

Advantech Wireless Technologies

By Cristi Damian, Vice President, Business Development

Disruptive technologies and innovative network architectures dominated the SATCOM industry during 2018 and dramatically changed the methods by which SATCOM businesses plan and operate.



In the well-established GEO Satellite world, discussions today are more about 5G, IoT, and LEO/MEO constellations than about High Throughput Satellites (HTS) or the launching of another GEO satellite.

As a company that thrives on technological challenges, Advantech Wireless Technologies ("Advantech") was part of this massive industry shift. As history shows, companies that have the DNA to adapt and thrive in adversity are those that will lead the innovation and industry evolution in the future.

2018 started on a highly positive note for Advantech. In January, **Baylin Technologies** purchased the company. The Baylin Group includes **Galtronics**, a 40 year veteran in the wireless communications business specializing in advanced antenna design and a pioneer in 5G MIMO technology. Advantech itself brings 30 years of expertise in active RF MW design in cellular, terrestrial point to point microwave links as well as SATCOM and RADAR technologies. The synergies between the two companies are dynamic and strategically aligned.

Advantech has a successful history of listening to the firm's customers and collaborating with them to successfully solve their challenges. Due to increasingly sophisticated customer demands, technologies in the SATCOM industry today can quickly become outdated.

Only a few years ago a teleport operator or service provider could invest in a hardware solution and confidently know that it would safely last for 10 years or more. Today, this is not necessarily the reality. Fifteen years ago, data rate demand would range from a few kbps to 1 Mbps. Due to the introduction of HD video services, a single HD video channel — when compressed — would require as much as 7 Mbps. This demand required LTE cellular growth. Now, ultra HD 4K video requires an additional four times more bandwidth. Required data rates today range up to 30 Mbps. This demand brings challenges to older teleports, SNG trucks, and terrestrial wired IP networks.

Looking forward, 5G and IoT will require as much as 10 Gbps of aggregated data rates as well as low delay processing time for real time applications, such as autonomous vehicles. These technological advancements demand leading-edge solutions from service providers and satellite operators.

Higher data rates require higher bandwidth. Higher bandwidth means higher RF transmitted power and higher linearity. Improved data rates can also be achieved by using higher order modulation schemes, but these have a higher C/N ration and therefore more RF power. This is where Advantech Wireless excels. In 2010, Advantech released a complete line of Gallium Nitride (GaN) based Solid State Power Amplifiers that addressed two separate markets:

- 1. The Mobility market, which required small and energy efficient but powerful SSPAs**
- 2. Large Teleports that required very high power SSPAs to efficiently support high bandwidth demand and high modulation.**

While hardly imaginable five years ago, installing SSPA technology with power levels of 6kW in large teleports has become the norm. These modular systems with built in redundancy provide 100 percent availability for critical video broadcasting events while drastically reducing OPEX at the teleport.



The initial investment in Advantech's **SapphireBlu™** GaN based technology is typically recovered in less than two years of electrical energy savings and overall operating costs because the system is capable of replacing tens of klystrons or traveling wave tubes (TWTs). The most critical advantage of the SapphireBlu GaN technology is the ability to support Ultra HD 4K 8K and higher order modulation rates such as 256 APSK.

In 2014, Advantech Wireless designed and built two teleports that were used for the first time to transmit major sporting events in Ultra HD. This was a milestone and an international achievement largely recognized in the industry.

The ability to design and manufacture SSPA technology that reduces OPEX and is future proofed against additional bandwidth increase demands puts Advantech Wireless in a commanding position. The company is currently actively involved globally in analyzing existing teleport architectures and providing consulting services for technology upgrades.

All teleports today struggle with high operating costs and reduced revenue due to customer migration to alternative technologies. Most of these teleports are using inefficient and often outdated RF technology.

As a major sign of market acceptance, in September of 2018, one of the largest worldwide video broadcasting companies installed a 3kW GaN based Ku-band system, capable of up linking more than 1 Gbps of Ultra HD video content.

The recognition of the company's state-of-the-art technology solutions and R&D innovations led several international customers to grant Advantech single source supplier status for all their RF needs. Successful organizations realize the benefit of reducing and consolidating their supplier chain while aligning their R&D road maps.

Advantech achieved an additional milestone in the summer of 2018. A 256 APSK link was achieved with just one 4.5 meter C-band antenna, equipped with only a 400W C-band SapphireBlu GaN technology. A remarkable efficiency of 8 bits per Hz was achieved with a much smaller EIRP (*Effective Isotropic Radiated Power*), which allowed the end user to employ only a portion only of the transponder, without taking the entire capacity from adjacent customers.

With 5G and IoT coming online, now data rates in excess of 1 Gbps will be economically feasible for a SATCOM Uplink. This solution was desperately needed by the teleport operators in order to remain relevant in the years to come.

In July of 2018, **Alga Microwave** ("Alga"), an RF and MW design and manufacturing company, also joined the Baylin Group. Alga Microwave brings unique expertise in SATCOM as well as the wireless and cellular market. Some of the world's largest cellular network manufacturers use Alga Microwave technology in their base stations, strategically positioned around advanced Microwave filters, combiners, and diplexers.

In December of 2018, Advantech will relocate with Alga to a new, state-of-the-art design and manufacturing facility to efficiently deliver one of the most ambitious R&D roadmaps in the industry. The future prospects for Advantech and the SATCOM Industry are extremely exciting.

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Mr. Cristi Damian joined Advantech Wireless in 1995 where he held various positions in Operations, Manufacturing, Sales, Engineering and Customer Support. Prior to Advantech Wireless, he acquired experience as a hardware engineer in various high-tech companies. Mr. Damian holds a Master's degree in Electrical Engineering from Concordia University.