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December 2007 Worldwide Satellite Magazine Vol. 5 No. 8

2007 IN REVIEW

Featuring

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The View From Europe
The View From Asia
MSS WInners & Lossers
Financial Overview
Mobile Communications
The Teleport Market (WTO)

Perspectives From

XipLink, Inc.—World Teleport Association—Wegener—ViaSat—SSPI—Space Data—PCI—NSSL—Near Earth LLC—ND SatCom—Iridium—Intelsat General—iDirect—Hughes—Harris—Globecomm—Comtech EF Data—Bivio

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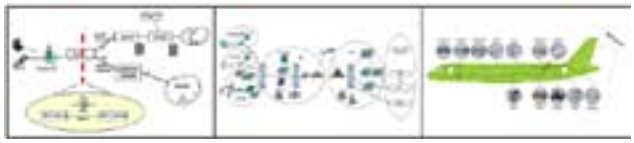

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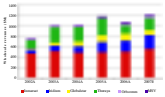

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EDITOR'S LETTER

WHAT A YEAR! WHAT A GROUP! WHAT A PUBLICATION!

The satcom and ancillary business world must be congratulated. The past year, 2007, was replete with amazing missions, terrific hardware and software enhancements, advanced capabilities being offered to first responders and our military professionals to help them save lives and win missions... was it a momentous year?

Certainly one person cannot know all... hence our **YEAR IN REVIEW** issue of *SatMagazine*. We invited many of the industry's leaders and most successful companies to write about their "wins" over the past year, as well as give our thousands of readers a hint... a peek... a prognostication... as to what events, advances and milestones are in store for us in 2008.

When a company survives the machinations of economic and political turmoil... no, when a company **thrives** and is successful, regardless of enveloping economic and political turmoil, they have earned the right to be heard. And the smart individual will pay attention and listen to what is being said, in hopes he or she will gain knowledge, in order to further their impact, their role in ensuring our businesses reach even higher goals.

Picocell? Is that an unauthorized peek at a new type of battery? Not certain? Dr. Axel Jahn, the CEO of TriaGnoSys, explains all you would like to know about this wireless communication system that is rather analogous to a Wi-Fi Access Point in his feature article, "*The Power Of Picocells—Bringing Relief To The World Of Communications.*"

Then we're off into the examination of the past year through the expertise of leading companies and satcom experts. Being somewhat unorthodox myself, and listening to the suggestions from my *SatNews* cohorts, we held a "lottery" of the articles and selected them, one at a time, from a "virtual hat"... and that's the order the stories now appear in our publication. We did not focus on any particular company just because they may already be a client... this was a random selection as far as final publication placement is concerned.

And what a combo of brainpower and talent we have for you... Columnist *Chris Forrester* examines the advances made in Europe over the past year — *Tim Farrar* of **TMF Associates** offers insight into the **Mobile Satellite Service** for 2007 — Columnist *Michael Fleck* of **Global Vision** brings his Asian and Enterprise markets expertise to all — and then we dive headlong into the companies... **—XipLink, Inc.—SSPI—iDirect—Comtech—ND SatCom—Intelsat General—Hughes—Harris—ViaSat—Bivio Networks— Space Data— Proactive Communications—PacStar—Iridium—Globecomm—Wegener—**

We close the issue with a look at the upcoming PCT '08 Conference in Honolulu, Hawaii (tough responsibility to have to attend this show) and we offer the 30th Anniversary of **Eumetsat**'s **Meteosat**, from research program to constellation.

We certainly hope you enjoy this rather beefy issue of SatMagazine and all of the important information contained herein for your complete edification and use. Please don't forget our daily news offerings at www.satnews.com, and be certain to sign up for our weekly news with email distribution.

Exciting goodies from SatNews Publishers includes some terrific web work currently underway by our Creative Director, Simon, which will dramatically change the face of our online presence and also make access to our content far easier for everyone. Plus, we have a new publication, *digiGO™—The World of Digital Content, Creation and Delivery*, getting set to debut. Check our home page frequently as we move closer and closer to the fulfillment of hard work by our publishing group for updated announcements.

I personally, wish to thank every contributor to this magazine for their hard work in producing informative content of use to all readers. With the business of business driving most companies day in and day out, to take the time to write about accomplishments and what the future holds removes personnel from their milestone tasks. Believe me, all is sincerely appreciated.

