<1s	3, 1, 1, 2, 1, 1, 1, 1, 1	RS232, Ethernet, USB, event marker, PPS out, Bluetooth, WIFI, Cellular, UHF	300-230, 400, 100 Mbps	-30 to +65	9 - 36V	7W	(E)	Multi - constellation, dual antenna receiver with integrated Cellular modem, UHF radio, robust L - band receiver and support for TERRASTAR and VERIPOS
	AsteRx3 HDC	136 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC code & CP; GLONASS L1L2L2CA, P - Code; BeiDou, QZSS, WAAS / EGNOS	All in View	ADGLMMetNOPRTV1	130 x 185 x 46mm	510g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	25Hz		<45s	<15s (after reset)	<1s	3, 1, 1, 2, 1	RS232, Ethernet, USB, event marker, PPS out	300-230, 400, 10 Mbps	-40 to +60	9-30 V DC	3W typ	(E)	Triple frequency high accuracy GPS / GLONASS / GALILEO receiver in a versatile waterproof high - impact plastic housing.
	AsteRx2i OEM	136 par.	GPS + GLONASS L1, C / A and P - code & CP; L2, P - code & CP; WAAS / EGNOS	All in View GPS + GLONASS	ADGHLMMetNOPRTV2	60 x 90mm	60g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	50Hz		<45s	<15s (after reset)	<1s	4, 1, 2, 1	RS232, USB, event marker, PPS out	300-230, 400; 1 - 2 Mbps	-40 to +85	3.3V DC	2W IMU incl	(E)	high precision IMU enhanced GPS / GLONASS Dual - frequency OEM receiver.
	AsteRx2i HDC	136 par.	GPS + GLONASS L1, C / A and P - code & CP; L2, P - code & CP; WAAS / EGNOS	All in View GPS + GLONASS	ADGHLMMetNOPRTV1	130 x 185 x 46mm	510g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	50Hz		<45s	<15s (after reset)	<1s	3, 1, 2, 1	as above	300-230, 400; 1 - 2 Mbps	-40 to +60	9-30 V DC	2.5W IMU incl	(E)	hiprecision IMU enhanced GPS/GLNASS dual-frequency,waterprof hi-impact housing
	PolaRx4 PRO	264 Par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5a code & CP; WAAS / EGNOS; GLONASS L1 L2 L2 CA, P, L3, BeiDou B1, B2, B3, IRNSS L5, QZSS	All in View	ADGHLMMetNOPRTV1	235 x 140 x 37mm	980g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	50Hz		<45s	<15s (after reset)	<1s	2, 1, 1, 2, 1, 1	RS232, Ethernet, USB, event marker, PPS out, Ref in	300-230, 400, 1 - 2 Mbps	-40 to +70	9-30 V DC	6W typ	(E)	Multi - frequency GNSS reference receiver.
	PolaRx4TR PRO	264 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5a code & CP; WAAS / EGNOS; GLONASS L1 L2 L2 CA, P, L3, BeiDou B1, B2, B3, IRNSS L5, QZSS	All in View	DGLMetOPRTV1	235 x 140 x 37mm	980g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	50Hz		<45s	<15s (after reset)	<1s	2, 1, 1, 2, 1, 1, 1, 1	RS232, Ethernet, USB, event marker, PPS out, Ref in, PPS in, Ref out	300-230, 400, 10 Mbps	-30 to +70	9-30 V DC	6W typ	(E)	Multi - frequency GNSS reference receiver for highly accurate timing and frequency transfer
	PolaRxS PRO	136 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5a code & CP; WAAS / EGNOS; GLONASS L1 L2 L2 CA, P, L3, BeiDou B1, B2, B3, IRNSS L5, QZSS	All in View	DGLMetOPRTV1	300 x 140 x 37mm	980g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	50Hz		<45s	<15s (after reset)	<1s	4, 1, 2, 1, 2	RS232, Ethernet, event marker, PPS out, Ref out	300-230, 400, 10 Mbps	-30 to +70	9-30 V DC	6W typ	(E)	Scintillation monitoring receiver
	PolaRx5	544 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 E5abAltBOC E6 code & CP; WAAS / EGNOS, BeiDou B1 B2 B3, QZSS, IRNSS L5	All in View	ADGHLMMetNOPRTV1	235 x 140 x 37mm	980g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	50Hz		<45s	<15s (after reset)	<1s	4, 1, 1, 2, 1, 1	RS232, Ethernet, USB (client / host) , event marker, PPS out, Ref in	300-230, 400; 1 - 2 Mbps	-40 to +70	9-30 V DC, PoE	2 - 4W	(E)	Multi - frequency GNSS reference receiver.
	PolaRx4TR PRO	264 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5a code & CP; WAAS / EGNOS; GLONASS L1 L2 L2 CA, P, BeiDou, QZSS	All in View	DGLMetOPRTV1	235 x 140 x 37mm	980g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	50Hz		<45s	<15s (after reset)	<1s	2, 1, 1, 2, 1, 1, 1, 1	RS232, Ethernet, USB, event marker, PPS out, Ref in, PPS in, Ref out	300-230, 400, 10 Mbps	-30 to +70	9-30 V DC	6W typ	(E)	Multi - frequency GNSS reference receiver for highly accurate timing and frequency transfer
	PolaRxSS	544 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 E5abAltBOC E6 code & CP; WAAS / EGNOS, BeiDou B1 B2 B3, QZSS, IRNSS L5 ?	All in View	DGLMetOPRTV1	300 x 140 x 37mm	980g	1.3m (1s) / 0.6m (1s) / 1cm + 1 ppm / 5mm + 1 ppm	10	50Hz		<45s	<15s (after reset)	<1s	4, 1, 2, 1, 2	RS232, USB (client / host) Ethernet, event marker, PPS out, Ref out	300-230, 400, 10 Mbps	-30 to +70	9-30 V DC, PoE	2 - 4W	(E)	Scintillation monitoring receiver
	Altus NR2	136 par.	GPS + GLONASS L1, C / A and P - code & CP; L2, P - code & CP; WAAS / EGNOS	All in View GPS + GLONASS	GLMNOPRV1	167mm (Ø) x 69mm	.7kg	1.3m / 0.5m / .6cm + 1ppm	10	0.05		<60s	<30s	<1s	1, 2, 1, 1, 1, 1	RS232 (with special cable) , USB (UART) , Wi - Fi, Bluetooth, Ethernet, cellular	300-230, 400, 100 Mbps	-30 to +75 (Batteries limited to -20)	INT 2x3400mAh @ 3.6V EXT 9-30 VDC	7 W	INT	The Altus NR2 incorporates GNSS and wireless technology into a sleek and compact design. This provides an intelligent Network Rover and Base featuring web server on - board configuration and on - board GIS data collection (PinPoint - GIS) and extended operation time.
	Altus GeoPod	136 par.	GPS + GLONASS L1, C / A and P - code & CP; L2, P - code & CP; WAAS / EGNOS	All in View GPS + GLONASS	GLNOPRV1	110 x 78 x 35mm (160 mm deep in antenna area)	200g	1.3m / 0.5m / .6cm + 1ppm	10	0.02		<45s	<15s (after reset)	<1s	2	USB (RS232)	115, 200	-20 to +50	USB 2.0 - Power requirements - 5V DC, <1W	<1W	Internal: L1 GPS / GLONASS External Antenna Connector: LEMO connector	high precision for mobile computing platforms. May add RTK to on - board applicatio. PinPoint - GIS App..
	APS - 3G	136 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC, GLONASS L1L2L2CA, P - Code; BeiDou (B1, B2) , WAAS / EGNOS	All in View GPS + GLONASS + GALILEO	GLMNOPRV1	17.8 (Ø) x 9.0cm	<1.3kg	1.3m / 0.5m / 1cm + 1ppm / 2mm + 0.5ppm (1 - sigma)	10	0.04		<45s	<15s	<1s	6	2 RS - 232, 1 Bluetooth, 1 TNC, 1 UHF, 1 Cellular	1, 200 - 115, 200	-40 to +75 (Batteries limited to -20, UHF / Cell Communication limited to -30)	INT / EXT (9 - 18 V DC)	7 W	INT / EXT	Multi - Frequency Geodetic and RTK GNSS receiver. Provides UHF communication
	APS - 3L	136 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GLONASS L1L2L2CA, P - Code; WAAS / EGNOS	All in View GPS + GLONASS + GALILEO	GLMNOPRV1	17.8 (Ø) x 9.0cm	<1.3kg	1.3m / 0.5m / 1cm + 1ppm / 2mm + 0.5ppm (1 - sigma)	10	0.04		<45s	<15s	<1s	6	2 RS - 232, 1 Bluetooth, 1 TNC, 1 UHF, 1 Cellular	1, 200 - 115, 200	as above	INT / EXT (9 - 18 V DC)	7 W	INT / EXT	Multi - Frequency Geodetic and RTK GNSS & TERRASTAR L - Band receiver
	Altus APS3G	544 par.	GPS L1, C / A L2, P - code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC, E6 code & CP; GLONASS L1L2L2CA, P - Code; BeiDou (B1, B2, B3), IRNSS (L5) QZSS, WAAS / EGNOS	All in View GPS + GLONASS + GALILEO + BEIDOU + IRNSS	GLMNOPRV1	17.8 (Ø) x 9.0cm	<1.3kg	1.3m / 0.5m / 1cm + 1ppm / 2mm + 0.5ppm (1 - sigma)	10	0.04		<45s	<15s	<1s	6	2 RS - 232, 1 Bluetooth, 1 TNC, 1 UHF, 1 Cellular	1, 200 - 115, 200	as above	INT / EXT (9 - 18 V DC)	7 W	INT / EXT	Multi - Frequency Geodetic and RTK GNSS & TERRASTAR L - Band receiver
SkyTraq Technology, Inc. www.skytraq.com.tw	Venus816	167	L1 GPS, SBAS, QZSS	All in view	ACDHLMMetNPRTV2	5 x 5 x 0.85mm	0.1g	<2.5m / nr / nr / nr (CEP)	10ns	1, 2, 4, 5, 8, 10, 20, 25, 40Hz		29s	28s	<1s	1	UART	4800 / 9600 / 38400 / 115200	-40 to +85	ext	0.07	active or passive	GPS chipset
	Venus828F	167	L1 GPS, SBAS, QZSS	All in view	ACDGHLMMetNPRSTV2	7 x 7 x 1.4mm	0.3g	<2.5m / <2.0m / nr / nr (CEP)	10ns	1, 2, 4, 5, 8, 10, 20Hz		29s	28s	<1s	3	UART, SPI, I2C	4800 / 9600 / 38400 / 115200	-40 to +85	ext	0.05	active or passive	GNSS receiver
	Venus838FLPx	167	L1 GPS, SBAS, QZSS	All in view	ACDGHLMMetNPRSTV2	10 x 10 x 1.3mm	0.3g	<2.5m / <2.0m / nr / nr (CEP)	10ns	1, 2, 4, 5, 8, 10, 20, 25, 40, 50Hz		29s	28s	<1s	5	2 UART, 2 SPI, I2C	4800 / 9600 / 38400 / 115200	-40 to +85	ext	0.05	active or passive	GPS receiver

