

MARKET Briefs

Executive Summaries of Market Trends and Opportunities in Key Market Segments and Regions Worldwide

Trends in the Satellite Ground Segment Market



Trends in the Satellite Ground Segment Market

by Elisabeth Tweedie

In recent years the satellite industry has undergone a profound change—and one that is still continuing. High Throughput Satellites (HTS) have been joined by Very- and Ultra-High Throughput Satellites (VHTS and UHTS), and more recently by software defined satellites. Thousands of Non-Geostationary Orbit (NGSO) satellites are in operation. At the same time, new applications are constantly emerging. In-orbit Servicing (IoS) is a reality and Space Situational Awareness (SSA) is becoming a necessity, the Internet-of-Things (IoT) extends its reach on a daily basis. The range of frequency bands in regular use is expanding. L, C, Ku and Ka-bands are being joined by greater use of S, X and now V-band. Space tourism is a reality and in the next few years there will be satellites orbiting the moon, as well as earth.

None of this would be possible, were it not for a rapidly evolving and growing ground segment. According to Acumen Research, the Ground Segment will experience an impressive compound annual growth rate (CAGR) of 12.8% to reach US\$181.4 Billion in the ten years to 2032.

Key Trends Driving Increased Utilization of Ground Services:

NGSO Constellations and Multi-orbit Networks

In 2022 Low Earth Orbit (LEO)

constellations accounted for 52% of ground segment revenue, but this is likely to increase rapidly. Euroconsult predicts that by 2026, 90% of available in-orbit capacity will come from NGSO satellites. By definition communicating with satellites that are passing rapidly overhead, is far more complex than communicating with a GEO satellite. Constellations therefore demand far more from the ground system. They need complex traffic management systems, flexible beam allocation, load balancing and tracking antennas. As if this wasn't enough, in order to deliver committed Service-level Agreements (SLAs), switching between orbits and frequencies is also a requirement for some customers.

IoT Evolution

The Internet of Things (IoT) continues to experience rapid growth. The number of connected devices is expected to reach 29 Billion by 2027, up from 14.3 Billion in 2022. Applications range from security and surveillance, to automation and smart meters, and most importantly for satellite, tracking applications; everything from shipping containers to cows. Things that roam into areas where there is no terrestrial coverage. This segment also encompasses offshore, maritime and aeronautical applications, where remote devices are used to monitor equipment and automate processes.

5G

The development of the 5G cellular standard, marks the first time that the satellite industry was invited to participate in the creation of a terrestrial standard. As a result, satellite is integrated into the standard. Ultimately, this interoperability will facilitate the expansion of voice over satellite, and already data communication direct to the cellular device (D2D) is occurring. Some have referred to this as “the largest opportunity in Satcom’s history.”

Increasing International Tensions and Military Conflicts

As international tensions escalate, so does the demand for communications and surveillance by governments and militaries around the world.

Evolution of the Ground Segment to Accommodate Growth:

New Technologies

As the barriers to entry are lowered and new applications and users emerge, so data usage grows. According to Euroconsult by 2031 revenue from data services will account for 42% of total satellite revenue, up from 15% in 2021. In order to cope with this increase in volume and the accompanying complexity of data processing, there is an increasing need

for new technologies including automation, machine learning (ML) and artificial intelligence (AI). Among other things, these provide real-time detection of anomalies, predictive maintenance and problem detection, and more efficient use of resources, so optimizing performance and reliability.

Tracking and Phased-Array Antennas

Demand for these is increasing, as they are a necessity for both the NGSO constellations and also for maritime, aeronautical and land mobile applications whether these are communicating with a GEO or NGSO satellite. Phased-array antennas offer the advantages of dynamic beam forming for improved signal quality and communication with multiple satellites simultaneously.

Shifting Frequency Bands

While the use of Ka-band is expanding for communication satellites, earth Observation (EO) satellites often use S and X bands for remote sensing and research applications.

