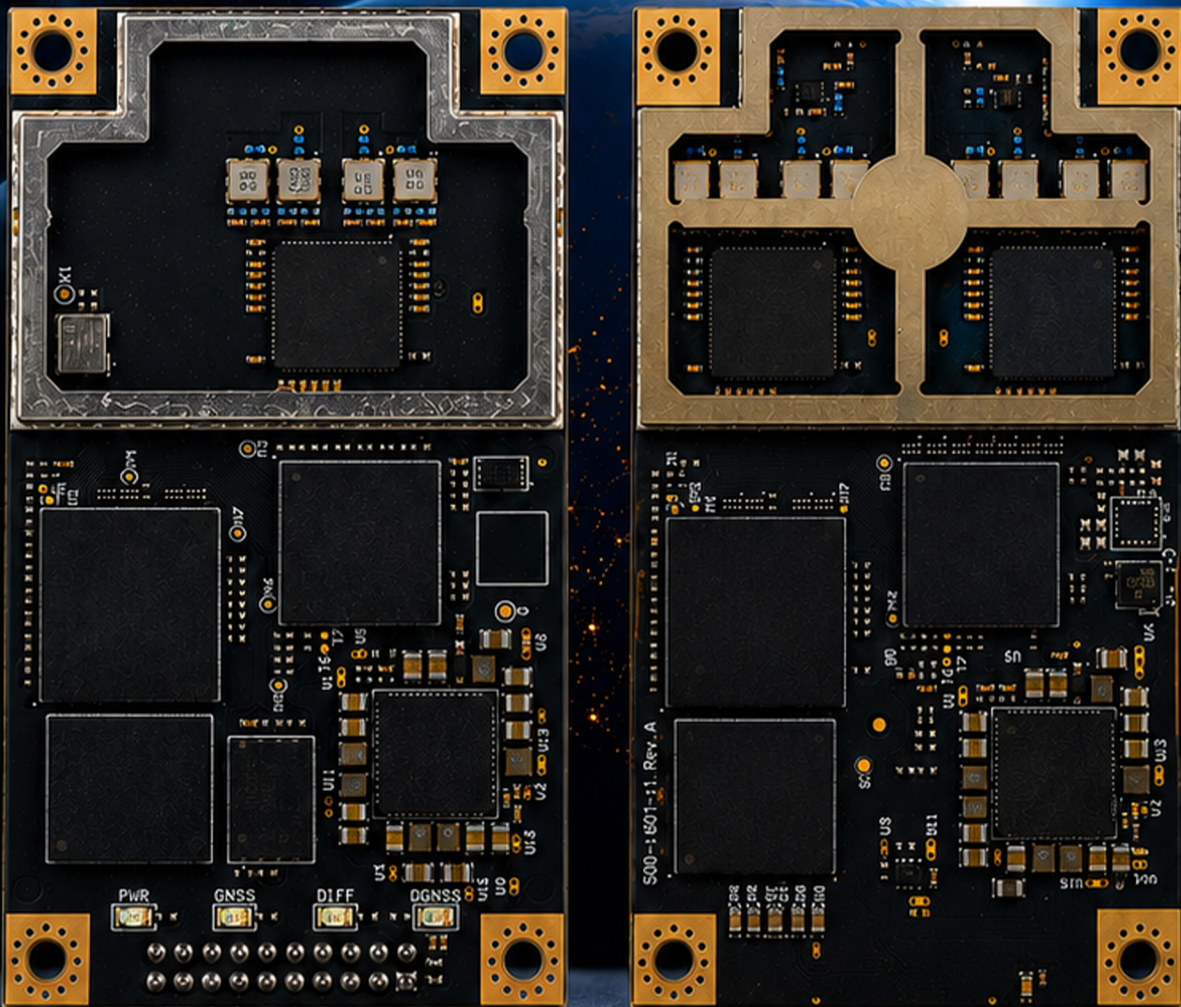




ENGINEERED FOR PRECISION

Advanced OEM GNSS solutions for reliable,
high-accuracy positioning and heading



PHANTOM™ & VEGA™
OEM BOARD PORTFOLIO

DESIGNED FOR DEMANDING APPLICATIONS

Whether deployed in agriculture, machine control, autonomy, Geographic Information Systems (GIS), marine, or industrial systems, Phantom and Vega receivers are engineered to deliver dependable performance in real-world operating environments. Advanced GNSS processing, fast convergence times, and robust signal tracking help maintain accurate navigation and positioning when reliable results matter most.