RECEIVER SURVEY 2016

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Manufacturer	Model	Channels/ tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real -time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)	Cold start[3]	Warm start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	Venus838LPx - T	167	L1 GPS, SBAS, QZSS	All in view	ACDGHLMMetNPRSTV2	10 x 10 x 1.3mm	0.3g	<2.5m / <2.0m / nr / nr (CEP)	6ns	1Hz	29s	28s	<1s	5	2 UART, 2 SPI, I2C	4800 / 9600 / 38400 / 115200	-40 to +85	ext	0.05	active or passive	precision timing GPS receiver
	S1216F8 - GL	167	L1 GPS, SBAS, QZSS, GLONASS	All in view	ACDGHLMMetNPRSTV2	12 x 16 x 2.5mm	2g	<2.5m / <2.0m / nr / nr (CEP)	10ns	1, 2, 4, 5, 8, 10, 20Hz	29s	28s	<1s	1	UART	4800 / 9600 / 38400 / 115200	-40 to +85	ext	0.05	active or passive	GPS / GLONASS receiver
	S2525DC8	167	L1 GPS, SBAS, QZSS	All in view	ACDGHLMMetNPRSTV2	25 x 25 x 3.5mm	3g	<2.5m / <2.0m / nr / nr (CEP)	10ns	1Hz	29s	28s	<1s	1	1 UART	4800 / 9600 / 38400 / 115200	-40 to +85	ext	0.18	active or passive	GPS disciplined clock
	S2525DR8	167	L1 GPS, GLONASS, SBAS, QZSS, B1 Beidou	All in view	DLNPV2	25 x 25 x 2.5mm	3g	<2.5m / <2.0m / nr / nr (CEP)	10ns	1, 2, 4, 5, 8, 10, 20Hz	29s	28s	<1s	3	1 UART, 1 SPI, 1 I2C	4800 / 9600 / 38400 / 115200	-40 to +85	ext	0.4	active	dead reckoning GNSS receiver
	S2525F8 - BD - RTK	167	L1 GPS, SBAS, QZSS, B1 Beidou	All in view	ACDGHLMNRV2	25 x 25 x 2.5mm	3g	<2.5m / <1.0m / 0.01m / nr (CEP)	10ns	1, 5, 10Hz	29s	28s	<1s	3	3 UART	4800 / 9600 / 38400 / 115200	-40 to +85	ext	0.3	active	RTK GNSS receiver
	S2525F8 - RTK	167	L1 GPS, SBAS, QZSS	All in view	ACDGHLMNRV2	25 x 25 x 2.5mm	3g	<2.5m / <1.0m / 0.01m / nr (CEP)	10ns	1, 5, 10Hz	29s	28s	<1s	3	3 UART	4800 / 9600 / 38400 / 115200	-40 to +85	ext	0.3	active	ultra low cost RTK GPS receiver
Sokkia www.sokkia.com	GRX2	226 Channels w/ optimized sat track technolgy	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C / A SBAS: L1 C / A WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	184 (Ø) x 95mm	1.1kg	2-3m / 50cm / 10mm / 3mm	10	0.05	<40	<20s	<1s	2	RS - 232, Ext Power	2, 400-115, 200	-40 to +65	ext. / int.	4	int.	Internal UHF digital radio and cellular option; Bluetooth
	GSX2	226 Channels w/ optimized sat track technolgy	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C / A, L2C SBAS: L1 C / A WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	150 x 150 x 64mm	0.85kg	2-3m / 40cm / 10mm / 3mm	10	0.01	<40	<20s	<1s	2	RS - 232 / Ext Power and mini USB	2, 400-115, 200	-40 to +65	ext. / int.	2	int.	Interference - Free Data Communication Technology; Bluetooth
	GCX2	226 Channels w/ optimized sat track technolgy	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C / A, L2C SBAS: L1 C / A WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	47 x 184.5 x 47mm	0.375kg	2-3m / 50cm / 12mm / 4mm	10	0.01	<40	<20s	<1s	2	Shared Ext Power and USB	2, 400-115, 200	-40 to +85	ext. / int.	2	int.	Interference - Free Data Communication Technology; Bluetooth
Spectra Precision www.spectraprecision.com	ProMark 120	45 par.	SBAS GPS L1 C / A Glonass L1 C / A	All - in - view	HGLNR1	9.0 x 19.0 x 4.3cm	0.63kg	3m / 30cm + 1ppm / 1cm + 1ppm / 0.5cm + 1 ppm	100	0.05s	90s	15s	15s	3	RS232, USB, Bluetooth	up to 115200	-40 to +60	ext. / int.	3	Patch internal, patch active (ER) ext.	Versatile GNSS solution with exceptional post - processing
	ProMark 220	45 par.	SBAS GPS L1 C / A L1 / L2 P - code, L2C Glonass L1 C / A, L2 C / A	All - in - view	HGLNR2	9.0 x 19.0 x 4.3cm	0.63kg	3m / 25cm + 1ppm / 1cm + 1ppm / 0.5cm + 1 ppm	100	0.05s	90s	15s	15s	3	RS232, USB, Bluetooth	up to 115200	-30 to +55	ext. / int.	3	Patch internal, patch active (ER) ext.	All - in - one solution for network RTK
	ProFlex 800	120 par.	GPS L1 C / A L1 / L2 P - code, L2 C, L5, L1 / L2 / L5 full wavelength carrier GLONASS L1 C / A and L2 C / A, L1 / L2 full wavelength carrier GALILEO E1 and E5 SBAS L1 code and carrier	12GPS / 12Glonass / 3SBAS + low signal acquisition engines	AGLMNOPR1	21.5 x 20 x 7.6cm	2.1kg	3m / 25cm + 1ppm / 1cm + 1ppm / 3mm + 0.5ppm	nr	0.05s	90s	35s	3s	7	1 RS232 / RS422, 2 RS232, USB, Bluetooth, Ethernet, 3.5G / GPRS GSM, Earth terminal	Selectable to 115, 200	-20 to +70	Int. / ext.	with UHF and GNSS antenna < 5	External active antenna depending on application: Geodetic Survey Antenna, Machine, Marine or Choke Ring	Outstanding GNSS Performance in Ultra Rugged Design GNSS Centric Z - Blade
	SP80	240	GPS L1C / A, L1P (Y) , L2P (Y) , L2C, L5 GLONASS L1C / A, L2C / A, L3 BeiDou B1 (PHASE 2) , B2 Galileo E1, E5A, E5B QZSS L1C / A, L2C, L1SAIF, L5 SBAS (WAAS / EGNOS / MSAS / GAGAN)	All - in - view	GLR1	22.2 x 19.4 x 7.5cm	1.17kg	3m / 25cm + 1ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	0.05s	60s	30s	3s	5	RS232, USB, Bluetooth, WiFi, 3.5G / UMTS GSM	RS232: up to 230, 400 USB 2.0 host & device Bluetooth 2.1 + EDR Class 2, SPP profile WiFi (802.11 b / g / n)	-40 to +65	Hot swappable Int. / Ext.	3.5	Internal patch	The Most Connected GNSS Receiver
	SP60	240	GPS L1C / A, L1P (Y) , L2C, L2P (Y) GLONASS L1C / A, L2C / A BeiDou B1, B2 Galileo E1, E5a, E5b QZSS L1C / A, L2C, L1SAIF, L5 SBAS L1C / A L - Band	All - in - view	GLR1	21 x 21 x 7cm	930g	3m / 25cm + 1ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	0.05s	60s	30s	3s	3	RS232, USB, Bluetooth Long Range	RS232: up to 921600 bits / sec USB 2.0 host & device up to 12 MHz Bluetooth 2.1 + EDR Class 1, Tx Power 19 dBm, SPP profile	-40 to +65	ext. / int.	2, 2 (with UHF Rx)	Internal patch	The Most Versatile GNSS Solution
Spectracom spectracom.com	SecureSync Time and Frequency Synchronization System	72	GPS / GLONASS / QZSS L1, BeiDou B1, future Galileo E1	All in view	ADLMOT1	42.5 x 4.4 x 35.6cm	2.95kg	Autonomous	25ns	1Hz	< 15min	< 5min	< 5min	> 2	1 RS - 232, 1PSS, 10 MHz, 1 Ethernet (others based on configuration)	9.6 Kbps	-20 to +65	ext	40 - 50 W	L1 (ER / WR)	Modular, GNSS Time and Frequency server
	SecureSync SAASM Time and Frequency Synchronization System	72	L1 C / A, P; L2 P & Y - code (encrypted P - code)	All in view	ADLMOT1	42.5 x 4.4 x 35.6cm	2.95kg	Autonomous	40ns	1Hz	< 20min	< 5min	< 5min	> 2	1 RS - 232, 1PSS, 10 MHz, 1 Ethernet (others based on configuration)	9.6 Kbps	-20 to +65	ext	40 - 50 W	L1 / L2 (ER / WR)	Modular, SAASM GPS Time and Frequency Server
	TSync Timing Boards	72	GPS / GLONASS / QZSS L1, BeiDou B1, future Galileo E1	All in view	ADLMOT1	Varied (based on form factor)	Varied (based on form factor)	40 m CEP; velocity 0.25 m / s CEP	50ns	1Hz	< 15min	< 5min	< 5min	NA	Register - based interface	NA	-40 to +85	ext	+ 5 V DC @ 55 mA	L1 (ER / WR)	GNSS Time Code Processor available in bus - level form factors
	VelaSync High Speed Time Server	50	GPS L1	All in view	T1	43.7 x 4.3 x 65.0cm	10.7kg	Autonomous	50ns	1Hz	< 15min	< 5min	< 5min	5	5 Ethernet (3 x 10 / 100 / 1000 Base - T and 2 x 10Gb)	9.6 Kbps	+10 to +35	ext	500W hi-eff.94%+ redund. power	L1 (ER / WR)	GPS 10Gb PTP Grandmaster and NTP High Speed Time Server
Spectrum Instruments www.spectruminstruments.com	Custom Time / Frequency Modules	50 par.	GPS L1, C / A - code SBAS	All in View + 2 SBAS	ADGLMMetOPT12	Various	Various	2.5m / 2.0m / NA (CEP)	10	1	<35s	<38s	<1s	Various	sine, 1PPS, RS - 232, TTL, IRIG B, NTP, various	Selectable to 115, 200	-20 to +70	ext	Various	ext.	Customizable time / frequency platform
	TM - 4	50 par.	GPS L1, C / A - code SBAS	All in View + 2 SBAS	DGLMMetNOPT1	4.0 x 1.5 x 4.125in Rack Brax avail.	1lb	2.5m / 2.0m / NA (CEP)	15	1	<35s	<38s	<1s	2, 9	as above	Selectable to 115, 200	-20 to +70	ext	3.2	ext.	Time / Frequency reference instrument. IRIG - B
	TM - 4D	50 par.	GPS L1, C / A - code SBAS	All in View + 2 SBAS	DGLMetOPT1	19.0 x 1.75 x 8.0in	6.5lb	2.5m / 2.0m / NA (CEP)	10	1	<35s	<38s	<1s	24, 9	as above	Selectable to 115, 200	0 to +70	ext	4	ext.	Time / Freq. instrument with integrated Distribution Amplifier. IRIG - capable.