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COVER STORY

THE POWER OF PICOCELLS

BRINGING RELIEF TO THE WORLD OF COMMUNICATIONS

by Dr. Axel Jahn

Estimates indicate there are nearly three billion mobile phones in the world. As much as 90 percent of the world's population will have mobile phone coverage by 2010. The approaching saturation of mobile phone ownership comes with the expectation that mobile network access is equally ubiquitous.

The advances in backhauling technology, particularly the improvements in picocell capabilities, mean that GSM and UMTS networks can literally be established anywhere – temporary networks in remote areas on land, as well as mobile networks on planes, ships and trains.

TECHNOLOGY INNOVATION

Satellite communication in itself is not new or particularly innovative and has been an expensive 'fix' when compared to terrestrial wireless or fixed-line technology. As a result, satellite-based usage has been, by and large, limited to critical communications in remote, inaccessible areas, frequently as a result of a disaster or when secure transmission is a high priority. Until now, satellite usage certainly has not been seen as a mainstream contender for network access.

Traditional satellite technology has been relatively crude. A GSM network is created by simply transporting a standard GSM interface over a dedicated link protocol, and a Base Transmitter Station (BTS) is connected to a base station controller (BSC) using the industry-standard Abis protocol, which is directly transported over satellite.

However, the disadvantages have been significant. In addition to high installation and running costs, the solutions have typically been large and expensive and certainly not spectrum-efficient, in that they usually require a large capacity link of around 2 Mbit/s to be up and running, whether there is GSM traffic or not.

But the fortune for satellite-based network provision is about to change – all thanks to the picocell. Picocells, which act similarly to a base station, are simple to install, compatible with existing GSM handsets, and use existing IP infrastructure for cost-effective backhaul. Picocells have traditionally been used to extend coverage to indoor areas where physical building restrictions mean poor signal reception. Or, they have been used to add network capacity in areas with very dense phone usage, such as train stations. However, they can now be used as the BST and can be backhauled to provide coverage anywhere on land in the air or at sea.

The new picocell- based technology can offer the one thing that has eluded previous satellite communications—effective communications management. System eefficiency is the key enabler to the technology behind the new GSM, GPRS, EDGE and UMTS networks based on satellite transport. Much of the pioneering development work that has gone into enabling picocell backhauling has been based around optimisation, including compression of payload, IP Header and signalling.

System architectures

Before addressing compression techniques, an understanding of the principle backhauling architectures is required.

There are two principle architectures for satellite-based communications. The first is the adaptation of current 2G GSM networks, offering comparable voice, GPRS data and SMS messaging services, as with terrestrial networks. The architecture of these systems connects different network elements of the GSM network at the remote area to the operator, via a satellite link. For this to occur, the functionality of the BSC is broken up into a BSC at the remote site, which acts as the terminal for the BTS, and a ground BSC, which performs data transcoding and routing to the core network – see Figure 1.

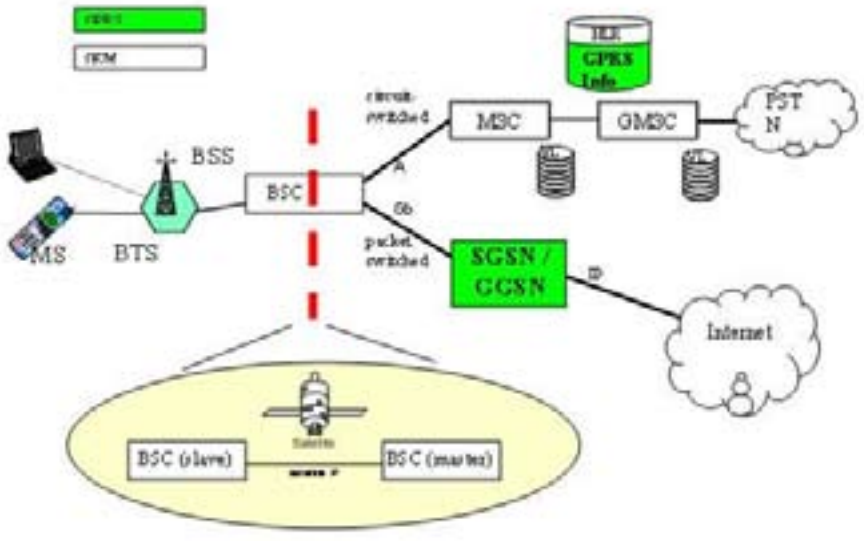

Figure 1: 2G architecture for mobile communications

The second implementation is for 3G—UMTS and 3G GSM networks—offering all of the additional advantages of 3G, including broadband wireless data and video conferencing. The architecture is based on the same approach as with 2G, except that the elements follow the 3G terminology, as shown in Figure 2. One of the key elements in the design is that it is scaleable by the addition of further BTSs/Node Bs, meaning the network can be expanded to meet increased capacity needs.

