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The race to embrace NewSpace – how market leaders see the space market today

The promise of global connectivity, smart cities, vehicles that are themselves dynamic nodes, intelligent agriculture, industrial IoT, and much more can only be achieved by integrating non-GEO constellations with the terrestrial 5G ecosystem by means of a more sophisticated ground infrastructure. Efforts to achieve this lofty goal are already afoot, but there is still a long way to go.

Crispin Littlehales, Global Contributing Editor, Satellite Evolution Group

MEO and LEO satellites offering terabit level capacity along with dynamic beams and software-defined payloads are being launched by the thousands. The NewSpace evolution is well underway with upwards of 50,000 satellites predicted to be in orbit over the next decade, according to Northern Sky Research (NSR). Now it is up to the ground segment to figure out cost-effective ways to take advantage of the potential these mega-constellations offer. With that in mind, we checked in with six companies to see how they are preparing for the future. While all those we queried expressed excitement about anticipated business growth, they also spoke about areas of immediate concern.

READY TO ROLL

Comtech already provides a variety of digital VSAT terminals, digital modems, and amplifiers into the smallsat market. The company also sells a product that flies on a small satellite and is used as the primary communications waveform for a constellation. Louis Dubin, Senior VP of Product Management for Comtech Satellite Network Technologies, Inc. states, "Our goal is to make products and develop software that is constellation and capacity agnostic. By doing this, we feel we can support the satellite community in a more efficient way."

Another company that is set to serve the needs of mega-constellations is Advantech Wireless Technologies. "LEO pretty much blends in with our overall market strategy," says Tony Radford, VP of Global Sales. "We're principally focused on RF converters and high-power amplifiers that cover a broad range of power and frequency. Since there is very little differentiation between amplifiers that are used for MEO/LEO and those used for GEO satellites, we're equipped to handle almost any satcom application."

The CPI SMP Satcom Products Group, which designs and manufactures high-power amplifiers for satellite uplink communications, is also positioned to support new constellation types. "We continue to augment and advance our Ka-band, Q-band, and V-band HPA capabilities," says Pam Lugos, VP of Business Development for CPI SMP. "The key thing that we see is the growing demand for data and throughput on all satellite platforms, regardless of size."

That leads to increased demand for newer and more powerful ground station hardware."

Customers in the gateway markets are now using Mission Microwave's high-power Ka-band Solid State Power Amplifiers (SSPAs) and converters in the 250–400-watt range. Used as a drop-in replacement for a 500-watt (Travelling Wave Tube) TWT, the 400-watt SSPA is a fundamental game-changer for the widespread deployment of Ka-band gateways for GEO, MEO, and LEO networks, according to Steve Richeson, VP Sales and Marketing for Mission Microwave. "One lesson we have learned about the Ka-band market is that customers always want more power and bandwidth. Typically, we have offered support of new constellations by adding capabilities to our existing product while maintaining consistent mechanical and electrical interfaces."

COLLABORATING WITH CUSTOMERS

Mission Microwave's customers design, manufacture, and implement ground terminals in the tactical, mobile, maritime, airborne, and gateway markets. Most of the existing business comes from traditional GEO and MEO constellations. "These are still early days in the LEO market and both customers and end-users are involving us directly or indirectly in their approach to these newer architectures," says Richeson. "Still, MEO, LEO, and microsatellite constellations represent both opportunity and risk to the ground equipment manufacturers. Expectations are at the peak of the hype cycle now and it's not clear that there is enough sustainable business to support the investments being made in this sector."

Comtech believes in engaging early with operators. Dubin explains, "Flexibility and orchestration are commonly

discussed, and these concepts offer significant opportunity, but they must be met with the proper level of commitment and engineering resources to support these designs. Finding the right partners, securing the right resources, and ensuring that our long-term goals and milestone progress points align with all parties is important."

Alvaro Sanchez, CEO of Integrasys, a company that specializes in creating software tools for satellite operators and service providers, is also a strong believer in customer-oriented product development. "The customer explains the problem so that we can better understand the need. Thanks to multiple interactions with multiple customers, we are able to bring more value to our products," notes Sanchez.

Today, Integrasys offers a variety of systems, all of which work with NewSpace. "We have a tool that enables customers in the design of both satellites and the ground before launching. Once you launch a constellation, we have another system that proves it works. You can use another tool to demonstrate that all the services are working correctly, and we also have a solution to certify that the level of service provided is in line with customer expectations," he says.

