

With David Burr, V.P. Business Development for Comtech EF Data

The Race to Ultra-High-Speed Connectivity

In the race to provide ultra-high-speed connectivity, Comtech EF Data continues to maintain a commanding market position, especially in Cruise, mobile backhaul, and demanding government markets.

To find out how Comtech maintains a lead in these high-demand markets and how it plans to handle the future demand for higher and higher network performance levels, we met with David Burr, Vice President Business Development for Comtech EF Data.

SMW: The need for ultra-high-speed connectivity is accelerating in many industries. Cruise, Oil and Gas, and Mining are using more bandwidth than ever before. What are the most significant advancements in its delivery, and in the future, how will hub and modem infrastructure providers enhance their infrastructure to meet the demand for higher and higher speeds?

David Burr (DB): High-speed capability is one of Comtech EF Data's core competencies, which accounts for our leading positions in cruise, energy and cellular backhaul markets.

As efficiency becomes more important and bandwidth increases, we are investing in

research and development to enable higher speed waveforms and advanced chipsets.

For example, for SCPC links, we feature DoubleTalk® Carrier-in-Carrier® technology, allowing satellite users to realize spectral efficiencies (i.e., BPS/Hz) that are unachievable with traditional links.

Incorporated into our modems, DoubleTalk Carrier-in-Carrier, allows transmit and receive carriers of a duplex link to share the same transponder space, essentially "stacking" the transmit and receive carriers onto the same frequency. This technique minimizes the amount of MHz required to support the same data rate, which reduces capacity costs. When used with 16-QAM, it approaches the bandwidth efficiency of 256-QAM (8 BPS/Hz).

Heights H-Plus is our "workhorse" remote gateway for maritime, and energy applications, and Heights Pro our ultra-high-speed platform, is ideal for Cruise and mobile backhaul applications.

Both Heights remote gateways deliver ultra-high-speed connectivity and offer a dynamic SCPC option (H-DNA) for the return

link. To maximize QoS, customers can also “tag” their traffic at Layer 2, Layer 3 or at MPLS, which allows for the shaping and prioritization of traffic. The Heights Plus delivers up to 100 Mbps X 40 Mbps and the Heights Pro, 250 Mbps X 200 Mbps.

Heights' improved performance has resulted in many of our customers upgrading from legacy TDMA systems, and they find that the bandwidth savings alone more than pay for the cost of the upgrades. In the future, we will continue to optimize existing processes to support higher data rates for applications like IoT and Cloud computing.

SMW: Satellite capacity is currently available from MEOs, and GEOs and will soon be available from LEOs. Multiple antenna installations with supporting dual or tri-band frequencies will result in a considerable increase in available bandwidth. Channel Bonding will be possible in high demand markets such as Cruise. Do Comtech Heights modems currently support channel bonding?



(DB): There are two parts to this question. Multi-band antennas minimize the amount of real estate required to support multiple frequency bands.

For example, when Intellian introduced their Tri-Band Antenna, we worked with them to add commands into Comtech Heights to support switching frequency bands, enabling us to control the roaming, depending on location. We are also working with Orbit to implement the same functionality with their dual-band antennas.

With data rates going up, in many cases, the data rate required for a single vessel is more than you can get from a single transponder. 120 Mbps X 80 Mbps is becoming the standard for larger Cruise vessels. So, it's necessary to spread the capacity across multiple transponders. We call that feature Channel Bonding.

It's a feature we implemented for Cruise customers and can work on the same satellite

or with different satellites. We have integrated Channel Bonding plus roaming into our Heights remote gateways to support our Cruise customers. It can work on the same satellite or with different satellites.

SMW: Kymeta is interested in eliminating the modem hardware component. Is virtualization possible with Heights now or in the near future?

(DB): I don't see modem hardware going away. However, we are working with Kymeta to integrate our modem card inside of their terminal. It's more of a case where the modem is hidden rather than eliminated.

Regarding virtualization, we have seen a different direction. We have added computing resources inside our Heights H-Plus modem, which allows our customers to run their own applications inside the modem – for example, virtual routers, firewall, or Wireshark to help them troubleshoot. Virtualization eliminates the need for additional external hardware – a valuable differentiating feature for our modems.

SMW: Software-defined modems are becoming more popular, allowing for modification and upgrade of modem capabilities through over-the-air firmware upgrades. Are Comtech Heights modems software-defined?