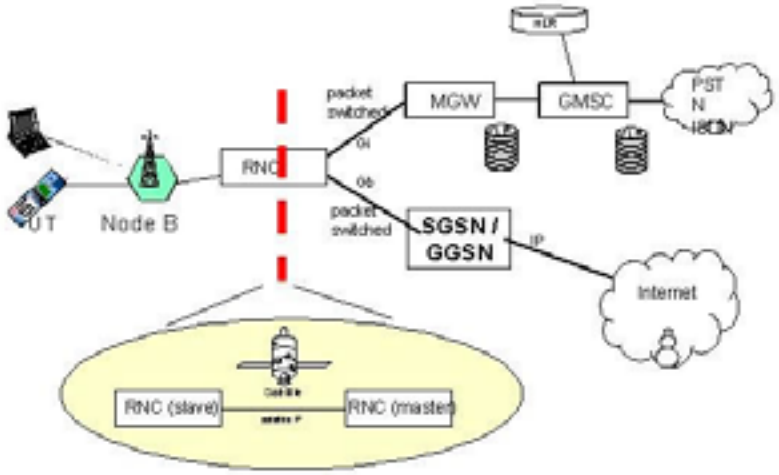

Figure 2: 3G architecture for mobile communications

The first practical architecture, however, was devised as part of the EU-funded WirelessCabin project. That paved the way for the development of picocell backhauling on commercial aircraft.

The architecture, which is significantly more complex than the previous examples, consists of three segments: the cabin segment at the remote site— in this case the aircraft—the satellite transport segment and the ground segment at provider site. See Figure 3.

The key elements work as follows:

- The SS7 Gateway in the Service Provider Domain is used to convert SS7 signalling from 2G/3G networks into sessions initiation protocol (SIP) and/or remote authentication dial in user service messages
- The WirelessCabin Location Register in the Service Provider Domain has Authentication, Authorization and Accounting server functionalities. The register checks that the user has an international roaming agreement with their mobile telecoms provider
- The SIP server and MGW in the SPD allow the system to interconnect with the 2G/3G domain. In particular, the SIP server, together with the one located in the SID, converge as the session is established using SIP.

Optimization

IP networks provide the versatility required for backhauling. However, the protocol headers involved can more than double the bandwidth required. Development focus has been on compressing the IP, real-time transport (RTP) and user datagram protocol (UDP) headers to maximise optimisation.

The reason the compression of RTP, UDP and IP headers is so important is because they add a total of 40 Bytes to each voice packet, regardless of the size of the packet. This means that a voice packet of 12 Bytes adaptive multi-rate (ARM), codecs, used by GSM and UMTS picocells, is increased by more than four times by the headers.