SCALABLE ACCURACY

From standalone navigation to precision-guided operations, Phantom and Vega receivers support a range of correction services and positioning modes. Users can deploy the accuracy level required for their application today while maintaining the flexibility to upgrade capabilities as operational requirements evolve. This scalable approach helps reduce development costs and simplifies product planning.

INTEGRATION MADE EASY

Designed for OEM integration, Phantom and Vega receivers provide flexible interfaces and industry-standard connectivity options that simplify system design. Compact form factors, low power operation, and compatibility with common correction formats enable efficient deployment across a broad range of applications and vehicle platforms while reducing integration effort and time to market.

MULTI-CONSTELLATION PERFORMANCE

Modern applications demand reliable positioning in increasingly challenging environments. Phantom and Vega receivers simultaneously track signals from major global GNSS constellations, maximizing satellite availability and improving performance near trees, buildings, terrain obstructions, and other sources of signal blockage. Multi-frequency signal processing enhances accuracy, availability, and resilience for mission-critical operations.



PHANTOM

POSITION

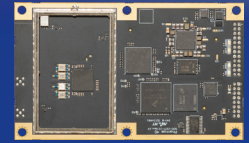
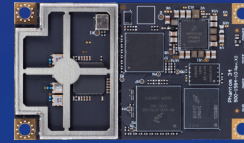
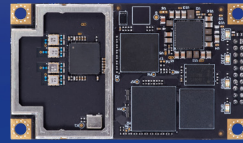
The Phantom series delivers reliable, high-accuracy GNSS positioning for demanding OEM applications. Designed for integration into agriculture, machine control, autonomy, GIS, and precision navigation systems, Phantom receivers are capable of tracking multiple GNSS constellations and frequencies simultaneously to provide robust performance in challenging environments. Support for RTK, network RTK, and PPP correction services enables scalable accuracy from meter-level positioning to centimeter-level precision. With low power consumption, flexible connectivity options, and an industry-compatible form factor, the Phantom series provides a dependable platform for OEMs seeking advanced positioning performance in a compact and easily integrated solution.

VEGA

HEADING + POSITION

The Vega series combines the advanced positioning capabilities of the Phantom platform with optional dual-antenna heading functionality. By leveraging a second GNSS antenna, Vega receivers can quickly provide highly accurate heading information without requiring vehicle movement, making them ideal for agriculture, machine automation, marine, and autonomous applications. Vega delivers the same high-performance positioning capabilities as the Phantom series, including multi-frequency, multi-constellation tracking and support for RTK and PPP correction services.





WHAT MAKES THEM **DIFFERENT**

Phantom and Vega boards are designed to fit existing industry footprints and pinouts, making your existing design a likely candidate for an easy upgrade.

For new integrations, select which board offers the features your design needs.

HARDWARE	PHANTOM 20	PHANTOM 34	PHANTOM 40
Antenna Inputs:	1		
Channels:	800+		
Maximum Update Rate:	50 Hz		
Status Indicators (LED):	Power, GNSS lock, Differential lock, DGNSS position		
COMMUNICATIONS			
UART Serial Ports CMOS:	4 x 3.3V CMOS	4 x 3.3V CMOS	2 x 3.3V CMOS
UART Serial Ports RS-232:			1 x RS-232
USB Support Device/Host:	1 x USB Dev. / Host	1 x USB Device	1 x USB Dev. / Host
USB Separate Host:		1 x USB Host	
Ethernet 10/100Mbps:			1 x Ethernet
CAN Ports (NMEA2000):	2 x CAN	2 x CAN	2 x CAN
Inputs:	1 x Event input	1 x Event input	1 x Event input
Outputs:	1 x PPS output	1 x PPS output	1 x PPS output
MECHANICAL			
Dimensions LxWxH (mm):	72 x 41 x 10	71 x 41 x 10	100 x 60 x 10
LxWxH (inches):	2.8 x 1.6 x 0.4	2.8 x 1.6 x 0.4	3.9 x 2.4 x 0.4
Weight:	22 g (0.79 oz)	22 g (0.79 oz)	44 g (1.56 oz)
Connectors:	2 x 10-pin male	34-pin male	24- & 16-pin male
Conn. Pitch:	2 mm pitch	0.05" pitch	2 mm pitch
RF, Straight:	MMCX, female	MCX, female	MMCX, female

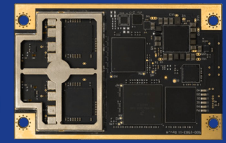
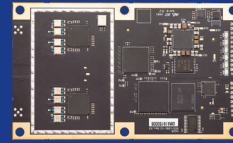
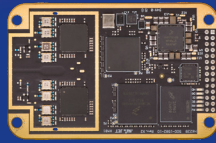
PHANTOM AND VEGA

Phantom and Vega boards share the main building blocks for their design and therefore share many of the same features and performance characteristics.