(DB): Our SLM 5650 A and B modems are software-defined. It's an essential feature for our military customers who may need to change the modem's personality.

Depending on the country, different networks might run on different standards, interfaces and types of encryption. So, changing the personality of the modem on the fly is important

On the commercial side, the modems are software upgradeable over the air. However, it's less important for commercial customers to change modem personalities, but they still want to keep up with the latest features and functionalities via updates.

SMW: Satellite operators and integrators often want to modify a modem's beam switching logic to adjust to vessel itineraries, weather, or customer preferences. Is this capability a significant advancement, and if so, has Comtech embodied this flexibility in its modems?

(DB): We have a Mobility Manager and have had it for fifteen years. Most customers run it in automatic mode with the network managing the beam roaming choices.

However, we offer an API with which customers can manually override the automatic function. It's useful to accommodate unusual vessel itineraries

when it's necessary to manually force vessels into the next beam to relieve congestion. Typically, this occurs proactively and is done in the customer's NOC.

SMW: The cruise industry employs various technologies to maximize bandwidth, including the use of C-Band, Ku-Band and Ka-Band and GEOs and MEOs. I understand SES is using a combination of GEOs and O3b MEOs and is serving around 30 vessels. What are the significant advantages of the GEO-MEO approach vs. all GEO? How do Comtech modems facilitate the operation of these multi-satellite networks?

(DB): We have been working with O3b since the beginning, and our modems have completed four or five million live MEO-GEO satellite handovers.

Customers love the O3b solution because it's a high performance and high data rate solution. However, with the current constellation, the coverage is limited. So, you need GEO to provide coverage for longer routes outside of the MEO coverage.



As the vessel transitions from MEO to GEO coverage, our system automatically switches to GEO. Switching can also occur when Rain Fade makes Ka-Band inaccessible and necessitates a switch to C-band.

As vessels sail various global routes and encounter changing weather conditions, it makes sense for them to invest in a system that supports multiple Bands and multiple orbits. It also gives them a future-proof option.

SMW: Other Hub and modem infrastructure providers are working to incorporate 5G protocols into their products. In particular, one manufacturer is upgrading their modem to enable it to emulate a 5G base station, thereby allowing for content to be multi-cast directly to the end-user. Is Comtech also involved

in 5G integration and, if so, how?

(DB): We have been a leader in mobile backhaul for more than a decade, and we have already worked with a number of our customers on 5G trials and proof of concepts.

In 5G networks, just like 3G and 4G, you have subscribers connecting to base stations, which connect into the core network. 5G protocol on the

backhaul links is very similar to 4G, enabling us to support both protocols.

We see that backhaul from the base station to the core network is a much bigger market for satellite than connecting directly to the subscribers, and don't see 4G, 3G, or 2G going away anytime soon. As 5G networks extend to rural areas, backhaul is going to be the dominant application.

SMW: Today, the satellite modem market is relatively small. However, LEO satellite constellations will deliver the Internet to hundreds of millions of end-users, creating huge demand for satellite modems. How will modems evolve to meet the needs of a mass-market?

(DB): Today on GEO, you have different operators supporting different applications. You have operators going direct to end users and others focusing on mobile backhaul, Trunking or government. That's where we focus and will continue to innovate.

In LEO, the markets will be similar. These high-end markets are capable of supporting modems priced in the \$2000

and above price range. The consumer market is different. Frankly, to build an antenna and modem for a low-cost LEO satellite terminal will be very challenging.

SMW: Steve Collar, SES CEO, speaks about eliminating the "walled garden" that limits network interoperability. Hub and modem infrastructure are still relatively incompatible. Do you see the industry moving toward standards that will allow roaming between dissimilar networks? Are the barriers technical or competitive?

(DB): I think it's a question of what outcome customers are trying to achieve and if standards help. Our industry tried open standards several years ago with DVB-RCS, and they failed. Customers wanted better networks and the effect of standardization was to slow down innovation. Individual companies with proprietary standards were able to innovate faster and provide better networks. It's about creating an incentive and encouraging innovation.



About David Burr

David is Vice President, Business Development for Comtech EF Data where he develops strategies and applications to address the maritime and satellite operator market verticals.

Burr is passionate about the role of efficiency and its application to satellite communications technology and business models.

As a 30-year veteran of the satellite communications industry, he previously served in various Product Management,