FACING CHALLENGES

Avanti Communications is a leading Ka-band high-throughput satellite capacity partner to the communications industry across EMEA and is focused on driving connectivity in Africa. "A significant part of our mission is to work with the people of Africa to empower growth, protect communities, and unlock opportunities for individuals, businesses, and governments though better

The advertisement for Azure Shine International Inc. features a composite image of a city skyline at night, a satellite in orbit, and three large satellite dish antennas. The company logo, a stylized star and wave, is in the top left. The text "也翔國際股份有限公司" and "AZURE SHINE INTERNATIONAL INC." is prominently displayed. Below this, it says "Eutelsat / Intelsat Type Approved VSAT ANTENNA SYSTEM" and "DTH ANTENNA SYSTEM". At the bottom right, there are logos for Eutelsat and Intelsat, a QR code, and the website "http://www.azureshine.com.tw".



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connections throughout the continent," says Vikas Grover, Avanti's CTO. "To support our mission, we bring enterprise-grade products and services that combine GEO, MEO, and LEO satellites and terrestrial network capabilities. But addressing the digital divide remains a considerable challenge."

Although the pandemic heightened the demand for greater capacity and extended coverage, it also created significant supply chain challenges. For Avanti, deliveries can take up to a year to arrive. "While these challenges will ease over time, we are likely to continue to feel the effects for the next 18 months," notes Grover.

CPI has also experienced supply chain issues over the last two years. "From shifting budgets to projects delayed for funding issues, the standard cadence of our markets has been interrupted," explains Tom Goebelbecker, VP of Sales and Marketing at CPI Satcom & Antenna. "While that may make business activity levels more difficult to predict, it also allows for interesting and useful changes to research and development, resulting in new designs, technologies and solutions that we will be able to share with customers as the world emerges from the pandemic and gradually returns to a more stable rhythm."

For Mission Microwave and its customers, one of the biggest challenges is figuring out the best types of ground terminals for supporting the new architectures. "User terminals need to be reliable and scalable," says Richeson. "Adding complexity and cost is contrary to that pillar of satellite network design. Our customers have a good understanding of the trade-offs, and their customers are overwhelmed by highly publicized claims of low-cost ubiquitous broadband 'coming soon'," he continues. "At best, this confusion leads to delays in much needed technology updates to the existing satellite networks. At worst, it leads to impractical design requirements that ultimately disappoint the end users and lead to poor investments of time and money by the suppliers to the industry."

Balancing the cost versus performance equation is proving to be a matter of concern for Advantech. "These projects demand products that will meet extremely high-performance targets at fire-sale prices," claims Radford.

Race to Embrace NewSpace

"Optimization is always warranted, but if you squeeze too much of the costs out of a high-power amplifier, it's likely that you'll end up compromising reliability and longevity. Any up-front savings will be consumed with down time and the logistics costs of servicing RMAs."

WHAT'S NEXT

The industry still has a maturity path to traverse with LEO technology, and Avanti predicts that it is likely to be 3-5 years before it can start offering mass market GEO and LEO combo services. However, Avanti is already playing a vital part in the rollout of 5G connectivity. Grover notes, "We believe everyone has the power to 'be more' and by helping to break down the barriers preventing Mobile Network Operators (MNOs) and Tower Companies (TowerCos) from accessing 5G coverage we will unlock opportunities that will enable these businesses to thrive. Last year we announced the launch of INSTANT5G, a new research project endorsed by the European Space Agency, UK Space Agency, and the Romanian Space Agency." The ongoing project is expected to extend 5G coverage by means of integrated satellite and terrestrial communication.

CPI just released a new larger aperture Earth observation antenna product. "Our LEO TT&C Antenna System product line is expanding in support of users moving to higher frequency bands, with many of those customers now migrating to Ka-band and looking to even higher frequency ranges for the next generation of products and services," adds Goebelbecker.

After two years of preparation, Integrasys is set to introduce its latest product this month. "We are excited about this product because it solves a current and future challenge—interference," states Sanchez. "Whether the interference is caused by 5G and C-band or by electronic warfare from enemy camps, our tool can nullify it."

Unification between the ground segment, terrestrial 5G, and NewSpace is still a work in progress, but a great deal of targeted innovation has commenced. Efforts by the DIFI/DIS to establish standards are advancing swiftly. Digitization, virtualization, and cloudification are being embraced. While it may take several years for seamless integration to be fully realized, there is clearly no turning back. ●



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