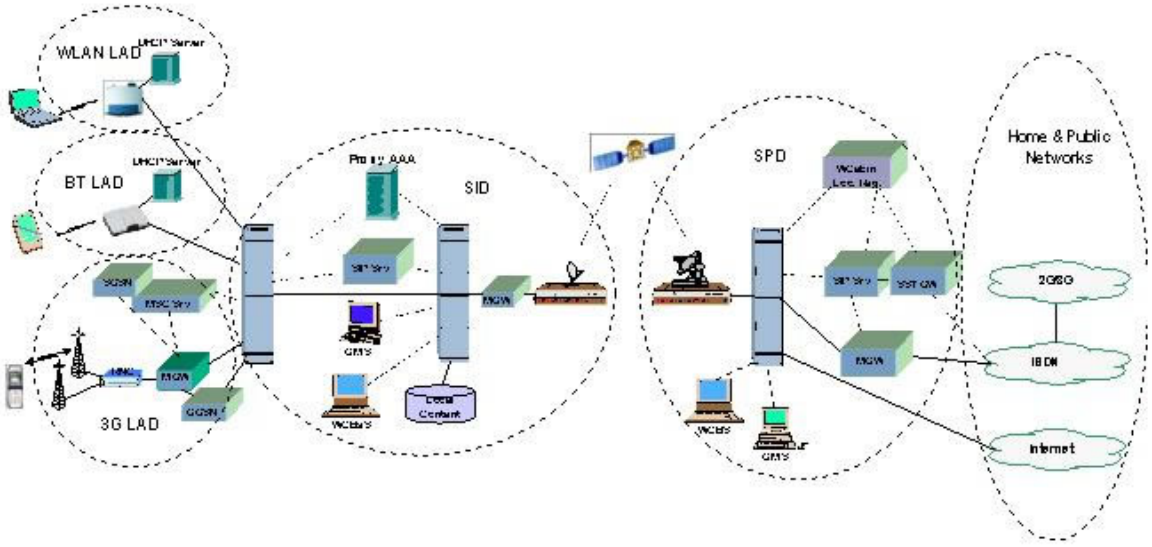

Figure 3: Architecture adopted in WirelessCabin

COVER STORY

The choice of an appropriate header compression protocol depends on the configuration of the modem and the satellite gateway. If they both support the compression technique, then the complete IP header can be removed. If they do not, the IP header is required for routing, and the RTP/UDP headers can be compressed between the BTS/RNC pairs, or the cabin and ground service provider domain—their equivalent in the WirelessCabin architecture.

In addition, there is the potential of using other compression techniques. IETF RFC 2507 can be spanned between the modem and the satellite gateway and it can compress the IP and UDP headers, but not RTP headers. It can reduce the IP/UDP header from 20 Byte to only 2 Bytes, leaving the 12 Byte RTP header untouched. Robust Header Compression (RoHC) is an extremely efficient way of reducing total overheads. However, RoHC uses the redundancy of the different packets and does not retransmit redundant information, instead storing it as context information at the compressor and decompressor. When combined with the technique of bundling several voice packets into a single IP datagram, very significant compression can be achieved, with overheads being reduced to only 5 Bytes.

APPLICATIONS

Picocell-based satellite technology can be used to set up a GSM or UMTS network anywhere in the world. The picocell can pick up signals within a 700-meter radius, and can handle up to 14 calls at any one time. There is an almost endless range of applications, some of which have already been developed into commercial applications.

Transport: Aircraft connectivity

Passengers have been able to communicate from planes for many years, using seat-back phones. What picocell backhauling enables them to do now is to use their own mobile phones and Blackberrys and other smartphones during flights, just as they would on the ground. In addition to being able to access all their normal phone functions, users will be billed as per normal, with call details and costs, based on international roaming rates, appearing on their normal monthly billing statement.

It also provides new crew applications. Transferring of non-flight-critical information in real-time is one example. Plus this can be used for pilots' electronic flight bag updates, catering updates, as well as real-time charging of credit cards for duty free sales.

A plane is a harsh environment: equipment is subject to significant forces and to dramatic changes in temperature and atmospheric pressure. It is also subject to the stringent safety require-

ments of one of the most tightly regulated industries. Aviation's safety record is a very good and no one—regulators, airframe manufacturers, airlines or passengers—want that to change. It was essential to ensure the equipment cannot jeopardise the safety of the plane, its crew and passengers.

In addition, the equipment has to be small and light. Margins are very tight in the air transport industry, particularly with oil prices rising, so airlines do not want to carry heavy equipment that will increase fuel consumption. Nor do they want to use limited space that could otherwise be filled with passengers or cargo. Figure 4 shows how the equipment fits into an aircraft.

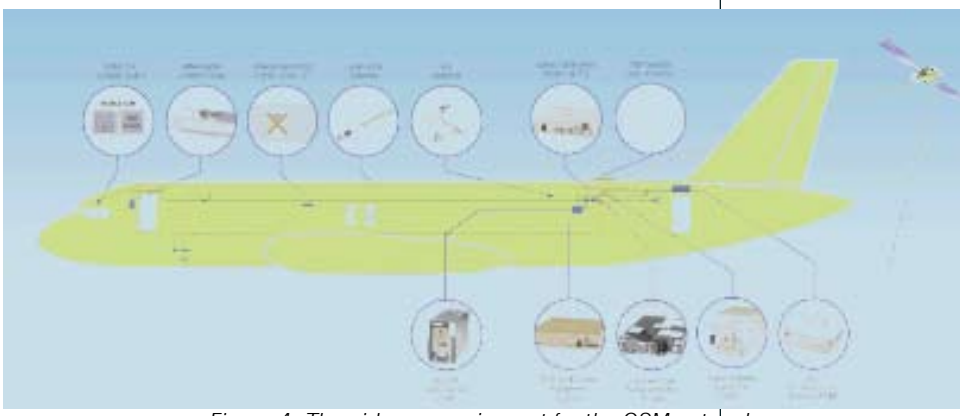

Figure 4: The airborne equipment for the GSM network

The first commercial operation of a GSM network on a commercial aircraft will start in 2008; by the end of the year, the technology will be installed on as many as 100 aircraft in Europe. Installations on business aircraft, typically less constrained by cost issues, are expected to follow quickly.