RF over IP

This is growing rapidly, it enables more cost-effective distribution of RF signals over greater distances, with minimal signal loss. This reduces the complexity of the ground infrastructure, removing the need for all processing to be carried out in the same location as the physical antennas. It also permits greater geographical diversity of antennas, providing remote backup in the case of weather outages, whilst only requiring one data center, which could be a virtual one.



Software Defined Ground Stations

While most service providers still rely on physical hardware for ground operations, there is an increasing trend towards virtualization of the ground, moving all or part of the infrastructure into the cloud.

The software defined ground station is more flexible and able to seamlessly switch between applications, satellites and frequency bands. It is also more scalable, allowing an operator to grow in-line with demand.

Standardization

At one time every hub manufacturer utilized its own proprietary standards. Not only did this mean that integration with terrestrial telecoms was more difficult, it essentially locked a user into one manufacturer. This is no longer the case as manufacturers are adopting common telecom standards. This is clearly shown by the Digital Intermediate Frequency Interoperability (DIFI) Consortium. Formed in late 2021, to enable the digital transformation of space, satellite, and related industries by providing a simple, open, interoperable Digital

IF/RF standard, DIFI now has over 60 members.

Smaller, Portable Hardware

The manufacture of smaller, cheaper equipment that incorporates more efficient waveforms, processing techniques and coding, is both a response to, and a driver, for increased utilization of ground systems.

Ground-Station-as-a-Service (GSaaS)

This is a particularly attractive option to global operators needing a corresponding ground infrastructure. EO and IoT in particular, where the relatively low data rates and contact time per satellite, don't justify the investment in a traditional owned and operated ground network. Offering GSaaS to those operators, enables them to move the expenditure from CAPEX to OPEX, lowering the upfront investment, reducing risk and allowing them to scale their operations in-line with demand.

Managing Ground Systems Complexity

The ground segment is under-

Krasimir Terziev and Bobby Kirchev Orbital Connect

Krasimir Terziev and Bobby Kirchev, both experienced telecommunications and satellite professionals, are on the executive team of Orbital Connect. Krasimir is Director of Business Development while Bobby is Director of Sales. In a relatively short time they built the company into one of the leading channel partners and authorized distributor of global leading hardware manufacturers. Orbital Connect's product list includes over 3,000 satellite products and RF components, solutions, and terminals, such as Earth station antennas, fixed and maritime VSAT or receive-only antennas, terminals on the move and on the pause, high power amplifiers, modulators, de-modulators, redundant systems, modems, RF products and matrices, RF over fiber solutions, LNBS, BUCs, BDCs, LNAs, among others. Excerpts of the interview with Krasimir and Bobby follows:

For the benefit of our readers, can you give a brief overview of what your company does?

Krasimir Terziev: Certainly.

Partnerships. Orbital Connect is an LA-based distributor of satellite ground equipment, partnering with over thirty leading manufacturers such as ST Engineering (iDirect), Norsat, and Terrasat, alongside other renowned manufacturers like Comtech, Kymeta, CPI, and MediaKind.

This extensive network of partners allows us to offer a comprehensive product range, ensuring we can meet the most sophisticated technical requirements.

We also partner with Speedcast, Sat-Lite, Novelsat, Global Invacom, Intellian, Cobham, ETL Systems, Spacebridge, Peplink, Globalstar, RF Design, Avcom, Satcube, Cisco, and others.

Products. We offer a diverse portfolio of satellite transmit/receive antennas, block-up converters, low-noise blocks, high-power amplifiers, and various modulators and demodulators. This selection extends to up/down converters, satellite modems, encoders/decoders, and hub systems, catering to different communication needs. We also provide solutions for on-the-move and on-the-pause applications, including satellite terminals and auxiliary RF products.

Services. Along with the equipment, Orbital Connect offers global Maritime, Land, and Mobility VSAT, Starlink, 4G/5G, satellite voice services, and connectivity solutions partnering with well-known service providers in the industry.

With this broad network of partners, we can provide satellite solutions for different network topologies. Whether customers request a star, multi-star, mesh,



Krasimir Terziev
Director-Business Development

single channel per carrier (SCPC), or mesh topology, we deliver the most efficient solution for their specific needs. We enable multiple services to enhance network reliability, supporting redundancy through robust service level agreements (SLA).

