

## Developments in Satellite Ground Systems

*Ground systems manufacturers are adopting to changing customer requirements*

by **Virgil Labrador, Editor-in-Chief**

**S**atellite ground stations and playout centers have to cope with demanding availability requirements. Unplanned shutdowns may cause enormous follow-up costs and contract penalties. Competition and the concentration of greater numbers of channels and circuits in fewer uplink and head end facilities, along with pressure to keep costs down means that backup systems and redundancy are perhaps more important than ever.

### More Channels Through Fewer Head Ends

Today over 100 DTH platforms around the world beam an estimated 15,000-plus channels from their uplink centers. Cable and IPTV uplinks add even more to the mix. A single satellite transponder can deliver scores of programs. A single downlink polarity on a receive antenna at a CATV headed or teleport can transmit hundreds of services.

As a result, the failure of a single device in the transmission chain can affect large numbers of services - making the need for smart, automated, backup protection systems more critical, and more complex than the past, some industry players say.

“Redundancy is a critical requirement in building a successful broadcast facility. For linear broadcast networks whether it be over the air, cable or DTH, redundancy applies to all critical components in the

broadcast chain, from origination (whether tape or file-based) to transmission delivery,” says Tony Roberts, Sr. Manager, Earth Station/Teleport Worldwide Technology & Operations, Disney ABC Television Group.

Beginning with power, it is important to have a good UPS (uninterruptible power supply) in the event of commercial power failure. Building a reliable backup generator infrastructure that can support the full technical and mechanical load with a UPS and redundant generators that are routinely tested, will ensure you always have power available.



**Teleports and other ground stations need to meet various demands for interfacility links and other customer requirements.**

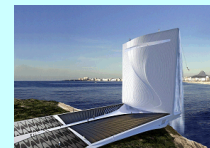
“All of these components which make up the earth station require redundancy: power, router video sources, encoders, multiplexers, up converters, amplifiers and antennas to meet the objective in broadcasting, to stay ‘on the air’,” explains Roberts.

### Redundancy Switches – Flexibility is Your Secret Friend

With all the service demands on active earth stations facilities, keeping pace with changes requires flexibility. For example, a facility may need to decide quickly if they need a redundancy switch to back up C-Band, Ku-Band, L-Band, ASI, Ethernet or other signals.

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*Satellite Ground Systems, from page 1*

Manufacturers such as DEV System-technik are responding with modular solutions, where a universal chassis can be loaded with application-specific modules, giving customers more flexibility than in the past.

“At Ericsson Television we particularly like the DEV 1951 switch because it is perfectly suited for broadcast needs. Its output signal will persist even if power is lost to the unit,” explains Steven Woodhead, Systems Engineering Group Manager, Ericsson Television Limited, which provides compression, contribution and distribution systems used by major broadcasters and service providers throughout the world.


“This is essential for the broadcast environment. It also offers the capability of hosting many different card types to suit different signal types, and can accommodate up to two switches in one chassis,” adds Woodhead. Adding yet more flexibility, DEV switch modules can even be upgraded or swapped in and out by a user in the field.

**Monitoring and Control (M&C)**

Some traditional systems for failover protection require a human operator. The more complex the equipment components and system, the more difficult effective human intervention can become, even with fully trained staff. Hence, the need for Monitoring & Control (M&C) systems. “With a good M&C (monitor and control system) you can operate and monitor the performance of each of the components in the broadcast chain successfully, which will result in reliable signal delivery to your customer,” says Disney’s Tony Roberts.

Easy integration of various manufacturers’ component gear into an M&C system via open standards, as well as easy and increasingly web browser-friendly control interfaces remains a goal. Technology suppliers are hearing that message from users, and integrating interoperability into their products. A case in point is one of DEV America’s RF redundancy switching products be-

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**-Tony Roberts,  
Senior Manager, Worldwide Technology &  
Operations, Disney ABC Television Group**

ing used in satellite, cable, broadcast, and teleport head ends to provide both IFL redundancy and downlink antenna redundancy.