Maritime connectivity

Ships, be they leisure or merchant, once in open seas need a cost-effective mobile connection solution for crew and passengers. In addition, there is increasing demand for the real-time monitoring of containers while at sea. The first commercial trial of the technology is already up and running on a German cruise ship. It is anticipated that once approved, the service will quickly come into service.

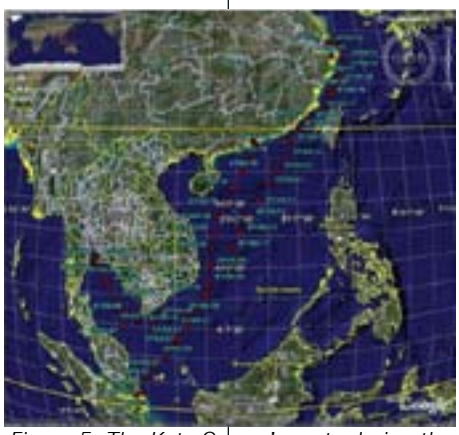

Figure 5: The Kota Gemar's route during the container tracking trial

Another good opportunity for growth is the tracking of containers. An RFID door seal attached to the container is connected to a SIM card, which sends messages via satellite to the control centers both on the ship and on the ground. These can include the shipping company's headquarters, the ship's homeport operator, or government security services. If the seal is compromised in any way, a panic 'alarm' signal is transmitted immediately, as is information about changes in temperature, humidity, vibration, light and volumetric pressure, as well as levels of oxygen, carbon monoxide and carbon dioxide.

The two main benefits of the system are that it monitors the security of the container, so can be used to demonstrate to government security services that there has been no breach of security, which can dramatically reduce the time it takes to enter a country, thereby cutting costs. It also means that valuable cargos can be monitored at all times, which can lead to a reduction in insurance premiums.

A solution for container tracking was tested in the South China Sea early in 2007. Figure 5 shows a map of where the ship, the *Kota Gemar*, travelled during the test.

Train connectivity

On most trains, passengers can connect to the standard terrestrial network. On high-speed trains, the handover process from one base station to the next often does not work effectively, meaning calls are dropped or, in some cases, connections are impossible.

A robust satellite radio link is being developed to react to the impairments caused by obstacles located along the railway (i.e., power lines and their metallic infrastructures). Today, Ku-band satellite terminals are available in industry, but also a prototype of a train terminal is being developed that will use a Ka-band two-way satellite to provide multimedia services to train passengers with smaller antenna sizes and higher bit rates.

LAND

The equipment needed to set up a back-hauled picocell is extremely portable. For use on land, equipment does not have to be built to withstand the same pressures that it does for transport, though it does have to be sufficiently rugged and sufficiently compact to be carried. It does require a power source, even as small as a 100 W generator that could be included as part of the equipment. The hardware has been adapted to make it transportable by air, wheeled or tracked vehicle, or even by rucksack.

Military applications

Maintaining lines of communication during military operations is of paramount importance. The standard technology used is radio. The ability to establish a 2 or 3G network anywhere, at any time, significantly increases the options available.

COVER STORY

The encryption links indicate the network can be used for secure communication, with end-to-end privacy, quite appropriate for the military environment. It can be programmed to accept connections only from registered phones, and therefore reject unknown devices. It can also be used to jam, monitor GSM and GPRS content, and to redirect certain calls for intelligence purposes.

Because it can handle up to 14 simultaneous calls, the network can be used for operational and personal communications. While personal communications are good for morale purposes, operational communications are a "must have" priority. To that end, the network can be set up to ensure the most important communications always have preference for the use of the network.

Finally, the technology allows for point-to-point calls within the 700m radius of the picocell. These calls are free, as they are not routed via the satellite.

Figure 6: Backhauled picocell in military use

Emergency preparation

As with military operations, effective and efficient communications are essential when dealing with large-scale emergencies, either man-made or natural, such as terrorist activity, flooding or widespread fires.