POWER	
Voltage:	Voltage 3.3 VDC +/- 5%
Phantom:	< 1.8 W all signals + L-band
Vega:	< 2.5 W all signals + L-band

SIGNALS	
GPS:	GPS L1CA/L1P/L1C/L2P/L2C/L5
GLONASS:	GLONASS G1/G2/G3, P1/P2
BEIDOU:	BeiDou B1i/B2i/B3i/B1C/B2a/B2b/AceBOC
GALILEO:	GALILEO E1BC/E5a/E5b/E6BC/AltBOC
Regional Signals:	QZSS L1CA/L2C/L5/L1C/L6, NavIC (IRNSS) L5
Satellite Corrections:	SBAS, Galileo HAS, Atlas

| OEM SOLUTIONS



HARDWARE	VEGA 28	VEGA 34	VEGA 40	VEGA 60
Antenna Inputs:	2			
Channels:	1100+			
Maximum Update Rate:	20 Hz			
Status Indicators (LED):	Power, Primary and Secondary GNSS lock, Differential lock, DGNSS position, Heading			
COMMUNICATIONS				
UART Serial Ports CMOS:	3 x 3.3V CMOS	4 x 3.3V CMOS	2 x 3.3V CMOS	5 x 3.3V CMOS
UART Serial Ports RS-232:			1 x RS-232	
USB Support Device/Host:	1 x USB Dev. / Host	1 x USB Device	1 x USB Dev. / Host	1 x USB Dev. / Host
USB Separate Host:		1 x USB Host		
Ethernet 10/100Mbps:	1 x Ethernet		1 x Ethernet	1 x Ethernet
CAN Ports (NMEA2000):	2 x CAN	2 x CAN	2 x CAN	2 x CAN
Inputs:	1 x Event input	1 x Event input	1 x Event input	1 x Event input
Outputs:	1 x PPS output	1 x PPS output	1 x PPS output	1 x PPS output
MECHANICAL				
Dimensions LxWxH (mm):	71 x 46 x 10	71 x 41 x 10	100 x 60 x 10	71 x 46 x 10
LxWxH (inches):	2.8 x 1.8 x 0.4	2.8 x 1.6 x 0.4	3.9 x 2.4 x 0.4	2.8 x 1.8 x 0.4
Weight:	24 g (0.85 oz)	22 g (0.79 oz)	44 g (1.56 oz)	24 g (0.85 oz)
Connectors:	2 x 14-pin male	34-pin male	24- & 16-pin male	2 x 30-female socket
Conn. Pitch:	2 mm pitch	0.05" pitch	2 mm pitch	0.8 mm pitch
RF, Straight:	MMCX, female	MCX, female	MMCX, female	MMBX, female

POSITION ACCURACY		
Phantom & Vega:	RMS (67%)	2DRMS (95%)
Autonomous, no SA:	1.2 m	2.5 m
SBAS:	0.3 m	0.6 m
Atlas H10:	0.04 m	0.08 m
Atlas H30:	0.15 m	0.3 m
RTK:	8 mm + 1 ppm	15 mm + 2 ppm

VEGA HEADING ACCURACY	
Antenna Separation	Heading Accuracy (RMS)
0.5 m (20 inches):	0.16°
1.0 m (39 inches):	0.08°
2.0 m (79 inches):	0.04°
5.0 m (197 inches):	0.02°
Pitch/Roll Accuracy:	0.05°