**RF Switch Redundancy Meets Automatic Dish Backup**

The traditional way to build an automatic backup antenna system is to use an RF matrix in combination with an M&C system. The work to integrate the matrix functions in terms of antenna



**Comtech Xicom’s XTD-400KHE high power amplifier**  
(photo: Comtech Xicom)

redundancy functions into an M&C system can cost a significant amount of time and money. “DEV’s innovative

redundancy switches save you as much as 85% in cost compared to other alternatives on the market – by delivering signal monitoring plus built-in antenna control and automatic positioning – all in an economical single 3RU device,” says Jörg Schmidt, President of DEV America. This kind of solution also takes up much less space than the traditional approach, and integrates everything.

“With this redundancy equipment, no operator intervention is needed because the switching to redundant paths or modules, or even redundant antennas, is done automatically when it is necessary — without any downtime or human fault rates,” adds Schmidt.

**Evolving Amplifiers**

On the uplink path, high power amplifiers (HPAs), 1:1 redundancy (1 backup per active amplifier) has long been standard practice. “Many of our customers use 1:1 systems, having a working unit and a hot stand-by,” explains Eric Schmidt, Director of Marketing & Sales for amplifier manufacturer Comtech Xicom. “These can be switched in/out

on a moment's notice. This provides redundancy and the opportunity to test or maintain the stand-by side."

The gradual replacement of traditional klystron power amplifiers (KPA) with traveling wave tube amplifiers (TWTA) is changing redundancy approaches. With a traditional fixed station that uses Klystron power amplifiers, the users must have one KPA for each transmission channel. These are generally protected with a hot-standby KPA protecting 2 or 4 working channels.

"This is a very expensive and inefficient way to assure protection. Since a TWTA is a broadband device, one TWTA can back-up multiple KPAs" says Schmidt. Moving to TWTA technology lets uplinks reduce the number of HPAs, as well as related multiplexers, and simplify redundancy switching systems, compared with traditional klystrons. In addition, since transmit frequencies on a TWTA are easily changed by modifying its input, TWTAs eliminate the need for a fast channel changer for the backup HPA; klystrons must be mechanically tuned.

In applications where solid-state power amplifier technology (SSPAs) offers an alternative to TWTAs, redundancy considerations have also changed in recent years. "TWTAs must remain in a warm-stand-by mode 7/24, constantly using up power, HVAC resources and operational life," says Colin Boyd, VP of Broadcast Systems for amplifier manufacturer Wavestream. "Our SSPA solutions operate in a cold stand-by mode, with no power usage. Customers save energy costs over the life of the system, which can add up to hundreds of thousands of dollars annually."

### Inter-facility Links and Backup via Fiber

Above and beyond redundancy within a facility, Disney's Roberts points out, "It is important to consider satellite and earth station redundancy by managing through a well-designed business continuity plan or disaster recovery plan (alternate broadcast location)." Thanks

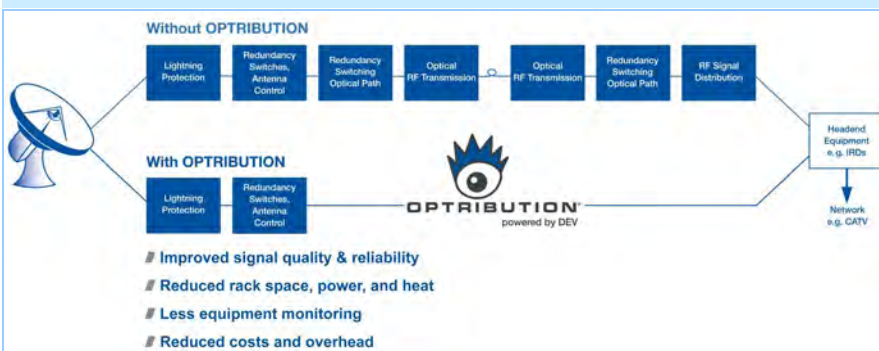
## From Dish to Rack and Back

In recent years, large earth station operators and RF distribution and switch manufacturers have been coming to the same conclusion: compared to traditional coaxial cable, fiber-optic links within the earth station and connecting signals from the outdoor equipment offer advantages.

