



Photo courtesy of Isotropic Networks

Gearing up for a 5G future

The 5G revolution is upon us, and everyone from service providers to terrestrial network operators, satellite owners and teleports are getting in on the action. The new ultralow latency connectivity is expected to usher in a new world of machine-to-machine communications and Internet of Things applications, with great opportunities for teleports across the globe.

Hank Zbierski, Chief Catalyst and Co-Founder, Isotropic Networks

The advent of 5G is upon us and it promises so much from blazing-fast mobile broadband speeds, exponentially higher efficiencies, massive scalability, and significantly lower cost for mobile and fixed networks, along with ultralow latency to enable new applications like massive machine-to-machine communications (M2M) and the Internet of things (IoT). It will offer a unified network infrastructure where all access technologies – wired, wireless, terrestrial and satellite – work in sync. Known as the ‘Network of Networks,’ it offers a golden opportunity for satellite to play an integral role within the mainstream telecom network and it is being included from the start.

5G’s future impact on satellite has been called a revolution. Experts say it will dramatically affect how satellite networks integrate into the terrestrial network. Unlike past standards, where VSAT equipment had to catch up and integrate with mobile/cellular network standards, 5G is being standardized

to enable full interoperability with satellite from the outset.

Why satellite?

The 3GPP is working to integrate current and future satellite constellation types into the 5G standard architecture so that a seamless service and traffic flow can be created for many new types of services. 3GPP members and the industry have recognized the key advantages that satellite communications can bring to mobile networks. Satellite enables:

- **Wide area coverage/ubiquity** - The ability to reach anywhere on the globe wirelessly, beyond the reach of terrestrial infrastructure;
- **Mobility** - Anywhere connections to moving platforms (e.g., aircraft, trains, ships, vehicles, unmanned aerial vehicles); and
- **One to many/multicast** - Efficient simultaneous, wide area data broadcast to dispersed sites for live transmission or local/edge caching.

Isotropic: Big plans for 5G

Set on the idyllic banks of Lake Geneva, Wisconsin, one of the very best locations in the US for satellite transmission, the Isotropic Earth station comprises nine antennas, 21 acres and its headquarters. The company has a personal interest in a facility in Europe and has recently ordered three new hubs from ST Engineering iDirect. The company is also set to be co-located in other facilities to allow global coverage from one location with a global Network Management System, with every hub controlled from Lake Geneva. Isotropic will cover North and South America, Europe and Africa and the Middle East out of a European facility in Poland and will also co-locate in a facility for Asia-Pacific coverage.

Isotropic shares the industry view that satellite networks can help service providers maximize 5G and that satellite networks will require increased network visibility, bandwidth management, and optimization to integrate with 5G - satellite networks will need to plug and ‘play nicely’ in a 5G world.

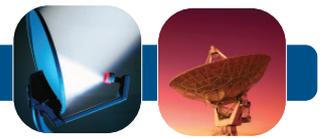
Satellites can affordably extend connectivity to 5G base stations (gNB) and even user devices beyond the reach of terrestrial networks, for example, into remote, rural, low-density locations. Not only this, but satellites can provide broadband connectivity to aircraft, vessels, rail, and vehicles outside of cell range and support cellular roaming services for subscribers or devices on mobile platforms. Satellites can efficiently multicast livestream broadband media and cacheable apps and content to distributed 5G edge nodes. As a result, they can reduce connectivity requirements for backhaul connections to base stations and improve end-user service quality.

Satellite networks can also provide backup capacity and mobile/transportable 5G cells for emergencies and disaster recovery connectivity when terrestrial networks are down - for example, due to cable cuts or natural disaster.

For low bit rate IoT networks with latency-insensitive applications, VSATs can efficiently concentrate local traffic in remote locations or moving platforms for connectivity to the network.

Finally, the ability to offload low-priority traffic, or multi-castable content, from backhaul networks (enterprise or cell) can help preserve precious spectrum on the main network or provide overflow capacity for peak periods.

Satellite networks multicast livestreams and big data efficiently to distributed edge servers on a 5G network. This



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can free up precious spectrum between cell nodes and/or backhaul capacity so that other, more latency-sensitive types of traffic can run between the gNB and core network (CN) over terrestrial connectivity.

In addition to reducing backhaul load, by providing a cache at the base station close to the edge, user latency can be reduced when compared with requiring content to be pulled from the cloud. As 4K video streaming services - and smartphones with 4K screens - become more widespread, this caching capability along with multicast could become important to delivering improved user Quality of Experience (QoE).

5G networks that use millimetre wave frequencies will require more base stations per square kilometre of coverage compared with LTE and 3G. The higher base station count increases the number of terrestrial backhaul points that will need to be added to the network. Satellite multicast networks are extremely bandwidth efficient for multipoint networks, adding zero incremental bandwidth cost as the number of sites scales up.

Isotropic is testing and rolling out early stage 5G applications building on the company's 4G/LTE experience and is working with clients (carriers, MNOs, maritime, and mobile communications networks) and partners to address 5G opportunities.

Datadragon: Revolutionary bandwidth management for 5G

In addition, Isotropic has also introduced its solution, Datadragon, to the market. Datadragon is a bandwidth management and service platform from Isotropic that enables never-before-possible levels of application-level transparency, optimization, and personalization across any single or hybrid network. Through its proprietary bandwidth monitoring platform, Isotropic's clients can now provide their customers or end users with real-time visibility into their Internet usage so they can proactively analyze and address everything from service requests to billing issues.

Datadragon's patented algorithm, paired with state-of-the-art AI technology, offers detailed insights into day-to-day user activities and gives our clients the ability to optimize and prioritize bandwidth allocation according to their end users' needs.

The goal of Datadragon is to provide clients with a deep understanding of their bandwidth usage patterns and user trends as well as with tools to help them more efficiently

deliver high quality of service and better user experience. Strategic insights into end-user bandwidth usage can provide opportunities to create new revenue streams and increase network profitability.

Key features of Datadragon include the following:

- **Transparency:** Datadragon creates a hardware-agnostic platform that gives network managers and end users a real-time picture of bandwidth utilization at the application level across any single, multi-use, or hybrid network.
- **Visibility:** Datadragon's proprietary algorithm provides detailed insights into end users' real-time usage. This creates opportunities to proactively troubleshoot performance issues more efficiently.
- **Optimization:** Datadragon gives network managers the ability to understand and allocate the appropriate levels of access to bandwidth, creating opportunities for upselling and increased sales.
- **Frictionless:** Datadragon gives network managers the power to deliver bandwidth on demand. Satellite remote access is as simple to provision as a terrestrial connection.
- **Personalization:** By leveraging analytics and AI in Datadragon, operators can now customize their data plans to match end users' specific needs.

Prepared for the 5G Future

Times are changing fast, and it is critical that the industry is ready for these changes and able to adapt and thrive. Satellite offers so many unique features that it must become an integral part of the delivery jigsaw for 5G networks. Innovation such as Datadragon will be fundamental in ensuring a smooth transition to 5G for customers, giving them more control over their networks. There is still a lot of work to do in terms of working out how integration will be completed, but this will be a core focus for the entire industry – and there will be a plethora of opportunities to seize upon. ■



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