	TM4 - M + , TM4 - M / D	50 par.	GPS L1, C / A - code SBAS	All in View + 2 SBAS	DGLMMetOPT1	9.5 x 1.75 x 9.0in	4lb	2.5m / 2.0m / NA (CEP)	10	1	<35s	<38s	<1s	6, 9	as above	Selectable to 115, 200	0 to +70	Universal AC	3.2	ext.	Time / Frequency instrument with internal UPS
	TM4 - MRII	50 par.	GPS L1, C / A - code SBAS	All in View + 2 SBAS	DLMetOPT1	19.0 x 3.5 x 8.0in	6lb	2.5m / 2.0m / NA (CEP)	5	1	<35s	<38s	<1s	6, 9	as above	Selectable to 115, 200	-20 to +70 or-40 to +85	Universal AC	<12	ext.	Time / Frequency instrument with Rubidium oscillator. Rack Mount
	TM - 4OEM	50 par.	GPS L1, C / A - code SBAS	All in View + 2 SBAS	ADGLMMetOPT2	3.875 x 1.0 x 4.00in	0.5lb	2.5m / 2.0m / NA (CEP)	10	1	<35s	<38s	<1s	2, 9	as above	Selectable to 115, 200	-40 to +85	ext	Various to under 2 W	ext.	Board level module, Time / Frequency, IRIG - B
	TM4 - PC / 104	50 par.	GPS L1, C / A - code SBAS	All in View + 2 SBAS	ADGLMMetOPT2	3.775 x 0.497 x 3.55in	0.5lb	2.5m / 2.0m / NA (CEP)	10	1	<35s	<38s	<1s	3, 9	10 MHz sine (x2) , 1PPS, RS - 232, TTL, IRIG B, NTP, various	Selectable to 115, 200	-20 to +70 or-40 to +85	ext	as above	ext.	Board level module, Time / Frequency, IRIG - B, PC / 104 compliant
	TM4 - SN, TM4 - S	50 par.	GPS L1, C / A - code SBAS	All in View + 2 SBAS	ADGLMNOPT2	5.1 x 1.0 x 1.6in	0.5lb	2.5m / 2.0m / NA (CEP)	15	1	<35s	<38s	<1s	2, 5	10 MHz LVDS, 1PPS LVDS, TTL, Custom	4800 - 115500	-40 to +85	ext	as above	ext.	Board level module, Time / Frequency, MGRS, WAAS, High Sensitivity, Fully Shielded
	TM5 - OEM	50 par.	GPS L1, C / A - code SBAS GLONASS	All in View + 2 SBAS	ADGLMNOPT2	60 x 114 x 16mm	0.5lb	2.5m / 2.0m / NA (CEP)	10	1	<35s	<38s	<1s	2, 8	sine, 1PPS, TTL, various	4800 - 115500	-40 to +85	ext	3.2	ext.	Board level module, Time / Frequency, high sensitivity, WAAS, Fully Shielded
	TM5 - OEM	50 par.	GPS L1, C / A - code SBAS GLONASS	All in View + 2 SBAS	ADGLMNOPT2	60 x 114 x 16mm	0.5lb	2.5m / 2.0m / NA (CEP)	10	1	<35s	<38s	<1s	2, 8	sine, 1PPS, TTL, various	4800 - 115500	-40 to +85	ext	3.2	ext.	Board level module, Time / Frequency, high sensitivity, WAAS, Fully Shielded
STMicroelectronics www.st.com/gps	Cartesio PLUS (STA2064)	32	GPS / Galileo (L1) , SBAS	32	ACDGLHMNPTV	15 x 15 x 1.2mm	na	2m / 1.5m / na / na	<50 (rms)	1Hz	35s	34s	<1s	17	UART, SPI, I2C, USB, CAN, SD / MMC, I2S / TDM, SPDIF, GPIOs	4800 - 115500	-40 to +85	1.25V	Variable (inquire)	E (passive & active)	Infotainment application processor with embedded GPS
	Cartesio PLUS (STA2065)	32	GPS / Galileio (L1) , SBAS	32	ACDGLHMNPTV	16 x 16 x 1.2mm	na	2m / 1.5m / na / na	<50 (rms)	1Hz	35s	34s	<1s	22	UART, SPI, I2C, USB, CAN, USB, SD / MMC, I2S / TDM, SPDIF, SmartCard, GPIOs	4800 - 115500	-40 to +85	1.25V	Variable (inquire)	E (passive & active)	Infotainment application processor with embedded GPS
	Teseoll (STA8088CEXG)	32	GPS / Galileio / Glonass QZSS (L1) , SBAS	all in view	ACDGLHMNPTV2	9 x 9 x 1.2	na	2m / 1.5m / na / na	<20 (rms)	1Hz / 5Hz / 10Hz	35s	34s	<1s	3, 2, 1, 1, 1, 2, 1, 1, 1, 64	UART, SPI, SQI, I2C, USB, CAN, SD / MMC, I2S, FSMC, GPIOs	4800 - 115500	-40 to +85	1.2V / 1.8V	Variable (inquire)	E (passive & active)	GNSS Processor
	Teseol (STA8088CFG)	32	GPS / Galileio / Glonass QZSS (L1) , SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20 (rms)	1Hz / 5Hz / 10Hz	35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, , GPIOs	4800 - 115500	-40 to +85	1.2V / 1.8V	Variable (inquire)	E (passive & active)	GNSS Stand - Alone Receiver
	Teseoll (STA8088GA)	32	GPS / Galileio / Glonass QZSS (L1) , SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20 (rms)	1Hz / 5Hz / 10Hz	35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, , GPIOs	4800 - 115500	-40 to +85	1.2V / 1.8V	Variable (inquire)	E (passive & active)	Automotive GNSS Stand - Alone Receiver
	Teseoll (STA8088GAT)	32	GPS / Galileio / Glonass QZSS (L1) , SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20 (rms)	1Hz / 5Hz / 10Hz	35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, , GPIOs	4800 - 115500	-40 to +105	1.2V / 1.8V	Variable (inquire)	E (passive & active)	AEC - Q100 Grade 2 (- 40 - to 105) qualified
	Teseoll (STA8088CWG)	32	GPS / Galileio / Glonass QZSS (L1) , SBAS	all in view	ACDGLHMNPTV2	4 x 4 x 0.64	na	2m / 1.5m / na / na	<20 (rms)	1Hz / 5Hz / 10Hz	35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, , GPIOs	4800 - 115500	-40 to +85	1.2V / 1.8V	Variable (inquire)	E (passive & active)	Multiconstellation Stand - Alone WL - CSP
	TeseoIII (STA8090EXG)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1) , SBAS	all in view	ACDGLHMNPTV2	9 x 9 x 1.2	na	2m / 1.5m / na / na	<20 (rms)	1Hz / 5Hz / 10Hz	35s	34s	<1s	3, 2, 1, 1, 1, 2, 1, 1, 64	UART, SPI, SQI, I2C, USB, CAN, , SD / MMC, I2S, GPIOs, FSMC	4800 - 115500	-40 to +85	1.6 - 4.2V	Variable (inquire)	E (passive & active)	GNSS Processor
	TeseoIII (STA8090FG)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1) , SBAS	all in view	ACDGLHMNPTV2	6 x 5 x 1.2	na	2m / 1.5m / na / na	<20 (rms)	1Hz / 5Hz / 10Hz	35s	34s	<1s	3, 2, 1, 1, 1, 2, 1, 1, 32	UART, SPI, SQI, I2C, USB, CAN, , SD / MMC, I2S, GPIOs	4800 - 115500	-40 to +85	1.6 - 4.2V	Variable (inquire)	E (passive & active)	GNSS Processor
	TeseoIII (STA8089FG)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1) , SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20 (rms)	1Hz / 5Hz / 10Hz	35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, GPIOs	4800 - 115500	-40 to +85	1.6 - 4.2V	Variable (inquire)	E (passive & active)	GNSS Stand - Alone Receiver
	TeseoIII (STA8089GA)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1) , SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20 (rms)	1Hz / 5Hz / 10Hz	35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, GPIOs	4800 - 115500	-40 to +85	1.6 - 4.2V	Variable (inquire)	E (passive & active)	Automotive GNSS Stand - Alone Receiver
	RF Front - End (STA5630)	na	L1	na	ACDGLHMNPTV2	5 x 5 x 1.0mm	na	na	na	na	na	na	na	na	na	9, 600-38, 400	-40 to +85	1.62 - 1.98V	29mW	na	Low power GPS - Galileo RF Front - end
Surrey Satellite Technology Ltd. www.sstl.co.uk	SGR - 10	24	GPS L1 C / A	>12	NS1	160 x 50 x 160mm	1kg	<10m / - / - / 1m (95%)	500	1	3.5min	60s	nr	2	RS - 422, CAN bus	9, 600-38, 400	-20 to +50	External	<6	2 patch + LNAs	Heritage space receiver
	SGR - 20	24	GPS L1 C / A	>12	NOS1	160 x 50 x 160mm	1kg	<10m / - / - / 1m (95%)	500	1	3.5min	60s	nr	2	RS - 422, CAN bus	9, 600-38, 400	-20 to +50	External	<7	4 patch + LNAs	Spacecraft att. determ.