Emergency services use dedicated emergency networks where they exist, but often rely on public land-based and mobile networks for their communications. All terrestrial mobile networks are subject to failure should power supplies be interrupted. Back-up power supplies are generally in place but are not designed to last more than one or two hours, in many cases. The satellite-based technology using a picocell (with its own power supply) represents an excellent back-up solution.

Disaster recovery

When disaster strikes, co-ordinating a response is often hampered by a lack of information and the ability to communicate to emergency services, government and aid organisations. For example, when the earthquake hit Pakistan, the international community responded quickly. Unfortunately, much of the effort was misdirected as there was little information about what and where the equipment was needed. Also difficult was communicating what little information was available to the relevant people. That meant that some villages were visited by emergency services several times a day, while others received no help at all.

In the first few hours of a disaster response, the opportunity to set up a robust communications network is critical to direct aid to the most badly effected areas to save more lives.

Other applications

The number and range of potential applications for the backhauling of picocells is endless. It is suitable for any remote site, where the laying of cables is prohibitively expensive or impossible. It is suitable whenever a communications network needs to be established very quickly and securely. And the backhauling of picocells is highly suited for anyone who wishes to be in control of their communications—at all times.

Dr. Axel Jahn is Managing Director of TriaGnoSys, a leading provider of mobility satellite communications solutions for remote mobile air, sea and land communications from anywhere to anywhere via satellite.

Before founding TriaGnoSys, Axel worked at DLR, the German Space Agency, and he was the project manager on WirelessCabin. He has been at the forefront of the development of picocell-based satellite backhauling. TriaGnoSys solutions are used for a range of commercial applications, including the provision of GSM/GPRS services on commercial aircraft, cruise ships, container tracking and for military use.

TriaGnoSys is also involved in a wide range of research projects, focusing on focus on a broad range of mobile satellite communication areas in conjunction with leading academic, government and industry researchers to advance the state of the art in such areas as mobile end-to-end solutions, next generation satcom and aircom, and combined navigation/communications applications and technologies.

THE VIEW FROM EUROPE

by Chris Forrester

A year ago, we headlined our European end-of-the-year review as being 'Europe's action packed year'. Well, guess what? **The Europeans have done it again!** Europe has enjoyed a blisteringly good year, with significant increases in revenues, margins and transponder rental prices. Moreover, we have also seen peace 'break out' between **SES** and **Eutelsat** in the shape of co-operation for a planned pan-European DVB-H broadcasting-to-mobile project.

"Our joint venture takes care of the satellite side of things," said *Volker Steiner*, Marketing Director at **Eutelsat Deutschland**. "On the terrestrial side, we're still looking for partners, including mobile communications companies, broadcasters and corresponding industry consortiums."

SES Astra and **Eutelsat** agreed, in October 2006, to develop this promising new market through a joint undertaking in which both sides would hold a 50 percent stake. Using a hybrid satellite and terrestrial based network TV channels, multimedia content will be relayed directly via satellite, or indirectly via terrestrial repeaters, to mobile devices such as laptops, PDAs, mobile phones and car stereos. Steiner is anticipating strong demand for the service, which will be deployed via satellite frequencies using the S-band. "Mobile communication is one of the industry's key developments and offers expanded opportunities for the satellite industry. All over Europe the demand for transmission possibilities for TV content, multimedia services and data to mobile devices is growing."

According to Steiner, a single TV channel designed for mobile reception requires a data rate of around 256 to 384 Kbit/s. Every 5 MHz of bandwidth enables 8 to 10 channels. Additionally, a further 20 to 30 terrestrial channels will be made available with

SES' romain Bausch & Eutelsat's Giuliano Berretta signing the JV Arabsat's footprint

THE YEAR IN REVIEW

the introduction of the hybrid solution. "S-band is new territory for both companies and, in comparison with our core business fields, an absolute niche market. After detailed analysis we arrived at the conclusion that to unite forces for the development of a solution for this new communications market in Europe was the most sensible option. We can work with a single technical standard, establish a uniform infrastructure and jointly introduce the solution."

Steiner stressed that the planned platform was not intended as competition for DVB-H. "To put it simply, our initiative is an optimised version of DVB-H for satellite. The new standard DVB-SH (satellite to handheld), which the DVB Committee plans to approve in March, enables a combination of both networks and is compatible with mobile phones. The deployment of S-band supplements the available transmission capacity for potential service providers." As the first satellite, W2A will offer S-band capacity for the hybrid network.