What key vertical markets or applications are you focusing on?

Bobby Kirchev: In each vertical market we focus upon, we aim to provide reliable communication options for our clients. The vertical markets we serve are:

- Maritime
- Broadcasting and Media
- Military and Defense
- Aviation and Aerospace
- Oil and Gas
- Transportation and Logistics
- Government
- Non-Governmental Organizations (NGOs) and Aid
- Science and Telecommunications

What differentiates you from other companies providing similar services?

Bobby Kirchev: The companies that have a similar business profile to ours are the ones that bet on diverse product portfolios in the first place. We have launched our online store, with more than 3,000 items, and keep adding to it. However, our vision extends beyond this solid foundation.

More than a product catalog—Our concept is to be a single point of contact for our clients and to provide professional end-to-end satellite connectivity products and solutions by offering pre-sales analysis, project management, supply, installation, configuration, and after-sales maintenance.

For example, we cooperate with manufacturers to supply customized RF products when possible. Additionally, we have a network of certified installation companies to install and configure the delivered satellite hardware at any location across the Globe.

Global reach is another differentiator. Orbital Connect operates two offices – one in Los Angeles and one in Europe which is a significant advantage for us and an ease for our clients because the satellite industry has a global demand.

Finally, while we may be newer to the game than our



Bobby Kirchev
Director of Sales

competitors, we see that as an advantage.

We ride along with esteemed and proven names, many with more than 20 years of expertise and experience, and we must show flexibility and agility to differentiate ourselves. We must run faster and jump higher to stay in the game, figuratively speaking. But I look at this as a benefit to our clients too.

Can you cite an example of how you were able to meet one of your client's requirements?

Krasimir Terziev: Absolutely! Through years of experience with clients from different verticals, we gained an understanding of their technical and business requirements.

On the technical side, we recently faced a unique challenge with an imposing research vessel sailing from Europe to the South Pole. The key objective was for the ship to remain with uninterrupted connectivity in the remotest areas on Earth or harsh weather conditions. The research team on board had a specific exploration mission and needed to promptly send reports to the

command center. We collaborated closely with the client and manufacturers to develop a customized solution that perfectly addressed their complex and demanding needs. Orbital Connect supplied, installed, and configured satellite equipment compatible with multiple satellite operators, ensuring uninterrupted data connectivity and voice services. Despite the vessel enduring extreme weather conditions, we enabled satellite service in L and Ku-band, with an optional Ka-band. The result of this hybrid-connectivity solution was 100% coverage during the scientific expedition.

We are looking forward to supporting similar missions in the future as well.

Beyond just technical expertise, we also understand the evolving business landscape. In today's satellite industry, stringent security and compliance requirements are crucial for securing partnerships with major clients and government projects. Orbital Connect prioritizes cybersecurity and adheres to industry standards such as cybersecurity policy, ISO 9001:2015, NIST 800-171, and export policy. Doing business in compliance demonstrates our commitment to reliable and secure solutions, making us a trusted partner for even the most demanding clients.

How do you see your company going forward?

Krasimir Terziev: I envision Orbital Connect going forward as a part of the satellite industry, expanding its market presence, strengthening its positions, and establishing a trusted brand. The current market industry trends in the ground segment are giving us the direction we should go to fulfill this ambition.

We will continue to expand our network of key partnerships to provide advanced satellite solutions and align our strategies with the changing dynamics of the satellite industry. We will remain committed to serving as the sole and reliable distributor of satellite connectivity services.

Here is an example: consider the deployment of a satellite network. The selection of ground equipment for the Teleport site and remote locations is essential in establishing a robust connection between space and ground.

Orbital Connect offers comprehensive solutions, including the VSAT hub, Gateway antenna, baseband equipment, and customers' remote terminals with RF accessories for an end-to-end solution. Given the complexity of telecommunications, we should adopt new converged IT solutions to meet the growing expectations of the end-user.