	SGR - 07	12	GPS L1 C / A	12	NS1	120 x 47 x 76mm	450g	<10m / - / - / 1m (95%)	500	1	9m / 2m	60s	nr	2	RS - 422, CAN bus	9, 600-38, 400	-20 to +50	External	<2	1 patch + LNA	Packaged SGR - 05P
	SGR - 05P	12	GPS L1 C / A	12	NS2	70 x 10 x 70mm	60g	<10m / - / - / 1m (95%)	500	1	9m / 2m	60s	nr	2	TTL, RS422, CAN	9, 600-115, 200	-20 to +50	External	1.5	1 Quadrifilar / patch + LNA	Rdcd - size OEM w TMR
	SGR - 05U	12	GPS L1 C / A	12	NS2	70 x 10 x 45mm	30g	<10m / - / - / 1m (95%)	500	1	9min	60s	nr	1	UART TTL	9, 600-115, 200	-20 to +50	External	1	1 Quadrifilar / patch + LNA	University - grade space OEM
	SGR - ReSI	16	GPS L1 C / A, L2C	>12	NS1	300 x 40 x 200mm	1kg	10m / - / - / <1m (95%)	500	1	3 / 2min	60s	nr	3	RS - 422, CAN bus, LVDS	9, 600-115, 200, 10Mbps	-20 to +50	External	5 - 10	Four spiral array, plus standard patches	Remote Sensing Capability (Reflection & RO)
	SGR - Axio	24	GPS L1 C / A, L2C, GLONASS L1OF, L2OF, GALILEO E1OS	>12	NS1	160 x 50 x 180mm	1kg	5m / - / - / <1m (95%)	100	1	3 / 2min	60s	nr	3	RS - 422, CAN bus, LVDS	9, 600-115, 200	-20 to +50	External	4 - 6	Up to 4 patches	New Generation Space Receiver
Tallysman Wireless www.tallysman.com	TW5340	32 + 2 fast acquisition	GPS L1 C / A code, GLONASS G1 C / A code	32	DLMNV1	66.5 x 21mm	150g	~5m	<100ns	Configurable to 10Hz	<39s	<34s	<1s	1	1 RS - 232, differential 1PPS (RS - 422)	Configurable to 115.2kb	-45C,+85C	3.3V, 5V, 12 V ext	120 mA acq., 80 mA operating, <100µA standby	Dual Feed Active, Axial Ratio 1 dB typical	Fixed mount Multi - Constellation Smart Antenna
	TW5341	32 + 2 fast acquisition	GPS L1 C / A code, GLONASS G1 C / A code	32	DLMNV1	66.5 x 21mm	150g	~5m	<100ns	Configurable to 10Hz	<39s	<34s	<1s	1	1 RS - 232, differential 1PPS (RS - 422)	Configurable to 115.2kb	-45C,+85C	3.3V, 5V, 12 V ext	as above	Dual Feed Active, Axial Ratio 1 dB typical	Non - Magnetic Fixed mount Multi - Constellation Smart Antenna
Telit Communications www.telit.com	Jupiter JF2 Flash	48	GPS L1, Galileo E1, SBAS, QZSS	All in view	CDLHMNPTV2	11 x 11 x 2.5mm	1g	1.2m (CEP)		5Hz	27s		1s	3	UART, I2C, SPI	All standard bit rates	-40 to +85°C	ext. 1.8 V	70mW	external	
	Jupiter JF2 ROM	48	GPS L1, Galileo E1, SBAS, QZSS	All in view	CDLHMNPTV2	11 x 11 x 2.5mm	1g	1.2m (CEP)		5Hz	27s		1s	3	UART, I2C, SPI	All standard bit rates	-40 to +85°C	ext. 1.8 V	70mW	external	
	Jupiter JN3 Flash	48	GPS L1, Galileo E1, SBAS, QZSS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1g	1.2m (CEP)		v	27s		1s	3	UART, I2C, SPI	All standard bit rates	-40 to +85°C	ext., 3 - 3.6 VDC	70mW	external	
	Jupiter JN3 ROM	48	GPS L1, Galileo E1, SBAS, QZSS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1g	1.2m (CEP)		5Hz	27s		1s	3	UART, I2C, SPI	All standard bit rates	-40 to +85°C	ext., 3 - 3.6 VDC	70mW	external	
	Jupiter SL869	32	GPS L1, GLONASS L1, Galileo E1, QZSS, SBAS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1.8g	1.5m (CEP)		10Hz (15Hz in DR)	28s		1s	5	3XUART, I2C, USB, 2XCAN	All standard bit rates	-40 to +85°C	ext., 3 - 3.6 VDC	126mW	external	
	Jupiter SL869 - T	32	GPS L1, GLONASS L1, Galileo E1, QZSS, SBAS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1.8g	1.5 m (CEP)		10Hz (15Hz in DR)	28s		1s	5	3XUART, I2C,	All standard bit rates	-40 to +85°C	ext., 3 - 3.6 VDC	126mW	external	Timing Receiver
	Jupiter SL869DR	32	GPS L1, GLONASS L1, Galileo E1, QZSS, SBAS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1.8g	1.5m (CEP)		10Hz (15Hz in DR)	28s		1s	5	UART, I2C, 2XCAN	All standard bit rates	-40 to +85°C	ext., 3 - 3.6 VDC	138.8	external	Dead reckoning GNSS module with external interface (gyro, wheel tick)
	Jupiter SL869 - V3	32	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1.8g	1.5m (CEP)		10Hz (15Hz in DR)	28s		1s	5	UART, I2C, USB, 2XCAN	All standard bit rates	-40 to +85°C	ext., 3 - 3.6 VDC	138.8	external	Dead reckoning GNSS module with external interface (gyro, wheel tick)
	Jupiter SL869 - 3DR	32	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1.8g	1.5m (CEP)		10Hz (15Hz in DR)	28s		1s	5	UART, I2C, USB, 2XCAN	All standard bit rates	-40 to +85°C	ext., 3 - 3.6 VDC	138.6mW	external	Dead reckoning GNSS module with internal MEMS sensors
	Jupiter SE868 - V3	56	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	11 x 11 x 2.5mm	1g	1.2m (CEP)		5Hz	27s		1s	3	UART, I2C, SPI	All standard bit rates	-40 to +85°C	ext. 1.8 V	70mW	external	
	Jupiter SE868 - A	99 / 33	GPS L1, GLONASS L1, Galileo E1, SBAS, QZSS	All in view	CDLHMNPTV2	11 x 11 x 6.1mm	2g	3m (CEP)		10Hz	35s		1s	2	2xUART	All standard bit rates	-40 to +85°C	ext., 2.8 - 4.3 V	72mW (Track)	embeded 9x9 mm GPS + GLO SMT	
	Jupiter SE868 - AS	66 / 22	GPS L1, SBAS, QZSS	All in view	CDLHMNPTV2	11x11x6.1mm	2g	3m (CEP)		5Hz	35s		1s	2	2xUART	All standard bit rates	-40 to +85°C	ext., 2.8 - 4.3 V	59.4mW (Track)	embeded 9x9 mm GPS SMT	
	Jupiter SE873	56	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	7 x 7 x 1.85mm	0.5g	1.2m (CEP)		5Hz	27s		1s	3	UART, I2C, SPI	All standard bit rates	-40 to +85°C	ext. 1.8 V	70mW	external	
	Jupiter SL871	99 / 33	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	10.1 x 9.7 x 2.2mm	1g	2.5m (CEP)		10Hz	35s		1s	2	2xUART, I2C	All standard bit rates	-40 to +85°C	ext., 2.8 - 4.3 V	72.6mW	external	
	Jupiter SL871 - S	66 / 22	GPS L1, SBAS, QZSS	All in view	CDLHMNPTV2	10.1 x 9.7 x 2.2mm	1g	2.5m (CEP)		5Hz	35s		1s	2	2xUART	All standard bit rates	-40 to +85°C	ext., 2.8 - 4.3 V	59.4mW (Track)	external	

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Manufacturer	Model	Channels/ tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real -time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
THALES - Avionics Division www.thalesgroup.com	GNSS 1000C	12	L1 : C / A	All in view	ADLMNPT2	149.35 x 144.65 x 19mm	430g	< 5m (95%)	< 50	10Hz		<60s	20s	<5s	4, 1, 1, 1, 2	RS 422, DPRAM, DS - 101, DS - 102, HVQK, 1PPS In / Out	115 200	-46°C to +101°C	External	< 10W	Ext. Passive or active (E)	SPS receiver, pin to pin compatible with GNSS 1000S.
	GNSS 1000G	20 par.	GPS L1 C / A code and GLONASS L1	10 GPS + 10 GLONASS	ADLMN2	149.35 x 144.65 x 19mm	430g	< 5m (95%)	< 50	5Hz		GPS : 200 s GLO : 290 s	GPS : 50 s GLO : 60 s	<15s	3, 1	RS 422, DPRAM	4800, 115 200	-46°C to +71°C	External	14W	Ext. Passive or active (E)	
	GNSS 1000S, SAASM - Based	24 par.	L1 : C / A, P or Y code L2 : P or Y code	All in view	ADLMNPT2	149.35 x 144.65 x 19mm	430g	< 3m (95%)	< 50	10Hz		<60s	20s	<5s	4, 1, 1, 1, 2	RS 422, DPRAM, DS - 101, DS - 102, HVQK, 1PPS In / Out	115200	-45°C to +82°C	External	< 10W	Ext. Passive or active (E)	SAASM Based, GRAM - S (SEM E) module
	GNSS 100 - 2, SAASM - Based	24 par.	L1 : C / A, P or Y code L2 : P or Y code	All in view	ADLMNPT1	221.5 x 162 x 67.3mm	1.6kg	< 3m (95%)	< 50	10Hz		<60s	20s	<5s	1 or 2, 2, 1, 1, 1, 1, 2	1553 or ARINC 429, RS422, NMEA, DS - 101, DS - 102, HVQK, 1PPS In / Out	100 000, 19200	-40°C to +70°C	28 V dc	< 25W	Ext. Passive or active (E)	SAASM Based
	GNSS 100 - 3, SAASM - Based	24 par.	L1 : C / A, P or Y code L2 : P or Y code	All in view	ADLMNPT1	211 x 160 x 49mm	1.4kg	< 3m (95%)	< 50	10Hz		<60s	20s	<5s	4, 1, 2	RS 422, HVQK, 1PPS In / Out	460800	-30 to +70	28 V dc	< 20W	Ext. Passive or active (E)	SAASM Based
	TOPSTAR 200	12	L1 : C / A	All in view	AN1	66 x 216 x 241mm	1.6kg	< 15m, 1m (SBAS) (95%)	< 50	1Hz or 5Hz		<210s	75s	<10s	8, 1, 3, 3	ARINC 429, RS 232, Time Mark Pulse; discrete	460800	-40 to +65	28 V dc	< 18W	Ext. Passive or active (E)	TSO C145c (Beta - 3) and TSO C146c (Delta - 4) certified
Topcon www.topconpositioning.com	GR - 5	226 Channels with Universal Tracking Channel Technology	GPS: L1, L1C, L2, L2C, L5 GLONASS: L1, L2 GALILEO: E1, E5a / E5b, ALTBOC BeiDou: B1, B2 QZSS: L1 C / A, L1C, L2C, L5 SBAS: L1 C / A, L5 WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	158.1 x 253.0 x 158.1mm	1.44kg	1.2m / 40cm / 10mm / 3mm	10	up to 0.02		<60s	< 30s	< 1s	3	RS - 232, USB, Ext Pwr	up to 460800	-30 to +70C	ext. / int.	3	int.	Internal digital UHF and FH915 (SpSp) radio with cellular (HSPA / CDMA) options; Bluetooth
	HiPer V	as above	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C / A SBAS: L1 C / A WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	184 (Ø) x 95mm	1.0kg	1.2m / 50cm / 10mm / 3mm	10	up t o 0.05		<60s	< 35s	<1s	2	RS - 232, Ext Power	up to 115200	-40 to +65C	ext. / int.	4	int.	Internal digital UHF and FH915 (SpSp) radio with cellular (HSPA / CDMA) options; Bluetooth
	HiPer SR	as above	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C / A, L2C SBAS: L1 C / A WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	150 x 150 x 64mm	0.85kg	1.2m / 40cm / 10mm / 3mm	10	0.1		<40s	<20s	<1s	2	RS - 232 / Ext Power and mini USB	up to 115200	-40 to +65C	ext. / int.	2	int.	LongLink Technology; Hybrid; Cellular; Bluetooth
	NET - G5	452 Channels with Universal Tracking Channel Technology	GPS: L1, L1C, L2, L2C, L5 GLONASS: L1, L2, L3 GALILEO: E1, E5a / E5b, ALTBOC, E6 BeiDou: B1, B2 QZSS: L1 C / A, L1C, L1 - SAIF, L2C, L5, LEX SBAS: L1 C / A, L5 WAAS, EGNOS, MSAS, GAGAN	All in view	GLR1	150 x 200 x 60mm	2.0kg	1.2m / 25cm / 10mm / 3mm	10	0.01		<60s	<10s	<1s	8	2 RS - 232, 1 RS - 422, USB Host USB Type - A, USB Device - Mini - B, 2 Power, 1 Ethernet (PoE)	up to 460800	-40 to +80C	ext.	< 5.0	ext.	ref. network receiver; internal back up power (UPS) ; 1 Ext. Frequency; 1 PPS; 1 Event Mark; UBS host & device supporting OTG functionality; Ethernet ; Class 2 Bluetooth + EDR; Wifi; NTRIP client.