The Eutelsat satellite, which European manufacturer Alcatel Alenia Space has been commissioned to construct, will be launched at the start of 2009 and positioned at 10° East. The S-band capacity is connected with six regional beams, which will completely cover Germany, France, Italy, Spain, Poland, Great Britain and Ireland," explained Steiner. He added that the service would concentrate on two to three markets during the initial stages. He underlined that the satellite operators will not directly target end consumers with their solution. "We are addressing regional service providers such as mobile broadcasters and pay-TV platforms, which will offer services in their individual markets. These providers can order the required capacity from us and the operators of the terrestrial networks."

In every other respect, of course, the rivalry between SES and Eutelsat is as great as ever, especially over developing markets... more on that in a moment. However, SES managed one major coup over France when, on January 19th, pay-TV operator **Canal Plus** signed a new long term contract for its existing Astra capacity (15 transponders) and announced that Canal+ would take a further 5 transponders, all of which should be in use by the end of 2008. This was excellent news for SES, which meant that viewers in France would no longer be left confused as to which DTH system to support. The absorbed TPS system's viewers will be "invited" to switch dish system from the second half of 2007, at Canal's cost. The combined DTH offer is now delivered to more than 7m subs, and with confusion removed, there is hope that DTH can start moving positively forward.

The prize for SES is truly enormous. It means that SES now, more or less, exclusively supplies DTH signals for Germany, the UK and France and has a more than useful foothold in Spain. As an SES insider told us: "This opens the way for expanded HD services from 19.2 degrees, as Canal Plus over time migrates more of its channels into high-definition." *Ferd Kayser*, president/CEO of SES Astra, in a statement added: "With this contract, we significantly enhance our position in the French market and further strengthen our relationship with Canal+ as one of our most important European customers."

But if there's a winner, there has also to be a loser, although Eutelsat remains a strong client of Canal+ in other markets, such as its relationship supplying DTH programming to Poland. "Canal has made its decision and we see this being a slow migration," said a Eutelsat spokeswoman. "It isn't quite as radical as switching off overnight. Our TPS capacity is contracted until 2014. We worked hard with TPS over the years to develop the French satellite market and we'll continue to work closely with Canal Plus on its other markets where we have strong relationships."


Atlantic Bird 3

Besides Poland, Eutelsat is carrying C+ signals into its Indian Ocean markets. Eutelsat is also carrying the established French national analogue networks on its **Atlantic Bird 3** craft, estimated at supplying some 1.9m homes by DTH and not likely to be switched off for some time. Eutelsat also carries signals for the French DTT system. "Within the framework of our overall video business into France, the loss of TPS is unfortunate but far from catastrophic," said Eutelsat.

"SES becomes the dominant force in direct to home satellite distribution in France. As well as being a feather in SES' cap, this also means the group is exceptionally well positioned to benefit from the growth in demand for high definition services, which are likely to be most prevalent in pay-television."
Morgan Stanley report "Arc de Triomphe", Jan 22

A few days later, as if to stress its undoubted power in the marketplace, Eutelsat revealed its Hot Bird cluster of satellites had topped the 1,000-channel mark. Eutelsat manages to beam well over 1,000 digital video channels into an audience of 121m homes, representing more than 50 percent of all TV homes across Europe. It is two years since the last survey, and the 42-country study shows significant growth right across the region in this period.

"Satellite and cable penetration increased by 13 percent to 170m homes from 150m, while television homes expanded by 6 percent to 333m homes from 314m. Satellite and cable reception has consequently passed the tipping point of 50% of television homes," read Eutelsat's release.

Hot Bird's audience also grew, says Eutelsat. "[Our] audience at end 2006 had progressed from 111m to 121m homes, of which 40 percent (47.5m) are equipped for DTH satellite reception. This growth took place in parallel to a steady increase in channels broadcast, which grew by 273 channels over the same period to over 1050 at end December 2006." Italy saw

the greatest individual expansion (up 280,000 homes) and Poland (up 211,000)."

January also saw Eutelsat's new 32 percent shareholder, **Abertis Telcom**, take up their seats on the Eutelsat board. The consequences of that appointment have been far reaching. In October this year, Abertis said it has bought a 28.4 percent stake in satellite operator **Hispasat**, paying $287.5m (€199m). Abertis used its Abertis Telecom division and acquired the stake from **Ensafeca Holdings** (a consortium of BBVA and telco Auna).