Manufacturers such as DEV Systemtechnik, Foxcom, SatService and Vialite have developed fiber optic inter-facility link equipment to directly connect antennas and outdoor RF systems with indoor IF, L-band and base band gear in both in a local earth station, as well as with remote facilities that may be many kilometers away, such as control rooms, network operations centers or broadcast head ends.

Advantages of RF over fiber links include:

- low transmission losses over long distances,
- no frequency-dependent losses in the transmission band
- galvanic isolation between transmitter and receiver,
- insensitivity to electro-magnetic interference
- higher security against signal interception compared to RF.



These are no doubt key reasons why RF over fiber and coax solutions from DEV Systemtechnik have made inroads at some of the world's largest satellite broadcast facilities. DEV America ([www.dev-america.com](http://www.dev-america.com)) is a subsidiary of Germany-based DEV Systemtechnik GmbH & Co. KG, ([www.dev-systemtechnik.com](http://www.dev-systemtechnik.com)) which develops and produces a complete range of leading-edge, high-performance products and systems for the optical and electrical transmission of Radio Frequency (RF) signals via coaxial cable or fiber for satellite, cable, and broadcast television head ends. DEV products include distribution amplifiers, splitters and combiners, switching systems, distributing matrices, routing products, multiplexers, and fiber-optic RF signal transmission systems.

OPTRIBUTION® (Optical Transmission and Distribution of RF Signals) is DEV Systemtechnik's systematic approach to the ongoing development of the signal distribution infrastructure in satellite ground stations and CATV head-ends. Benefits that satellite facilities can gain from integrated RF and fiber optic transport through OPTRIBUTION® include improved signal quality and reliability, and the need to monitor less equipment, and the ability to do so with simpler user-friendly interfaces. This, along with reduced rack space, power and heat consumption can help satellite head ends, teleports, and uplink facilities save on costs and overhead.

"It's an example of DEVs innovative development strategy to minimize space while reducing costs, maintenance time, and the number of active modules in a chain. Also we minimize risk of signal loss, because less equipment means that fewer devices can fail," explains DEV America President Jörg Schmidt.

to the huge drop in fiber bandwidth costs over the past ten years, distant and remotely located antenna farms connected by fiber can also cost-effectively provide disaster recovery services for catastrophic facility outages, or outages such as an individual antenna failure. Geographically separate facilities can share backup antennas and route signals between them over fiber, where traditional copper coax would be cost prohibitive.

But while a Disaster Recovery site certainly increases the potential reliability of a network, "If a control solution does not have visibility over both sites, then much of that potential may be wasted. In fact, a disaster recovery uplink could disrupt the network if both sites are transmitting simultaneously and there isn't a unified monitoring system alerting operators that a dual illumination situation is occurring," says Roger Franklin, President and CEO of Crystal Solutions™, which provides earth sta-

**“...While devices in the ground systems chain may change over time, the case for redundancy remains the same: accomplishing the business objective of uninterrupted services within budget ...”**

tion and broadcast M&C systems. "In the multi-chain, multi-site ground stations, having the right redundancy control system will significantly increase network reliability and deliver cost savings over traditional hardware UPC and old-style redundancy designs."

Overall, while the devices in the ground systems chain may change over time, the case for redundancy remains the same: accomplishing the business objective of uninterrupted services within budget that are constrained by the realities of competitive markets.



**Virgil Labrador** is the Editor-in-Chief of *Satellite Market and Research* based in Los Angeles, California. He is the author of two books on the satellite industry and has been covering the industry for various publications since 1998. Before that he worked in various capacities in the industry, including a stint as marketing director for the Asia Broadcast Center, a full-service teleport based in Singapore. He can be reached at [virgil@satellitemarkets.com](mailto:virgil@satellitemarkets.com)

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tion channels,” said Satlink CEO David Hochner ( Listen to a podcast of the interview at [www.satellitemarkets.com/current/?q=node/98](http://www.satellitemarkets.com/current/?q=node/98) ).