	MR - 1	72 Channels with Universal Tracking Channel Technology	GPS: L1, L2, L2C GLONASS: L1, L2 SBAS: L1 C / A WAAS, EGNOS, MSAS, GAGAN	36	GLM1	115 x 35 x 155mm	0.4kg	2-3m / 40cm / 10mm / 3mm	25	0.01		<40s	<5s	<1s	3	1 common port for 2xRS - 232, Power and PPS; 2 ext antenna	460800	-40 to +75C	ext	4.0W Max	ext. (x2)	GNSS Modular receiver with dual antenna input support for precise heading (and inclination) determination using Topcon's VISOR technology; PPS support
	B110	226 Channels w/ Univ. Tracking Channel Tech.	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C / A, L1C, L2C SBAS: L1 C / A WAAS, EGNOS, MSAS, GAGAN	All in view	2	40 x 55 x 10mm	na	1.2m / 30cm / 10mm / 3mm	10	0.01		<60s	<35s	<1s	9	2 RS232, 4 LVTTL UART, 1 USB, 1 CAN, 1 I2C interface, 1PPS	up to 460800	40 to +85C	ext.	1	ext	Compact OEM L1 / L2 GNSS board for high precision RTK positioning
	OEM - 1	72 Channels w/ Univ. Tracking Channel Tech.	GPS: L1, L2, L2C GLONASS: L1, L2 SBAS: L1 C / A WAAS, EGNOS, MSAS, GAGAN	36	2	60 x 13 x 100mm	na	1.2m / 30cm / 10mm / 3mm	25	0.01		<60s	<35s	<1s	6	3 RS - 232, 1 USB, 2 CAN	2, 400-115, 200	-30 to +85C	ext.	1.8	ext	OEM GPS Board, dual antenna input support for precise heading, inclination determination using VISOR technology.
	112 PII	144 Channels w/ Univ. Tracking Channel Tech.	GPS: L1, L2, L2C, L5 GLONASS: L1, L2, L5 QZSS: L1 C / A, L1C, L2C , L5 SBAS: L1 C / A WAAS, EGNOS, MSAS, GAGAN	>50	2	112 x 14.7 x 100mm	na	1.2m / 30cm / 10mm / 3mm	10	0.01		<60s	<35s	<1s	8	4 RS - 232, 1 Ethernet, 1 USB, 2 CAN	2, 400-115, 200	-40 to +75 C	ext.	4.8	ext	OEM GPS Board; USB Host and Device
Trimble www.trimble.com	Trimble NetR9 / Trimble NetR9 Geospatial	440	GPS: L1 C / A, L2C, L2E (L2P) , L5 GLONASS: L1 C / A, unencrypted P code, L2 C / A2, unencrypted P code, L3 CDMA Galileo L1 CBOC, E5A, E5B & E5AltBOC BeiDou: B1, B2, B3QZSS: L1 C / A, L1C, L1 SAIF, L2C, L5, LEX SBAS: L1C / A, L5 L - Band OmniSTAR (VBS, HP and XP) + RTX Expandable for future signals	88	GLMMetNVPRT1	26.5 x 13.0 x 5.5cm	1.75kg	1-5m / 0.25m + 0.5ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	50Hz		<60s	<30s	<15s	1, 1, 1, 1, 1	D9 Serial; 7pin Lemo; Mini USB (Device and Host modes) ; RJ45 Ethernet: TCP / IP, UDP, HTTP, HTTPS, FTP, NTRIP Caster, NTRIP Client, NTRIP Server, NTP; Bluetooth	2400 - 460800	38, 400 (Port 1 115, 200 (Port 2)	-40 to + 65	3.8W (setting dependent)	Zephyr Geodetic II GNSS Choke Ring GNSS - TI Choke Ring	Full GNSS CORS featuring advanced data logging and power parameters, 8GB internal memory, global RTX correction capability, secure Web User Interface with Position Monitoring.
	Trimble M7	72	GPS L1 C/A Code, L2, L1/L2 Full Cycle Carrier1	24		18.5 x 6.7 x 18.0 cm	2.2kg	1–5m / 0.25m + 1ppm / 10mm + 1ppm / 3mm + 0.1 ppm	100	1Hz RTK		<60s	<30s	<15s	4	RS232, GNSS antenna	Serial 460,800 bps	–30 to +49 C	ext / int	4w Fast Static, RTK	Zephyr 2	SAASM anti-spoofing system for land/ geodetic surveying. Requires U.S. government approvals and authorizations to have and operate this GPS-S.
	Trimble Nomad 1050 Series	nr	L1 C / A code, SBAS	nr	GHLMNOV1	17.6 x 10 x 5.0cm	596g including rechargeable battery	nr / 2 - 4m / nr	nr	nr		nr	nr	nr	1, 1, 1, 1	Serial / WiFi / Bluetooth / USB	nr	-30 °C to 60 °C	ext / int	nr	Internal	Ultra rugged handheld available in a number of configurations (camera, barcode scanner, cellular data) .
	Trimble R1	44	L1 / G1 GPS, GLONASS, Galileo, Beidou, QZSS	nr	GHLMNOV1	11.2 x 6.8 x 2.6cm (4.4 x 2.7 x 1.0in)	187g (0.4lb)	nr / 75cm + 1ppm HRMS / nr	nr	1Hz		nr	nr	nr	1, 1	USB, Bluetooth	nr	-20 °C to +60 °C (-4 °F to +140 °F)	int	nr	Internal	higher - accuracy GNSS for mobile devices
	Trimble R2	220	L1 / L2 (GPS, GLONASS, Galileo, BeiDou, QZSS) , MSS (RTX) , L1 SBAS	nr	GLMNOPRV1	14.0cm (5.5in) diameter x 11.4cm (4.5in) height	1.08 kg (2.38 lb) receiver only	1-5m / 0.25m + 1ppm, 0.50m + 1ppm / 10mm + 1ppm, 20mm + 1ppm / nr	nr	1Hz RTK		nr	nr	nr	1, 1, 1, 1	USB, Bluetooth, WiFi, Radio	nr	-20 °C to +55 °C (-4 °F to +131 °F)	ext / int	4.95 W (VFD 100%) , 3.7 W (VFD 12.5%) @ 18 V, rovermode	Internal	Advanced Trimble Maxwell 6 custom GNSS chip, Trimble EVEREST™ multipath signal rejection, CenterPoint RTX
	Trimble R4	220	Simultaneously GPS: L1C / A, L1C, L2C, L2E - GLONASS (opt.) : L1C / A, L1P, L2C / A, L2P, L3 - SBAS: L1C / A - Galileo (opt.) : E1, E5A, E5B - BeiDou (opt.) : B1, B2 SBAS: QZSS, WAAS, EGNOS, GAGAN	44	GLMNOPRV1	19.0 (Ø) x 10.2cm	1.52kg	1-5m / 0.25m + 1ppm, 0.50m + 1ppm / 3mm + 0.5ppm, 5mm + 0.5ppm / nr	100	1Hz RTK		<60s	<30s	<15s	3, 1, 1	2 x RS232, Bluetooth, Radio coms	38, 400 (Port 1 115, 200 (Port 2)	-40 to +65	ext / int	< 3.2W in RTK mode	Internal Zephyr 2	Trimble R - Track Technology, Advanced Maxwell 6 Survey GNSS chip
	Trimble R5	72	GPS L1 C / A Code, L2C, L1 / L2 Full Cycle Carrier - GLONASS L1 C / A Code, L1 P Code, L2 P Code, L1 / L2 Full Cycle Carrier WAAS / EGNOS Channels	24	GLMMetNVPRT1	13.5 x 8.5 x 24cm	1.5kg	1-5m / 0.25m + 0.5ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	1Hz RTK		<60s	<30s	<15s	3, 1, 1, 1	RS232, radio antenna, GNSS antenna, Compact Flash	115, 200 (Port 1-3) ; USB 1 Mbps	-40 to +65	ext / int	4w Fast Static 5.9 w / radio, BT RTK	Zephyr 2, Z Geodetic 2 w / Stealth GP, GNSS Choke Ring	as above
	Trimble R6	220	Simultaneously: - GPS: L1C / A, L1C, L2C, L2E, L5 - GLONASS (opt.) : L1C / A, L1P, L2C / A, L2P, L3 - SBAS: L1C / A, L5 (for SBAS sats supporting L5) - Galileo (opt.) : E1, E5A, E5B - BeiDou (opt.) : B1, B2 SBAS: QZSS, WAAS, EGNOS, GAGAN	44	GLMNOPRV1	19.0 (Ø) x 10.2cm	1.52kg	1-5m / 0.25m + 1ppm, 0.50m + 1ppm / 3mm + 0.5ppm, 5mm + 0.5ppm	100	1Hz RTK		<60s	<30s	<15s	3, 1, 1	2 x RS232, Bluetooth, Radio coms	38, 400 (Port 1 115, 200 (Port 2)	-40 to +65	ext / int	< 3.2W in RTK mode	Internal Zephyr 2	Trimble R - Track Technology, Advanced Maxwell 6 Survey GNSS chip
	Trimble R7	72	GPS L1 C / A Code, L2C, L1 / L2 / L5 Full Cycle Carrier1 - GLONASS L1 C / A Code, L1 P Code, L2 P Code, L1 / L2 Full Cycle Carrier, WAAS, EGNOS - OmniSTAR VBS, HP, XP	24	GLMMetNVPRT1	13.5 x 8.5 x 24cm	1.5kg	1-5m / 0.25m + 1ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	1Hz RTK		<60s	<30s	<15s	3, 2, 1, 1, 1, 1	RS232, radio antenna, GNSS antenna, Compact Flash, Bluetooth	USB 2.0 1Mbps, Serial 460, 800 bps, Bluetooth 2.1 + EDR, WiFi 802.11b / g, UMTS / HSDPA 850 / 900 / 2100 MHz, GPRS / EDGE 850 / 900 / 1800 / 1900 MHz	-40 to +65	ext / int	4w Fast Static 5.9 w / radio, BT RTK	Zephyr 2, Z Geodetic 2 w / Stealth GP, GNSS Choke Ring	as above
	Trimble R8	440	Simultaneously: - GPS: L1C / A, L1C, L2C, L2E, L5 - GLONASS: L1C / A, L1P, L2C / A, L2P, L3 - SBAS: L1C / A, L5 (for SBAS sats supporting L5) - Galileo: E1, E5A, E5B - BeiDou: B1, B2 SBAS: QZSS, WAAS, EGNOS, GAGAN	88	GLMNOPRV1	19.0 (Ø) x 10.4cm	1.52kg	1-5m / 0.25m + 1ppm, 0.50m + 1ppm / 3mm + 0.5ppm, 5mm + 0.5ppm	100	1Hz RTK		<60s	<30s	<15s	3, 1, 1	2 x RS232, Bluetooth, Radio coms	38, 400 (Port 1 115, 200 (Port 2)	-40 to +65	ext / int	< 3.2W in RTK mode	Internal Zephyr 2	Trimble 360 Technology, Advanced Maxwell 6 Survey GNSS chips
