

GIM INTERNATIONAL INTERVIEWS CHUCK JOSEPH, HEMISPHERE GNSS

Opening up New Opportunities in High-precision GNSS



In a fiercely competitive landscape, there is considerable pressure on GNSS companies such as Hemisphere GNSS to be innovative and respond to the challenging market conditions. New developments, such as the expansion of the Chinese BeiDou and the European Galileo systems as well as the spectacular rise of UAVs, demand a long-term strategy combined with the agility to adapt. Chuck Joseph, president and CEO of Hemisphere GNSS (HGNSS), explains how his company strives to play a leadership role in the industry.

(by Wim van Wegen, editorial manager, GIM International)

Mr Joseph, you have been president and CEO of Hemisphere GNSS since 2014. How do you look back on that period?

The past two years have been the most exciting times I have spent in my career. I often refer to what we are doing at Hemisphere GNSS as executing and performing like a 'start-up inside of a reinvention'. I've been involved in the GPS-centric world, or what is now known as the GNSS world, since 1992 and each and every iteration of growth and expansion brings with it new challenges and exciting opportunities. With our new business model, we are now participating in large-volume application areas where high-precision GNSS products are expanding exponentially, both in professional market segments, such as deep integration original equipment manufacturer (OEM) opportunities, and in consumer volume implementations such as autonomous driving. We are involved in high, very high technology and 'planes, trains and automobiles' – what could be more fun?!

In 2013 your company was acquired by Beijing UniStrong and was subsequently renamed Hemisphere GNSS. What impact has this change had so far?

Beijing UniStrong's support as our parent company has allowed us to thrive and grow rapidly in all our targeted market segments and new business opportunities. During a time when many of the market segments we serve are punishing our competitors by challenging financial success, we have been able to expand innovation by investing heavily and developing new technologies. We have recruited some of the best people in our industry to join the company and their contributions are already being seen in products and solutions we have been able to rapidly bring to market. In addition, the talent inside of UniStrong via our family relationship is shared across the world in our global markets.

What is Hemisphere GNSS's position in the geomatics sector?

HGNSS is a hardware, software and systems solution supplier in the overall geomatics business sector. We partner with application software suppliers in several market segments and, through these partnerships, provide total solutions to our customers. We provide our product capabilities in the form of board sets and firmware for our OEM and systems integrator customers as well as 'finished products', i.e. smart antennas and suchlike, through our dealer network. Additionally, we participate in industry-specific trade shows, technical councils and standards committees and often take a leadership role.

Your company's Atlas GNSS global correction service made its trade-show debut at Intergeo 2015 and you called it "a game-changer". Can you tell us more?

Before HGNSS released Atlas, the availability of high-precision augmented services was often far too expensive for end users to deploy, and the dealers and systems integrators who served them could not participate in selling or servicing the solutions. Atlas has a disruptive new pricing model and our business model for selling it through our dealer channel and to OEMs enables them to participate in the revenue model as well as supporting their customer bases. This has opened up the market tremendously. We have private-label OEM versions of the Atlas capability coming to market as well as a growing base of users who are purchasing the service through our dealer network. We believe the entire augmented services industry will grow much more rapidly in multiple directions thanks to the market availability of Atlas.

What are your expectations of low-cost, chip-scale multi-frequency GNSS receivers, and what effect will they have on the professional OEM board business?

The technology is definitely moving in this direction. Lower-cost and lower-power multi-frequency GNSS will enable the use of precision GNSS in applications where it has not been seen in the past, especially due to power concerns such as in battery-powered devices. This will open up new and exciting market opportunities. Just having a multi-frequency GNSS chip, though, is not enough. There is still the expectation, in the professional markets, to have very reliable and robust GNSS. The years of GNSS experience that many of the OEMs have accumulated in real-time kinematic (RTK), precise point positioning (PPP) and other high-precision technologies will allow them to continue to be involved, provided they adapt on the chip side of the business.

Unmanned aerial vehicles (UAVs) are a hot topic in the geomatics sector. How will they influence the regular GNSS receiver business, do you think?