“Content is king, but interface is the crown,” said Bill Roedy of MTV Networks in the session on the “Future of Broadcasting.” Consequently we see a lot of interface equipment on display at the show. The buzzwords are “interoperability” and “multiplatform delivery.”

The following are some key trends that I observed from visiting several equipment manufacturers at IBC:

**Ka-Band.** Several new Ka-Band satellites like Eutelsat’s KA-SAT, Avanti’s Hylas-1, Yahsat-1, among others have been launched recently in the EMEA region and many more are planned. This makes Ka-Band ground equipment in great demand.

**Bandwidth Optimization.** Equipment that optimizes bandwidth and use scarce spectrum efficiently are very hot. With rising transponder prices and growing demand from users, bandwidth optimization products can save customers a lot in cost and everybody is looking to save money any way they can these days.

**Carrier ID.** Satellite interference is a major issue with incidences on the rise globally. At IBC, Eutelsat announced that it will be requiring all its users to have Carrier ID capability which can help identify sources of interference. Industry groups like the GVF and sIRG are hoping other operators will follow suit, which it hopes will lead to the standardization of Carrier ID capability in uplink equipment.

Finally, attendance this year is up 4% percent from last year at the IBC, with good representation from all over the world. This just goes to show that the IBC continues to be relevant not just for the EMEA region but for others as well.



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# Products and Services MarketPlace

■ A guide to key products and services showcased at the SATCON 2011 exhibition in New York City, from October 12-13, 2011.

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**AVCOM of Virginia** is a vertically integrated company with over 25 years of experience in designing and manufacturing high quality, low cost spectrum analyzers.

AVCOM continued to develop and produce a variety of receivers and satellite accessories throughout the early 1980's. Their catalog included products such as power dividers, 60dB isolators, DC blocks, low loss microwave cable assemblies as well as other more sophisticated products such as the PTR-24 test receiver, the TISH-40 terrestrial interference survey horn and the WCA-4 waveguide adapter.

At SATCON, AVCOM of Virginia will be launching its new SBS-2 Single Board, an upgrade of its very successful AVCOM SBS Single Board Spectrum Analyzer. The SBS-2 comes with more features in an even smaller, more compact form factor than it's predecessor. Come see the SBS-2 at Booth #713.

**AvL Technologies**  
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**AvL Technologies** designs and manufactures mobile, motorized antenna systems and positioners featuring high performance carbon fibre reflectors, auto-acquisition controllers, and the unique AvL cable drive system. Ideal for small aperture antennae, it boasts zero backlash, high stiffness, light weight ruggedness, reliability, and cost effectiveness. AvL has designed and developed SNG antennae for 1.0M, 1.2M, 1.4M, 1.6M, 2.0M and 2.4M apertures and a diverse product line of rugged motorized FlyAway packages, many available in back-pack configurations, some as small as to meet airline requirements for cabin baggage. AvL, now recognized as the leading producer of SNG antenna systems in the USA and fast becoming known worldwide, developed the first motorised, auto-acquisition Mobile VSAT antenna system designed specifically for IP broadcast. AvL has over fifteen thousand high-quality antennae for C-band, X-band, Ku-band, DBS-band, and Ka-band in service throughout the world for SNG, military, emergency communications, disaster management, mobile medicine, and other speciality applications.

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**ATCi**, founded in 1979, offers end-to-end systems integration and technical services. From front-end consulting and planning, to integrating, installing, coordinating and managing technology solutions, ATCi has the depth and experience to respond to unique challenges and opportunities. Based upon the experience and expertise ATCi has gained through hundreds of successful installations, the communications challenge is turned into a success for its customer. Regardless of the system requirements, we create complete end-to-end solutions.

**ATCi** introduces **Simulsat5b** - the newest multibeam system capable of receiving transmissions from 35+ satellites simultaneously. Simulsat has been providing programming to over 30 million cable subscribers in the U.S. market making ATCi the world leader in multibeam technology.