	Trimble R8s	440	Simultaneously: GPS L1C/A, L1C,L2C,L2E, L5. GLONASS L1C / A, L1P, L2C/A, L2P, L3. SBAS: L1C/A, L5 (for SBAS sats supporting L5). Galileo E1, E5A, E5B. BeiDou: B1, B2. QZSS, WAAS, EGNOS, GAGAN	88	GLMNOPRV1	19.0 (Ø) x 10.4cm	1.52kg	1-5m / 0.25m + 1ppm, 0.50m + 1ppm / 3mm + 0.5ppm, 5mm + 0.5ppm	100	1Hz RTK		<60s	<30s	<15s	3, 1, 1	2 x RS232, Bluetooth, Radio coms	38, 400 (Port 1 115, 200 (Port 2)	-40 to +65	ext / int	< 3.2W in RTK mode	Internal Zephyr 2	Trimble 360 Technology, Advanced Maxwell 6 Survey GNSS chips
	Trimble R10	440	Simultaneously: GPS L1C/A,L1C,L2C,L2E, L5. GLONASS L1C/A, L1P, L2C/A,L2P, L3. SBAS L1C/A, L5 (for SBAS sats supporting L5). Galileo E1, E5a, E5B. BeiDou B1, B2 CenterPoint RTX, OmniSTAR VBS, HP, XP, G2, VBS. QZSS, WAAS, EGNOS, GAGAN	88	GLMNOPRV1	11.9 (Ø) x 13.6cm	1.12kg	1-5m / 0.25m + 1ppm, 0.50m + 1ppm / 3mm + 0.5ppm, 5mm + 0.5ppm	100	1Hz RTK		<60s	<30s	<15s	1, 1, 1, 1, 1, 1	USB, RS232, Bluetooth, WiFi, Radio antenna, 3.5G UMTS Cellular Modem	38, 400 (Port 1 115, 200 (Port 2)	-40 to +65	ext / int	< 5.1W in RTK mode	Internal Zephyr 2	HD - GNSS processing technology, xFill Technology, Surepoint Technology with Full Tilt Compensation, Trimble CenterPoint RTX and Trimble 360 support, GLONASS, Galileo, and COMPASS Support, Adv Maxwell 6 Survey GNSS chips
	Geo7X with Trimble Access	220	- GPS: L1C / A, L2C, L2E - GLONASS: L1C / A, L1P, L2C / A, L2P - SBAS (WAAS / EGNOS / MSAS) : L1C / A	44	GHLN1	9.9 x 23.4 x 5.6cm	0.925kg	1-5m / 0.25m + 1ppm, 0.50m + 1ppm / 13mm + 1ppm / 5mm + 0.5ppm	100	1Hz RTK		<60s	<30s	<15s	1, 1, 1, 1	USB, Bluetooth, WiFi, 3.5G	USB2.0, Bluetooth2.1+EDR, WiFi 802.11b/g, UMTS/HSDPA 800/850/ 900/1900/2100 MHz, GPRS/EDGE 850/900/1800/1900 MHz, CDMA/ EV-DO Rev. A 800/1900 MHz	-20 to +50	ext / int	2.7W - 3.7W	Internal L1 / L2 and external Zephyr 2 antenna	Trimble R - Track Technology, Advanced Maxwell Survey GNSS chip
	GPS Pathfinder ProXRT	440	L1 / L2, GPS / GLONASS L1 / L2, Omnistar, SBAS	88	GLN1	9.4 x 4.7 x 1.9in	3.42lb	na / 30cm / 10cm / 10cm	na	1		60s typ	30s typ.	<5s typ	2, 2	Bluetooth / RS232	110 - 115, 000	-20 to +60	int / opt. ext	4.4W	Ext antenna	Flexible GNSS receiver with real - time decimeter accuracy
	Trimble Pro 6T	220	GPS: L1C / A GLONASS: L1C / A, L1P	24	GLN1	Height: 204mm (8in) Diameter: 138mm (5.4in)	inc. battery: 1040g (2.3lb)	2 - 5m / 75cm / 50cm / 50cm	na	1Hz		60s typ.	30s typ.	<5s typ.	2, 2	RS - 232 / Bluetooth / USB	110 - 115, 000	-20 °C to +60 °C (-4 °F to 140 °F)	ext / int	<1	Internal and external L1 / L2 antenna	Trimble Floodlight satellite shadow reduction technology
	Trimble Pro 6H	220	GPS: L1C / A, L2C, L2E GLONASS: L1C / A, L1P, L2C / A, L2P	24	GLN1	Height: 204mm (8in) Diameter: 138mm (5.4in)	inc. battery: 1040g (2.3lb)	2 - 5m / 75cm / 10cm / 10cm	na	1Hz		60s typ.	30s typ.	<5s typ.	2, 2	RS - 232 / Bluetooth / USB	110 - 115, 000	-20 °C to +60 °C (-4 °F to 140 °F)	ext / int	<1	Internal and external L1 / L2 antenna	Trimble Floodlight satellite shadow reduction technology
	Trimble Geo 7X	220	GPS L1C/A L2C L2E GLONASS L1C L2P Galileo E1 QZSS L1C / A, L2C, L1-SAIF BeiDou B1. WAAS EGNOS MSAS GAGAN	44	GHLN1	234 x 99 x 56mm (9.2 x 3.9 x 2.2in)	1080g	2 - 5m / 75cm / 10cm / 10cm (1cm with carrier)	na	1Hz		<60s	<30s	<5s	1, 3, 1, 2	RS - 232 (via cable adapter) / Integrated virtual com ports / USB / Bluetooth	110 - 115, 000	-30 to +60 C	external / internal	<4.5W (typ)	Internal or external L1 / L2 antenna	Includes cellular data capability, Floodlight Technology and laser rangefinder module.
	Trimble AP10 Board Set	220	GPS L1 / L2, GLONASS L1 / L2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	167 x 100 x 45Hmm (including IMU)	0.28kg (including IMU)	1.5 - 3m / 0.25 - 1m / 0.02 - 0.05m / 0.02 - 0.05m	100	200Hz		<60s	<30s	<15s	1, 4, 1, 5	Ethernet, RS232, 1PPS, Event	2, 400-115, 200	-40 to +75 C	ext	< 20W (incl IMU and ant)	MMCX receptacle	GNSS + Inertial for continuous positioning during satellite blockage
	Trimble APX - 15 UAV	220	GPS L1 / L2 / L5, GLONASS L1 / L2, BeiDou B1 / B2, Galileo, QZSS, SBAS		ACGNOPR2	67 x 60 x 15Hmm (including IMU)	60 grams	1.5 - 3m / 0.5 - 2m / 0.02 - 0.05m / 0.02 - 0.05m	100	200Hz		<60s	<30s	<15s		Ethernet, RS232, 1PPS, Event	2, 400-115, 200	-40 to +75 C	ext	~3.5W at room temperature	MMCX receptacle	Small lightweight high accuracy GNSS + Inertial solution for direct georeferencing of unmanned aerial vehicles and sensors
	Trimble AP15 Board Set	220	GPS L1 / L2, GLONASS L1 / L2, BeiDou B1 / B2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	130 x 100 x 39Hmm (not including IMU)	0.28kg (not including IMU)	1.5 - 3m / 0.25 - 1m / 0.02 - 0.05m / 0.02 - 0.05m	100	200Hz		<60s	<30s	<15s	1, 4, 1, 5	Ethernet, RS232, 1PPS, Event	2, 400-115, 200	-40 to +75 C	ext	<20W (incl ant, not incl IMU)	MMCX receptacle	GNSS + Inertial for continuous positioning during satellite blockage and high accuracy orientation for mobile mapping
	Trimble AP20 Board Set	220	GPS L1 / L2, GLONASS L1 / L2, BeiDou B1 / B2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	130 x 100 x 39Hmm (not including IMU)	0.68kg (not including IMU)	1.5 - 3m / 0.5 - 2m / 0.02 - 0.05m / 0.02 - 0.05m	100	100Hz		<60s	<30s	<15s	1, 4, 1, 5	Ethernet, RS232, 1PPS, Event	2, 400-115, 200	-40 to +75 C	ext	<20W (incl ant, not incl IMU)	MMCX receptacle	GNSS + Inertial for continuous positioning during satellite blockage and high accuracy orientation for mobile mapping
	Trimble AP40 Board Set	220	GPS L1 / L2, GLONASS L1 / L2, BeiDou B1 / B2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	130 x 100 x 39Hmm (not including IMU)	0.68kg (not including IMU)	1.5 - 3m / 0.5 - 2m / 0.02 - 0.05m / 0.02 - 0.05m	100	200Hz		<60s	<30s	<15s	1, 4, 1, 5	Ethernet, RS232, 1PPS, Event	2, 400-115, 200	-40 to +75 C	ext	<20W (incl ant, not incl IMU)	MMCX receptacle	GNSS + Inertial for continuous positioning during satellite blockage and high accuracy orientation for mobile mapping

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Manufacturer	Model	Channels/ tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real -time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	Trimble AP50 Board Set	220	GPS L1 / L2, GLONASS L1 / L2, BeiDou B1 / B2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	130 x 100 x 39Hmm (not including IMU)	0.68kg (not including IMU)	1.5 - 3m / 0.5 - 2m / 0.02 - 0.05m / 0.02 - 0.05m	100	200Hz		<60s	<30s	<15s	1, 4, 1, 5	Ethernet, RS232, 1PPS, Event	115, 200 RS - 232, 10 / 100Mbps Ethr	-40 to +85	ext	<20W (incl ant, not incl IMU)	MMCX receptacle	GNSS + Inertial for continuous positioning during satellite blockage and high accuracy orientation for mobile mapping
	Trimble AP60 Board Set	220	GPS L1 / L2, GLONASS L1 / L2, BeiDou B1 / B2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	130 x 100 x 39Hmm (not including IMU)	0.68kg (not including IMU)	1.5 - 3m / 0.5 - 2m / 0.02 - 0.05m / 0.02 - 0.05m	100	200Hz		<60s	<30s	<15s	1, 4, 1, 5	Ethernet, RS232, 1PPS, Event	115, 200 RS - 232, 10 / 100Mbps Ethr	-40 to +85	ext	<20W (incl ant, not incl IMU)	MMCX receptacle	GNSS + Inertial for continuous positioning during satellite blockage and high accuracy orientation for mobile mapping
	BD910 GNSS Receiver	220	GPS L1 / L2, GLONASS L1 / L2, SBAS, QZSS, GALILEO, BeiDou B1 / B2	44	DGLMNPRTV2	41 x 41 x 7mm	0.7oz	1-5m / 0.25m + 0.5ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	20		<45s	<30s	<2s	4, 1, 1	RS - 232, Ethernet, USB	115, 200 RS - 232, 10 / 100Mbps Ethr	-40 to +85	ext	1.1W	MCXX receptacle	