MULTI-GNSS BENEFITS

Powered by

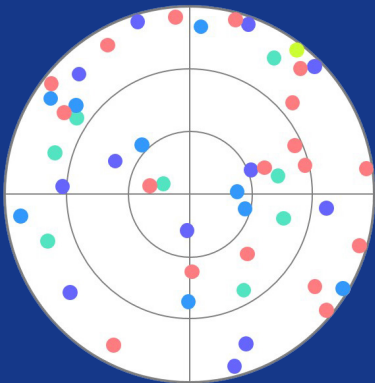
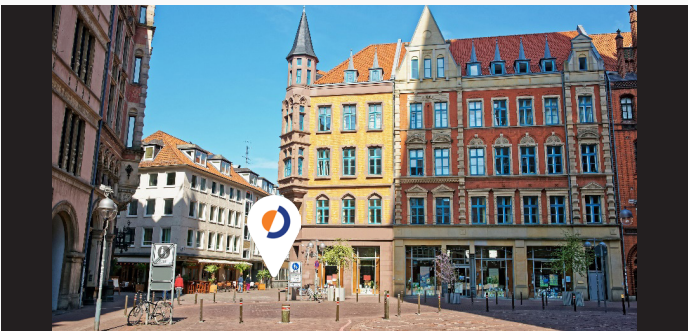
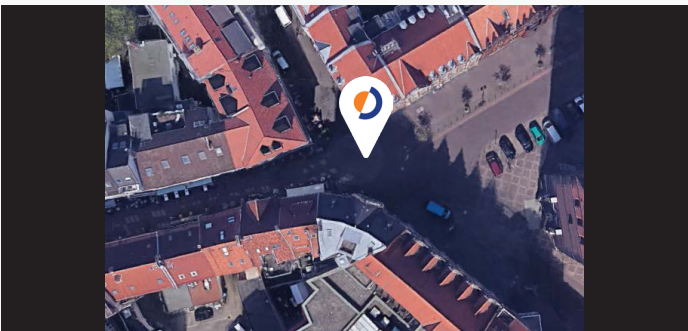


GPS works well in open skies, but buildings, trees, terrain, and other obstructions can block satellite signals and reduce accuracy. Multi-GNSS receivers track satellites from GPS, Galileo, GLONASS, and BeiDou, providing access to many signals. The result is increased satellite availability, better positioning performance, and greater reliability in challenging environments. Hemisphere Phantom and Vega receivers support all four GNSS constellations by default.

Let's look at an example.

The two images below show a street intersection in Hanover, Germany, from above, and from street level. A sky-plot is like using a fish-eye lens on a camera and looking straight up. The horizon is visible around the edge, and in the middle is directly above where we are standing. Imagine overlaying the sky-plot onto the fish-eye photo. This is how the sky-plot works.

The table below shows two sets of numbers. The first set is the number of satellites available. You could track all of these if there were no obstructions – perhaps for an airplane or drone flying over the intersection. The second set shows the number visible down at street level.



Satellites		Available	Street Level
BeiDou		18	6
QZSS		1	0
Galileo		8	3
GLONASS		9	3
GPS		12	3
All GNSS		48	15

SBAS + DGNSS

SCALABLE ACCURACY OPTIONS

Phantom and Vega receivers support multiple correction technologies, allowing users to select the performance level that best meets their operational requirements. Satellite Based Augmentation Systems (SBAS) provides an accessible accuracy improvement without subscriptions or local infrastructure, while Differential GNSS (DGNSS) delivers enhanced sub-meter performance using external correction sources. Together, these options offer flexible positioning solutions suitable for a wide variety of commercial and industrial applications. Phantom and Vega boards support both SBAS and DGNSS solutions by default. No upgrade required.

MULTI-FREQUENCY AND RTK OPTIONS

FAST, PRECISE POSITIONING

Phantom and Vega integrators can optionally activate multi-frequency signal tracking. This allows simultaneous signal tracking across multiple frequency bands, enabling free Galileo High Accuracy Service (HAS) corrections to be used. When combined with the RTK option, Phantom and Vega receivers deliver fast acquisition times, high positioning accuracy, and dependable performance where productivity and precision are critical.



GALILEO HIGH ACCURACY SERVICE

FREE GLOBAL HIGH-ACCURACY POSITIONING

Galileo High Accuracy Service (HAS) is a free, globally available GNSS correction service provided by the European Galileo satellite system. By delivering precise correction data directly through Galileo satellites, HAS enables decimeter-level positioning accuracy without requiring a paid subscription. Integrated support for Galileo HAS allows Phantom and Vega receivers to achieve significantly improved positioning performance worldwide, making it an attractive solution.

atlas[®] CORRECTION SERVICE

GLOBAL HIGH-ACCURACY POSITIONING

Atlas[®] is Hemisphere GNSS's subscription-based global correction service. Atlas delivers high-accuracy positioning solutions worldwide through satellite-based correction broadcasts. Designed for applications that require dependable performance beyond standard GNSS, Atlas provides scalable positioning accuracy options ranging from a few decimeters to a few centimeters. Because corrections are delivered directly via satellite, Atlas eliminates the need for local reference stations or cellular connectivity, providing a reliable positioning solution.



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