**Comtech Xicom**  
**Booth no. 404**  
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**Comtech Xicom Technology, Inc.**, a technology leader in high power amplifier products for satellite communications, will be showcasing at IBC its new high efficiency 400 Watt Ku-Band traveling wave tube amplifier (TWTA) with the size, weight and prime-power requirements of traditional 200 Watt products.

The XTD-400KHE high power amplifier (HPA) is a compact, antenna mountable TWTA designed for high linear power with outstandingly high efficiency. The new amplifier is in a compact, rugged package weighing only 32 pounds. Drawing only 960W at 200W of linear RF output power, the amplifier is ideal for transportable applications where high efficiency, light weight, and high ambient temperature operation are required.



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- Our latest Software developments for the Optrubition product family: Signal Recording helps you to analyze quickly the signal properties.

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**GlobeCast** is a leading provider of media management and global content delivery services for broadcasters and content creators. With a secure fiber and satellite network connected to dozens of teleports, technical operations centers, and points-of-presence worldwide, GlobeCast manages and transports millions of hours of video and other rich media each year. An integrator of audiovisual technology and a full service provider, GlobeCast works with all the actors in the audiovisual chain from production companies to broadcasters, retail organizations, cinema chains, and more. The company provides on-site service from major news and sporting events for coverage in SD, HD, or even 3D.

GlobeCast will be speaking to broadcasters and content creators from around the world at SATCON at booth #724, about the global distribution, media asset management, and play-out of international content for broadcasters.

The content management and delivery company will have staff on hand to speak directly to the needs of broadcasters looking to repurpose and expand distribution of content throughout the Americas and beyond to multiple platforms. Videos and demonstrations will illustrate media asset management and playout, including the ability to localize and repurpose content for *any platform, any screen*.

In addition, GlobeCast will be highlighting its expanded satellite and fiber network, with new points of presence and facilities around the world — including the Americas.

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**GLOBECOMM**® **Globecom** is one of the world's largest providers of satellite-based managed network solutions. Its presence at IBC includes demonstrations on how broadcasters, governments and corporations are successfully using hosted and managed communications services in the control room, on the ground, at sea and in the air.

Globecom broadcasts content for major entertainment networks and recently landed a deal to provide broadcast delivery services with QVC, one of the largest home shopping channels. Globecom tops 100 channels and logged more than one million broadcast hours of HD and SD content.

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Covering all of the Americas, **Hispar Satélites** – a Hispasat Group company – offers an extensive range of satellite communication services through the Amazonas 1 and Amazonas 2 satellites: IP, Broadcast, Corporate, Telecom, Government, Distance Learning, Telemedicine and Digital Signage. Amazonas 1 and Amazonas 2 are two of the biggest and most powerful satellites serving the American Continent and operate collocated at 61° W offering both C- and Ku-band capacity, with immediate availability of high quality Ku-band capacity for North America. Hispamar also offers the state of the art AMERHIS technology on board Amazonas 1 & 2 satellites which allows connections between VSATs located at any place in the American continent through a single hop, thereby eliminating the need of a hub station.

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**The SPACECONNECTION** is a global provider of satellite services and connectivity solutions. We serve a diverse community of media, broadcast, enterprise and military customers who depend on us to go the extra mile to deliver high quality end-to-end solutions that are reliable and cost effective. Well beyond a basic price quote, we deliver industry expertise, value-added global industry relationships, personalized analysis and best-in-class solutions. Because we are an equitable solution, not a satellite operator focused on providing their own solution, customers can feel confident we are 100% dedicated to fulfilling their needs.

## Dev Systemtechnik Appoints Area Sales Maanger

DEV Systemtechnik GmbH & Co. KG a manufacturer of satellite and cable transmission equipment and parent company of Newport Beach-based DEV America, has appointed Cyrille Mvondo Mvondo as Area Sales Manager for France, Spain, Portugal and Africa. Based in DEV's headquarters in Friedberg, Germany, Mvondo Mvondo reports to Rainer Lorger, Head of Sales and Marketing.