	BD920 GNSS Receiver	220	GPS L1 / L2, GLONASS L1 / L2, SBAS, QZSS, GALILEO, BeiDou B1 / B2	44	DGLMNPRTV2	51 x 41 x 7mm	0.85oz	1-5m / 0.25m + 0.5ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	20		<45s	<30s	<2s	4, 1, 2	RS - 232, Ethernet, USB	460, 800 RS - 232, 10 / 100Mbps Ethr	-40 to +75	ext	1.3W	MCXX receptacle	
	BD920 - W3G GNSS Receiver	220	GPS L1 / L2, GLONASS L1 / L2, SBAS, QZSS, GALILEO, BeiDou B1 / B2	44	DGLMNPRTV2	50 x 62 x 14mm	54oz	1-5m / 0.25m + 0.5ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	20		<45s	<30s	<2s	4, 1, 2	RS - 232, Ethernet, USB	115, 200 RS - 232, 10 / 100Mbps Ethr	-40 to +75	ext	1.3W	MMCX receptacle, 44 - pin header	GNSS receiver with integrated Bluetooth and WiFi wireless communications
	BD930 GNSS Receiver	220	GPS L1 / L2 / L5, GLONASS L1 / L2 / L23, SBAS, QZSS, GALILEO, BeiDou B1 / B2	44	DGLMNPRTV2	51 x 41 x 7mm	1.06oz	1-5m / 0.25m + 0.5ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	20		<45s	<30s	<2s	4, 1, 1	RS - 232, Ethernet, USB	115, 200 RS - 232, 10 / 100Mbps Ethr	-40 to +80	ext	1.7W	MCXX receptacle	
	BD930 - UHF GNSS Receiver	220	GPS L1 / L2 / L5, GLONASS L1 / L2 / L23, SBAS, QZSS, GALILEO, BeiDou B1 / B2	44	DGLMNPRTV2	60 x 55 x 15mm	2.12oz	1-5m / 0.25m + 0.5ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	20		<45s	<30s	<2s	3, 1, 1	RS - 232, Ethernet, USB	115, 200 RS - 232, 10 / 100Mbps Ethr	-40 to +80	ext	2.0W	MCXX receptacle	GNSS receiver with integrated UHF wireless communications
	BD982 GNSS Heading Receiver	220 x 2	GPS L1 / L2, GLONASS L1 / L2, SBAS, QZSS, GALILEO, VECTOR Antenna - GPS, GLONASS	44	DGLMNPRTV2	100 x 84.9 x 11.6mm	3.2oz	1-5m / 0.25m + 0.5ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	50		<45s	<30s	<2s	4, 1, 1, 1	RS - 232, Ethernet, USB, CAN	460, 800 RS - 232, 10 / 100Mbps Ethr	-40 to +75	ext	2.1 W	MCXX receptacle	
	BD970 GNSS Receiver	220	GPS L1 / L2, GLONASS L1 / L2, SBAS, QZSS, GALILEO, BeiDou B1 / B2	44	DGLMNPRTV2	100 x 60 x 11.6mm	2.2oz	1-5m / 0.25m + 0.5ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	50		<45s	<30s	<2s	3, 1, 1, 1	RS - 232, Ethernet, USB, CAN	38400	-40 to +85	ext	1.5W	MCXX receptacle	
	BX982 GNSS Heading Receiver	220 x 2	GPS L1 / L2, GLONASS L1 / L2, SBAS, QZSS, GALILEO, VECTOR Antenna - GPS, GLONASS	44	DGLMNPRTV2	262 x 140 x 55mm	1.6kg	1-5m / 0.25m + 0.5ppm / 8mm + 1ppm / 3mm + 0.1 ppm	100	50		<45s	<30s	<2s	3, 1, 1, 1	RS - 232, Ethernet, USB, CAN	57600	-40 to +85	ext	4.1 W	TNC	
	Trimble BD935 - INS Receiver with IMU	336	GPS L1 / L2 / L5, GLONASS L1 / L2 / L3, BeiDou B1 / B2, Galileo E1 / E5A / E5B, QZSS, SBAS		ACGNOPR2	67 x 60 x 15Hmm (including IMU)	60 grams	1.5 - 3m / 0.5 - 2m / 0.02 - 0.05m / 0.02 - 0.05m	100	100Hz		<45s	<30s	<2s	4	Ethernet, 2x RS232, USB	2, 400-115, 200	-40 to +75 C	ext	~3.5W at room temperature	MMCX receptacle	Small lightweight high accuracy GNSS + integrated Inertial navigation system for precision guidance and control applications
	Trimble BX935 - INS Enclosed Receiver with IMU	336	GPS L1 / L2 / L5, GLONASS L1 / L2 / L3, BeiDou B1 / B2, Galileo E1 / E5A / E5B, QZSS, SBAS		ACGNOPR2	149 x 93 x 43Hmm	660 grams	1.5 - 3m / 0.5 - 2m / 0.02 - 0.05m / 0.02 - 0.05m	100	100Hz		<45s	<30s	<2s	4	Ethernet, 2x RS232, USB	2, 400-115, 200	-40 to +75 C	ext	~3.5W at room temperature	TNC	Small lightweight high accuracy GNSS + integrated Inertial navigation system for precision guidance and control applications
	Trimble MB - Two Receiver	240	GPS L1 / L2 / L5, GLONASS L1 / L2, BeiDou B1 / B2, Galileo, QZSS, SBAS		DGLMNPRTV2	71 x 46 x 11Hmm	24 grams	1.5 - 3m / 0.5 - 2m / 0.02 - 0.05m / 0.02 - 0.05m	100	50Hz		<60s	<45s	<2s	5	Ethernet, 3x Serial, USB, CAN, 1PPS, Event	2, 400-921, 600	-40 to +85 C	ext	~3.5W at room temperature	MMCX receptacle	Small lightweight high accuracy GNSS with high performance RTX, Heading and Attitude
	Trimble SPS985 GNSS Smart Antenna	440	L1 / L2 / L5, GLONASS L1 / L2, Galileo, BeiDou, SBAS, OmniSTAR, QZSS	Unrestricted	GLVPRT1	12 × 13cm (4.7 x 5.1 in)	1.55kg (3.42lb) receiver only including radio and battery	1-5m / 0.25m + 1ppm / 8mm + 1ppm / 3mm + 0.1ppm	100	1, 2, 5, 10, 20Hz		<60s	<30s	<12s	1	Wi - Fi, USB / RS - 232, Bluetooth	up to 115, 000	-30 to +60	Removable Li - Ion and ext	< 3.7W in RTK mode	Smart Antenna Precise	ultra - rugged smart antenna design w/ integr. wireless comm. Construction apps such as grade checking, site survey, supervision, as temporary base station w/ traditional radio or Wi - Fi communications.
	Trimble SPS855 GNSS Modular Receiver	440	L1 / L2 / L5, GLONASS L1 / L2, Galileo, BeiDou, SBAS, OmniSTAR, QZSS	Unrestricted	LMNPRTV1	24 × 12 × 5cm (9.4 x 4.7 x 1.9in)	1.65kg (3.64lb) receiver with internal battery and radio	1-5m / 0.25m + 1ppm / 8mm + 1ppm / 3mm + 0.1ppm	100	1, 2, 5, 10, 20Hz		<60s	<30s	<12s	3, 1, 3	RS - 232, Ethernet, Bluetooth	110 - 115, 000	-20 to +60	Internal Li - Ion and ext	6 W	Zephyr Model 2	Flexibility for use as a base station or rover. The modular receiver can be located in a safe location while the external antenna can be placed for maximum usability.
	Force 22E MRU Module	24	L1, C / A, P & Y - code (encrypted P - code); L2, P & Y - code	12	ADLMNOPT2	3.14 x 3.82 x 0.5in	3.9oz	<5m	40	1		<60s	<2s	<2s	3	RS - 232, RS - 422	variable	-40 to +85	ext	<4W	+ 5VDC Active L1 / L2 FRPA	SAASM Compliant
	Force 27 SEGR	24	L1, C / A, P & Y - code (encrypted P - code); L2, P & Y - code	12	ADLMNOPT2	3.92 x 4.92 x 0.6in	0.5lb	<5m	40	1 to 10		<60s	<2s	<2s	3	RS - 232, RS - 422	variable	-54 to +85	ext	<6W	Various FRPA / CRPA / DAE	SAASM Compliant
	Force 27 SPS	12	L1, C / A code	12	ADLMNOPT2	3.92 x 4.92 x 0.6in	0.5lb	<5m	40	1 to 10		<60s	<2s	<2s	3	RS - 232, RS - 422	variable	-54 to +85	ext	<6W	Various FRPA / CRPA	
	Force 524D GRAM / GASR Module	24	L1, C / A, P & Y - code (encrypted P - code); L2, P & Y - code	12	ADLMNOPT2	5.88 x 5.715 x 0.6in	0.94lb	<5m	40	1 to 10		<60s	<2s	<2s	4	RS - 232, RS - 422, DP - RAM	variable	-54 to +85	ext	<7.5W	Various FRPA / CRPA / DAE	SAASM Compliant
	Force 524 SPS	12	L1, C / A code	12	ADLMNOPT2	5.88 x 5.715 x 0.6in	0.94lb	<5m	40	1 to 10		<60s	<2s	<2s	4	RS - 232, RS - 422, DP - RAM	variable	-54 to +85	ext	<7.5W	Various FRPA / CRPA	
	Force 524D VMEA	24	L1, C / A, P & Y - code (encrypted P - code); L2, P & Y - code	12	ADLMNOPT2	6U VME, Single - Height	2.5lb	<5m	40	1 to 10		<60s	<2s	<2s	4	RS - 232, RS - 422, A24 and A32 VME	4, 800 - 115, 200 bps; USB: 12 Mb/s	-40 to +85	ext	<7.5W	Various FRPA / CRPA / DAE	SAASM Compliant
	TA-24 Certified Sensor	24	L1, C / A, P & Y - code (encrypted P - code); L2, P & Y - code	12	ADNOPT1	5.00 x 9.50 x 2.10in	3.73lb	<5m	40	1		<60s	<2s	<2s	4	ARINC - 429, RS - 422, RS - 232	4, 800 - 115, 200 bps; USB: 12 Mb/s	-40 to +55	ext	<15W	+ 5VDC Active L1 / L2 FRPA	SAASM Compliant
	Buffalo	32	L1, C / A code GPS, GLONASS, future FW upgrades for Galileo and BeiDou	32	AGHLMMETNPV2	19 x 19 x 2.54mm	1.74g	<1.5	50	1Hz		35s	32s	2.5s	2	serial	57600	-40 to +85	ext	52mA @ 3V typical	supports active / passive	Can produce position solution from GPS + GLONASS combined constellations
	Bison	32	L1, C / A code GPS, GLONASS, future FW upgrades for Galileo and BeiDou	32	AGHLMMETNPV2	19 x 19 x 2.54mm	1.74g	<1.5	50	5 - 20Hz		38s	35s	2s	1	serial	115200	-40 to +85	ext	45mA @ 3V typical	supports active / passive	Dead reckoning position when connected to vehicle speed. Onboard gyro and accel.