GNSS is needed for a variety of UAV-associated applications such as monitoring, navigation, flight control, mapping, geofencing, autonomous operation, etc. For miniature UAVs, power and size are important, which provides the incentive for high-end GNSS systems to move further in this direction. In addition to position and velocity, vehicle attitude is needed which leads to tight integration of GNSS with inertial systems and into multi-antenna systems. For UAV applications requiring high accuracy, RTK can be used, but this is not always practical. HGNSS's Atlas system is an excellent fit for situations in which high accuracy is needed. Corrections are provided through the same antenna that is receiving the GNSS signals and consistent, reliable accuracy is delivered worldwide without the need for base stations or connections to RTK networks.

Indoor positioning has troubled the minds of numerous industry experts. How is Hemisphere GNSS dealing with this challenge?

Currently, we are not heavily focused on indoor positioning. We've looked into it, but it is complex from a technology standpoint, especially for high-accuracy situations where multipath and signal attenuation can wreak havoc. We are seeing a wide range of technologies being attempted to service this market and some seem to have potential where accuracy is not overly important. So far, nothing simple and ubiquitous has been found for higher-precision indoor positioning.

Galileo, Europe's GNSS system, is increasingly taking shape. How do you rate the opportunities Galileo offers?

With 12 Galileo satellites in orbit and more on the way, this is very exciting! We will soon have another highly useful GNSS system that further enhances the capabilities provided by GPS, GLONASS and BeiDou. Like GPS and BeiDou, Galileo is CDMA rather than FDMA and that is preferred for high-accuracy applications such as PPP. Galileo E5A and E1 signals align with GPS frequency bands which makes receiver design simpler. A GPS plus Galileo multi-frequency GNSS receiver, for example, could be made with a fairly simple radio-frequency footprint.

And what are your thoughts on BeiDou, the Chinese satellite navigation system?

BeiDou is great. The eastern hemisphere is enjoying the benefits of having three fully functional GNSS systems where you can often track more than 35 satellites. BeiDou, being a CDMA signal, acts much like GPS for precision needs. There are only a few satellites in the western hemisphere today, but that will change as BeiDou Phase III is rolled out. The Phase III system will be compatible with GPS and Galileo in many ways, adding simplicity and consistency to receiver architecture.

With China, Europe, India, and Russia actively developing GNSS systems, there are more positioning satellites available than ever before. How do you see navigation benefiting from this increased availability?

The more satellites and signals, the better! Accuracy improves, of course, but the real benefits are seen in robustness and in the ability to operate in environments with more obstructions and blockages. With so many satellites, even single-frequency RTK can become viable for many applications. Jamming and spoofing become more difficult, because there are more cross-checks and receiver autonomous integrity monitoring (RAIM) becomes more solid. Carrier-phase-based techniques for position extrapolation will be particularly robust with the addition of so many signals.

Your company is involved in several industries including agriculture, construction, machine control & mining, GIS & survey and marine. Which trends and developments do you foresee for these industries?

There is definitely a great deal of ground to cover when you look at all these market segments. I believe we are leaders in high-precision GNSS as well as delivering great technology and products to our volume-OEM and dealer-network customers. From that point of view, it is possible to categorise common ground for all high-precision GNSS market segments. We are committed to developing lower-power, less-expensive and smaller-footprint solutions while not trading off high-precision accuracy and performance. There remain only a handful of major GNSS players in the industry with complete vertical integration in developing their GNSS-centric solutions, and HGNSS is one of them. By controlling our technology from application-specific integrated circuit (ASIC) through to finished product including all the iterations along the way, we are able to drive technology and performance while reducing cost. High-precision GNSS application solutions will be entering the consumer electronics world via several platforms in the months and years to come. Combining the strengths of HGNSS' proprietary technology with UniStrong's technology, product platforms and manufacturing capabilities uniquely positions us in every world market and market segment for GNSS solutions.

And which exciting projects is Hemisphere GNSS working on right now? Can you give us a sneak preview?

We will be announcing several key OEM business relationships as well as a number of new product offerings in the months to come. We will be happy to provide more details when the time is right.

Biography

Chuck Joseph has over 30 years of executive leadership experience across multiple industries, having served in corporate officer and board-level capacities. He also has extensive experience in GNSS OEM and direct sales market segments including survey, GIS, machine control, marine, agriculture, avionics, personal (mobile) navigation and tracking systems. Prior to joining Hemisphere GNSS, Mr Joseph most recently served as president and COO of Nusola Inc., an energy technology company he co-founded. Previously, Mr Joseph was senior VP and general manager of Immersion Corporation, corporate VP of marketing and sales for Magellan Corporation, and executive VP and general manager of Trimble Navigation.