**Cyrille Mvondo**

Cyrille Mvondo Mvondo joins DEV from Eaton Corporation, a global supplier of system components for the manufacturing, automotive and aerospace industries. With roots in Cameroon, Africa, Mvondo Mvondo has a degree in Electrical Engineering from the University of Applied Sciences in Cologne, Germany, and Luxembourg, and a Master of Business Administration in Strategic Management from the University of Applied Sciences Bonn-Rhein-Sieg, Germany.

## Prof. Hoffmann Appointed SES Chair, Univ. of Luxembourg

Professor Dr. Mahulena Hofmann has been appointed as the SES Chair in Satellite Communications and Media Law at the University of Luxembourg. Her term began on September 1, 2011.

Prior to her appointment at the University of Luxembourg, Dr. Hofmann, a German and Czech national, was the holder of the Jean Monnet Chair in European Law and Transition Studies at the Faculty of Law, Justus Liebig University of Giessen. At the same time she served as a Senior Research Fellow at the renowned Max Planck Institute for Comparative Public Law and International Law where her research activities were in the field of International Space and Telecommunications Law, as well

as the public law of Central and Eastern European countries. Member of the European Centre for Space Law and an Expert Committee of the Council of Europe dealing with regional and minority languages, she has a rich scientific profile encompassing all aspects of Satellite Communication and Media Law (International, European and comparative).

Professor Hofmann holds a PhD on Remote Sensing of the Earth from Space - Legal Aspects from Charles University, Prague and a 'habilitation thesis' on *The Position of International and European Law in the Legal Systems of the Transformation Countries of Central and Eastern Europe* from the University of Cologne. She is a full member of the International Astronautical Academy.

## IAI Appoints New Chairman

Satellite manufacturer Israel Aerospace Industries' (IAI) Board of Directors has

appointed a new chairman, Mr. Don Baharav. Baharav was President and CEO of **Amdocs Management Ltd.** and a member of the Amdocs Board of Directors and its Executive Committee from 2002 to the end of 2010.



**Don Baharav**

Baharav became CEO of Amdocs during the 2001 world economic crisis. He quickly returned the company to growth and more than doubled its revenues from \$1.4 billion to over \$3 billion. Baharav joined Amdocs in 1991 as Vice President and was appointed Chief Financial Officer (CFO) in 1995, a position he held until being named President and CEO.

Prior to joining Amdocs, Baharav acted as Chief Operating Officer of Optrotech Ltd., a publicly held company that develops, manufactures and markets electro-optical devices.

## SSPI Announce 2011 Promise and Mentor Award Winners

The Society of Satellite Professionals International (SSPI) has selected three outstanding honorees with its 2011 Promise Awards, which recognize the potential of young satellite professionals to play a leadership role in the industry. The winners are:

- **David Giger**, Director, Dragon Spacecraft Development and Director, Dragon Propulsion, SpaceX
- **Bradley Patterson**, Senior Project Manager, Intelsat
- **Rohit Iyer Seshadri**, Senior Member, Technical Staff, Hughes Network Systems

**Tom Eaton**, President, Harris CapRock, was selected as SSPI's "Mentor Award" recipient, for his exemplary efforts to mentor the next generation of satellite professionals.

The recipients will be honored during SSPI's 6th annual **Future Leaders Dinner** on October 12 at The Princeton Club in midtown Manhattan. The Future Leaders Dinner begins at 6:00 p.m. (ET) with a cocktail reception. A portion of the proceeds from the banquet and awards ceremony goes to SSPI's educational fund for scholarship and intern grants for students seeking careers in the satellite industry.

In addition to the four honorees, SSPI makes honorable mention of four additional young professionals: Adam Mayer, Mechanical Systems Engineer, Spacecraft Systems Engineering, Space Systems/Loral; Tyler Moeller, Senior Engineer, Level 2 Support, Intelsat Video Operations Center; Ben Ramos, Senior Director, Field Operations, FOX News; and Richard Roithner, Senior Consultant, Euroconsult.