	Aardvark	22	L1, C / A code	22	AGHLMMETNPV2	19 x 19 x 2.54mm	0.544g	<2.5		1, 5, 10Hz		38s	35s	2s	1 + 1	serial & usb	38400	-40 to +85	ext	<37 mA typical 20-C	supports active / passive	Dead reckoning position when connected to vehicle speed. Onboard gyro.
	A3000	22	L1, C / A code	22	LV1	115 x 78 x 26mm	100g	<2.5		1, 5, 10Hz		38s	35s	2s	1 + 1	serial	9600	-40 to +85	ext / int battery	<40 mA typical, 9 - 30 VDC	supports active / passive	Dead reckoning position when connected to vehicle speed. Onboard gyro, IP54 packaging, onboard battery and charger
	Copernicus II GPS	12	L1, C / A code	12	AGHLMMETNPV2	2.54 x 19 x 19	0.7oz	3m	50	1		38s	35s	2s	2	TTL		-40 to +85	ext / int	44 mA @3.0 V	Micropatch (ER)	
	Condor C1011	22	L1, C / A code	22	AGHLMMETNPV2	10 x 10 x 2mm	0.364g	<2.5		1Hz		38s	35s	2s	1	serial		-40 to +85		<37 mA typical 20-C		
	Condor C1216	22	L1, C / A code	22	AGHLMMETNPV2	16 x 12.2 x 2.13mm	0.544g	<2.5		1Hz		38s	35s	2s	1 + 1	serial & usb		-40 to +85		<37 mA typical 20-C		
	Condor C1722	22	L1, C / A code	22	AGHLMMETNPV2	17 x 22.4 x 2.13mm	0.953g	<2.5		1Hz		38s	35s	2s	1	serial & usb		-40 to +85		<37 mA typical 20-C		
	Condor C1919	22	L1, C / A code	22	AGHLMMETNPV2	19 x 19 x 2.54mm	1.74g	<2.5		1Hz		38s	35s	2s	1	serial	9600	-40 to +85		<37 mA typical 20-C		
	Condor C2626	22	L1, C / A code	22	AGHLMMETNPV2	26 x 26 x 6mm	6.486g	<2.5		1Hz		38s	35s	2s	1	serial	9600	-40 to +85		<37 mA typical 20-C		
	Acutime GG Mulit - GNSS Smart Antenna	12	GPS: L1 & GLONASS: L1C	32	LMPST1	3.74 D, 2.85in H	5.4oz	40m CEP; velocity 0.25m / s CEP	15	1		<60s	<2s	<2s	2	RS - 422 / 485 or RS - 232	na	-40 to +85	ext	<1.0	Patch	
	Bullet III GPS Antenna	na	L1	na	TI	3.05 x 2.61	6.0oz	na	na	na		na	na	na	na	na	9600	-40 to +85	ext	<20 mA - 3V 30 mA - 5V	na	
	Bullet GG (GPS & GLONASS) Antenna	na	GPS: L1 & GLONASS: L1C	na	TI	3.05 x 2.61	6.0oz	na	na	na		na	na	na	na	na	9600	-40 to +85	ext	<20 mA - 3V 30 mA - 5V	na	
	Bullet L1 L2 Antenna	na	L1 & L2 C / A Code GPS	na	TI	3.05 x 2.61	6.0oz	na	na	na		na	na	na	na	na	9600	-40 to +85	ext	<20 mA - 3V 30 mA - 5V	na	
	Bullet 360 Antenna	na	GPS: L1, GLONASS: L1C, Galileo: E1, BeiDou: B1	na	TI	3.05 x 2.61	6.0oz	na	na	na		na	na	na	na	na	9600	-40 to +85	ext	<20 mA - 3V 30 mA - 5V	na	
	Bullet 40dB Antenna	na	High Gain GPS L1	na	TI	3.05 x 2.61	6.0oz	na	na	na		na	na	na	na	na	9600	-40 to +85	ext	<20 mA - 3V 30 mA - 5V	na	
	Bullet GB Antenna	na	GPS L1 and BeiDou B1	na	TI	3.05 x 2.61	6.0oz	na	na	na		na	na	na	na	na	9600	-40 to +85	ext	<20 mA - 3V 30 mA - 5V	na	
	Resolution SMT 360 Multi - GNSSTiming Module	32	GPS L1, C / A, GLONASS L1C, BeiDou B1 and Galileo E1 ready	32	T2	19 x 19 x 2.54mm	1.7g	na	15ns	1Hz		na	na	na	2	TTL	11500	-40 to +85	ext	250 mW	Active / external	
	ICM SMT 360 Multi - GNSSTiming Module	32	GPS L1, C / A, GLONASS L1C, BeiDou B1 and Galileo E1 ready	32	T2	19 x 19 x 2.54mm	1.7g	na	15ns	1Hz		na	na	na	2	TTL	11500	-40 to +85	ext	250 mW	Active / external	
	Mini - T GG Multi - - GNSS Disciplined Clock	32	GPS: L1 & GLONASS: L1C	32	T2	70x76x16	53g	na	15ns	1Hz		na	na	na	2	TTL	11500	-40 to +85	ext	<6W	Active / external	
	Thunderbolt E Disciplined Clock	12	L1 only C / A code	12	T2	4 x 2 x 5	0.628lb	na	<15ns	1Hz		na	na	na	1	RS232	115, 200 (RS 232) ; USB 1Mbp	-30 to +60	ext	na	External active 5v	
Unicore Communications www.unicorecomm.com	UB380	384 channel	GPS L1 / L2 / L5, GLONASS L1 / L2, BDS B1 / B2 / B3	112	AGLMMetNOPRTV1	100 x 60 x 11.4mm	42g	1.5m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm / 2.5mm + 1ppm post processed (All values in Horiz. RMS)	<20	20Hz		50s	/	<1s	8	1xLAN, 1xUART (RS - 232) , 2xUART (LVTTL) , 1xUSB, 1x1PPS, 1xEVENT, 1*Ext. OSC.	2, 400 - 921600	-40 to +85	3.3V + 5% / - 3% DC	2.6W (typical)	Active, GPS L1 / L2 / L5, GLONASS L1 / L2 and BDS B1 / B2 / B3	BDS / GPS / GLONASS Tri - System Octa - Frequency High Precision Board, CE, FCC compliant
	UR380	384 channel	GPS L1 / L2 / L5, GLONASS L1 / L2, BDS B1 / B2 / B3	112	AGLMMetNOPRTV2	222 x 164 x 79mm	1.8kg	1.5m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm / 2.5mm + 1ppm post processed (All values in Horiz. RMS)	<20	20Hz		50s	/	<1s	11	1*RS - 232 (DB9) , 1xRS232 (LEMO) , 1xRS232 / 485 (LEMO) , 1xLAN (RJ45) , 1xUSB (LEMO) , WiFi, BT, WCDMA, 1x1PPS, 1xEVENT, 1xExt. OSC.	2, 400 - 921600	-40 to +85	9 - 18V DC	4.8W (typical)	Active, GPS L1 / L2 / L5, GLONASS L1 / L2 and BDS B1 / B2 / B3	BDS / GPS / GLONASS Tri - System Octa - Frequency High Precision Receiver, CE, FCC compliant
	UM220 - III NV	64	GPS L1, BDS B1	64	CDHLMMetNPTV2	16.0 x 12.2 x 2.4mm	1.6g	2.5m CEP, Velocity: 0.1m / s RMS	na	1Hz		Cold start 30s, Hot start <1s	/	<1s	4	1xUART, 1x1SPI, 1xI2C, 1xEvent, 1x1PPS	4, 800 - 115, 200	-40 to +85	2.7~3.6V	120mW	Passive&Active	BDS / GPS dual - system module designed for In - dash automotive applications
	UM220 - III NL	64	GPS L1, BDS B1	64	CDHLMMetNPTV2	16.0 x 12.2 x 2.4mm	1.6g	2.5m CEP, Velocity: 0.1m / s RMS	na	1Hz		Cold start 30s, Hot start <1s	/	<1s	2	1xUART, 1x1PPS	4, 800 - 115, 200	-30 to +70	2.7~3.6V	120mW	Passive&Active	BDS / GPS dual - system module designed for automotive applications, handheld devices
	UM220 - III L	64	GPS L1, BDS B1	64	CDHLMMetNPTV2	22.4 x 17 × 2.4mm	3g	2.5m CEP, Velocity: 0.1m / s RMS	20	1Hz		Cold start 30s, Hot start <1s	/	<1s	2	2xUART, 1x0PPS	4, 800 - 115, 200	-30 to +70	2.7~3.6V	120mW	Passive&Active	BDS / GPS dual - system module designed for precise timing of electrical power / telecommunication
	UM220 - INS N	64	GPS L1, BDS B1	64	CDHLMMetNPTV2	16.0 x 12.2 x 2.4mm	1.6g	2.5m CEP, Velocity: 0.1m / s RMS	na	1 - 5Hz		Cold start 30s, Hot start <1s	/	<1s	6	2xUART, 1x1PPS, 1xSpeed, 1xFWD, 1xEvent	4, 800 - 115, 200	-40 to +85	2.7~3.6V	150mW	Passive&Active	BDS / GPS + MEMS dual - system module designed for In - dash automotive navigation and high - end navigation
	UC221	64	GPS L1, BDS B1	64	CDHLMMetNPTV2	6 x 6 x 1.2mm	0.4g	2.5m CEP, Velocity: 0.1m / s RMS, with TCXO	20	1Hz		Cold start 32s, Hot start <1s	/	<1s	4	2xUART, 1xSPI, 1x I2C	4, 800 - 115, 200	-40 to +85	Core: 1.1V ~ 1.3V, I / O: 1.7V ~ 1.9V	60mW@1.8V	Passive&Active	GPS / BDS high performance low - power GNSS SoC, which features single chip architecture (RF + BB) to provide users with low power consumption, high - performance