The transition from standard GEO services to NGSO

“...We will continue to expand our network of key partnerships to provide advanced satellite solutions and align our strategies with the changing dynamics of the satellite industry. We will remain committed to serving as the sole and reliable distributor of satellite connectivity services...”

and multi-orbital solutions, coupled with the virtualization of Teleports and the implementation of software-defined and flexible payloads, will require new technical knowledge and adaptation of innovative ground technologies to align with advancements in space and on the ground.


Moreover, in our organization, the customer always remains the primary focus. To maintain a high level of customer satisfaction, we constantly expand our sales and technical knowledge, refine our organizational procedures and policies, and enhance our products and services by introducing new features and improving the flexibility for our customers.

Anything else you want to add?

Krasimir Terziev: The world of telecommunications and satellites isn't just my career; it's been a two-decade journey of igniting my passion for the incredible science behind it. That passion fuels my can-do attitude with every new challenge I meet in this ever-changing field.

I believe in never stopping learning for myself and our team. By constantly growing and improving, I hope to level up our service and positively impact the exciting world of satellite communications. I adhere to the motto of Franklin D. Roosevelt: “A smooth sea never made a skillful sailor.”

Bobby Kirchev: Space has always fascinated me. Seeing how space tech and satellite connections drive innovation and change the world feels like living in the future! I am passionate about bringing these advancements to people, making their lives easier and safer by expanding their reach and security.

Technology is not an end but a powerful tool for improving modern individuals' quality of life. This vision empowers my commitment and excitement about being a part of the satellite communication industry. 

going a profound transformation, driven by increased demand and the growth in NGSO constellations in particular.

Ground stations are complex. They need antennas, modems, hubs, switches, routers, receivers and transmitters, encoders, network management systems, amplifiers, filters, transceivers and many other components. All of which have to work in perfect harmony, to provide the service required.

An operator could go alone and spend the time and money creating their own system, and dealing with different manufacturers; something that can become a major headache when something goes wrong and it isn't immediately clear where the fault originated. It is certainly a time-consuming and labor-intensive task when designing a new end-to-end system.

Alternatively, they could work with an experienced and reputable Systems Integrator, such as Orbital Connect. Not only does this mean that there is only one supplier to deal with, and "one throat to choke" if a fault occurs, most importantly, it means that an experienced vendor, familiar with multiple manufacturers' equipment can design an end-to-end system specifically tailored to an operator's needs.

Orbital Connect

Orbital Connect's product range includes over 3,000 satellite and RF components including Earth stations antennas, fixed and on-the-move and on-the-pause terminals and VSATs, receive-only antennas, high-power amplifiers, DVB modulators, demodulators, satellite modems, encoders, decoders, RF products and matrices, RF over fiber solutions, LNBs, BUCs,

"...An operator could go alone and spend the time and money creating their own system, and dealing with different manufacturers; something that can become a major headache when something goes wrong and it isn't immediately clear where the fault originated. It is certainly a time-consuming and labor-intensive task when designing a new end-to-end system..."

BDCs and LNAs. Orbital Connect's website has a very user-friendly store listing all the products they represent: <https://store.orbitalconnect.com/> It's a one-stop shop online store where you can order the products directly online.

The Orbital Connect team, have expertise in cutting-edge satellite connectivity services over diverse frequency bands, seamlessly connecting satellites from multiple operators.

It is an authorized distributor and reseller for over 20 leading RF equipment manufacturers well-known service providers and satellite operators. These partners are carefully selected from leading players in their segments and include: Speedcast, Inmarsat, Intelsat, IABG Teleports, MetOcean, Globalstar, ST Engineering iDirect, Norsat, Terrasat, Intellian, Cobham, CPI, Kymeta, C-Com, ETL Systems, Sat-Lite, Media Kind, Comtech, Profen, Spacebridge, Peplink, and many more.

These companies, in common with Orbital Connect, are proud of their reputations, therefore a company wanting to qualify as distributor, has to meet the stringent requirements, before being accepted as a partner. Orbital Connect's customers, can therefore feel confident that not only does Orbital Connect hold itself to the highest standards, because of its relationship with so many vendors, it also has very broad exper-

tise in ground systems, and knows precisely how to put together an end-to-end solution tailored to each customer's needs. Regardless of whether the requirement is for a mesh, star or hubless system; whether Starlink or cellular channel bonding is needed; whether communication is to one satellite or multiple satellites; whether the system is to be hardware based or in the Cloud, Orbital Connect has the experience and expertise to build a cost-effective end-to-end system.

Designing, specifying and installing a system is important, so too is being able to maintain that system and deal with any issues that arise during the course of normal operations. Orbital Connect, is your one-stop shop. It maintains a global support network of partners to meet even the need of most demanding customers.

Customers

Orbital Connect has expertise and customers in many key sectors, including: Broadcasting, Energy, Enterprise, Government, Maritime, NGO/Aid, Science and Education, Telecom and Transportation. It is not afraid to tackle the hardest challenges. For example, it worked with Intellian to provide the Bulgarian Naval Academy "always-on" connectivity in the most remote and extreme environment: The Antarctic and Livingstone Island (located at 62°S).

Orbital Connect is proud to count

Upgrading bTV Media Group's Satellite Ground System



Background

Contemporary TV broadcasting fuses entertainment, information and education on an unprecedented level, delivered immediately, with a global reach and at the highest possible quality. To stay ahead of this demanding game, the leading media company in the Bulgarian market, bTV Media Group, keeps up to date with every socioeconomic and technological trend. The successful management of its Satellite Ground Control Station equipment is crucial for bTV's broadcast operations.

bTV Media Group awarded Orbital Connect as a primary contractor to renew and upgrade its Satellite Ground System. The project aims to achieve two main objectives:

- The replacement, installation and configuration of diverse RF components within the existing satellite ground equipment infrastructure; and
- The setup of new Ku-Band satellite antenna systems.

Project Goals

1. RF Component Replacement and Infrastructure Upgrade

bTV Media Group is part of CME, a broadcast market leader which operates 43 television channels broadcasting to approximately 49 million people in six countries.

bTV Media Group's portfolio of services includes television channels, radio stations, digital platforms and movie production distribution. It is one of the most trusted sources of information and entertainment in the Bulgarian media market.

To achieve this goal, the company's engineering team managed the complex technical tasks of replacement, installation, and configuration of the equipment, ensuring a synchronized supply of RF components from multiple world-leading manufacturers despite the challenges posed by the global supply chain crisis.

2. Installation of New Satellite Antenna Systems

The second objective was the installation of two new KU-Band satellite antenna systems. These antennas operate within the Geostationary Earth Orbit (GEO) and receive satellite signals including free TV, encrypted TV channels and data from predetermined space orbital slots.

The Challenge

The project's technical complexity stemmed from the necessity to replace many diverse RF components and integrate them with existing infrastructure. Orbital Connect took a holistic approach to address the challenges and formulated a comprehensive technical execution plan based on an on-site survey and consultations with the client. Sound planning was the foundation of making the right decisions on specific product features and it significantly depended on the precise engineering knowledge and experience of the Orbital connect team.

Solution


The scope of the fieldwork involved the installation of 1.8m and 2.4m receive-only satellite antennas, replacement of actuators, low-noise block down-converters and RF feeds for existing 1.8m, 2.4m and 3m satellite antennas. Installation of de-ice system for existing satellite antennas. Pointing and precise positioning of the existing satellite antennas, installation of cable trays and conduits, configuration of the installed equipment, wiring power supply monitoring and testing.

“We successfully supplied all the items on time

due to the professional support and cooperation with our partners. Companies like Norsat, Global Skyware and CPI kept their exact standards even during this challenging time,” said Krasimir Terziev, Director of Business Development of Orbital Connect.

Benefits

By awarding the primary contract to Orbital Connect, bTV Media Group benefited from a single sourcing solution that integrated all engineering, installation and testing . bTV Media Group was able to upgrade their systems with the latest technology from the world's leading brands and seamlessly synchronized it with their existing infrastructure.

“bTV Media Group will continue to cooperate with Orbital Connect since the company offers a complete solution and participated actively in every phase of the project, from analysis and evaluation to implementation and configuration,” said a member of bTV's technical department. 

WE SPECIALIZE IN SATELLITE EQUIPMENT DISTRIBUTION

- OVER 3000 ITEMS IN OUR PRODUCT LIST
- MORE THAN 30 OF THE WORLD'S LEADING MANUFACTURERS
- PRODUCT SOLUTIONS FOR THE BROADCASTING INDUSTRY, SYSTEM INTEGRATORS, TELECOMMUNICATION COMPANIES, TELEPORTS, LABS, AND MORE



among its customers leading players in Satcom, Telecom and Broadcasting including: Intelsat, Aerospace Corporation, Globecast Americas, L3 Harris, Northrop Grumman, OHB Sweden, Raytheon, U.S. Navy, University of San Diego, U.S. Agency for Global Media, John Hopkins APL and the Bulgarian Antarctic Union. Clients from the scientific and aerospace fields frequently approach Orbital Connect, seeking customized solutions. These requests typically consist of specific technical parameters or innovative solutions to facilitate communication with LEO constellations for research purposes.

Looking to the Future

As already mentioned, LEO satellites whether for communication or EO, are projected to account for the majority of ground service revenue in the future. This means far greater demand for electronically steered antennas (ESAs) and associated RF components. Orbital Connect is keeping on top of this trend and the accompanying demand for customization in multiple sectors, including Maritime, Government, Transportation and Scientific Establishments.

For example, an aerospace client recently approached Orbital Connect to design and supply customized RF components for specific S and X-band frequency ranges and precise temperature tolerance, to enable a reliable ground to LEO satellite interface. It was able to supply this client with all the needed equipment and fully integrate this into the client's existing ground system.

In another example, there was a specific request for Ku- and Ka-band ESAs for scientific trials for an integrated network communicating with both LEO and GEO satellites. Again,

“...The tremendous opportunities presented by LEO orbit utilization and solutions stimulate a boom in the satellite industry, driving a trend to involve more critical thinkers and resourceful solution seekers in the process...”

it was able to satisfy the request and design a suitable system.

These were not simple requests. Addressing complex needs such as these, requires in-depth knowledge of phased-array technology, RF product specifications, applications and available configurations. This is made all the more challenging by the speed at which technology is advancing and new products are being introduced.

In today's world, to successfully finalize deals, a ground station equipment distributor increasingly relies on the participation of an engineering team and collaboration between vendors, clients, and sometimes third parties. The tremendous opportunities presented by LEO orbit utilization and solutions stimulate a boom in the satellite industry, driving a trend to involve more critical thinkers and resourceful solution seekers in the process.

It is therefore essential that any supplier needs to be fully aware, not only of what is available, but also of what will be available in the near future. To make sure that it is fully

abreast of the latest technology and trends, Orbital Connect works closely with its vendors and prioritizes facilitating first-line communication between clients and vendor technical teams.

More challenging projects, such as lunar orbit and deep space endeavors will require collaborating with the best available talent to develop appropriate solutions. The close association that Orbital Connect already has with its vendors, coupled with its team's deep technical expertise, means that it is ready to address these challenges and any others that the future may bring.



Elisabeth Tweedie is Associate Editor of the Satellite Executive Briefing has over 20 years experience at the cutting edge of new communications entertainment technologies. She is the founder and President of Definitive Direction (www.definitivedirection.com), a consultancy that focuses on researching and evaluating the long-term potential for new ventures, initiating their development, and identifying and developing appropriate alliances. She can be reached at: etweedie@definitivedirection.com



SATELLITE GROUND EQUIPMENT

DISTRIBUTION



PRODUCTS

Satellite Antennas
Baseband
RF Components
Video Contribution and Distribution
Network Equipment
Product Customization
System Design and Integration
Accessories

INDUSTRIES

Maritime
Telecom
Broadcasting
Government
Transportation
Energy
Science and Education
NGO

15415 Sunset Blvd, Ste#240, Los Angeles, CA, USA; +1.888.315.9545, <https://store.orbitalconnect.com>

WWW.ORBITALCONNECT.COM