This means Abertis will now in effect control 37.3 percent of Hispasat because of Abertis' existing 32 percent stake in Paris-based Eutelsat. Eutelsat itself holds a 27.7 percent stake in Hispasat. The Abertis/Hispasat agreement has to pass examination by Spain's competition and governmental offices. There's a long way still to go but a merger, or closer link, between Hispasat and Eutelsat is now a much more likely prospect. Spanish infrastructure and telecoms conglomerate Abertis says it has bought a 28.4 percent stake in satellite operator Hispasat. It paid $287.5m (€199m). Abertis used its Abertis Telecom division and acquired the stake from Ensafeca Holdings (a consortium of BBVA and telco Auna).

Abertis—or Eutelsat itself—has to build its stake in Hispasat in order to facilitate a merge between Eutelsat and Hispasat. With Abertis and Eutelsat working in concert, this should not be too difficult to engineer. Of course, the Spanish are ultra-sensitive about "their" satellite system falling to the French—but it ought not to be beyond the wit of Abertis to structure any eventual merger as a reverse take-over by the smaller Spanish business of Eutelsat and thus win government approval.

This approval is crucial. Earlier this year the Madrid government made its point clearly saying it was not in favour of any sort of dilution of Hispasat to foreign owners, a position it repeated again in November. The government wants to prevent one company controlling the Spanish satellite system. After opening the doors to the new shareholder, the Spanish government has shut it down again, fearing the possibility that Abertis might achieve as much as a 46.62 percent in the Spanish satellite company. Now it seems the government does not want Abertis to go further than the 28.84 percent it has recently taken in Hispasat.

The government can also veto this current operation but local political sources say it will give the go ahead to Abertis' current plans, but no further. But those responsible for Abertis Telcom are said to still be working on how they might take a higher percentage in Hispasat.

But a Paris HQ for Hispasat/Eutelsat, and flying a Spanish flag above the door, is not an impossible thought. The second key element in the decision-making process is French state bank **CDC Infrastructure** (a subsidiary **of Caisse des Depots et Consignations**), which also has a large stake in Eutelsat (25.5 percent) acquired from **Eurazeo** in December of 2006. CDC needs to support any move by Abertis, which has previously stated it had no "current" intention of mounting a full take-over bid for Eutelsat. That was earlier this year. Today the situation is a little different, and well worth following closely.

Eutelsat has much to be proud of, not the least of which is their canny development of capacity over the Middle East. The two established Mid-East competitors **Arabsat** and **Nilesat** have seen the pan-Arab market go absolutely crazy with about 370 free-to-air channels added to the available 100+ pay-TV services. And transponder capacity was very tight, which was where Eutelsat came in to play. For a couple of years, Arabsat had leased a Eutelsat satellite (EuroBird 2) as a replacement for one of its problem satellites at Arabsat's Mid-East 'hot spot' at 26° E, with EuroBird 2 sitting at 25.8° E. The contract came to an end in March this year. The problem is that since March 5, and for much of last year, Eutelsat has been marketing capacity from their co-located Arabsat position as Noorsat 1—and seemingly with some success. Noorsat 1 is a virtual satellite, given that it just sells Eutelsat capacity. Eutelsat considers they have a right to occupy 25.5°—slapped right up against Arabsat's 25.8° position.

> The issue at 26° E is simple," said our source. "The BSS frequencies are entirely ours, and cannot be contested. At FSS, however, it is somewhat complicated. When we used EuroBird 2, which we called Badr 2 (and Noorsat now brands as Noorsat 1) some of the frequencies are in a disputed area. A year or so from now we'll have Badr 6 on station and that will give us plenty of BSS frequencies to serve our customers."
>
> *"Demand in the region for FSS capacity has exploded, not just for broadcasting, but for trunking, VSAT and IP-based services. The recent loss of NSS-8 has not helped, and the market has been converging to us, with a huge increase in capacity demand. We see the next year as being interesting, legally, technically and commercially."*—an Arabsat source

Which is not to say that Arabsat is spending all of its time in discussions with its lawyers. It is also looking at Value Added services, "where they make commercial sense", and this includes partnering and joint-venture investments in play-out, studios and facilities, and other aspects of the broadcasting chain.

Mohamed Youssif, ArabSat's recently appointed **VP/Sales & Marketing**, speaking exclusively to *Inside Satellite TV*, says: "We want to come further along the value chain, which is why we have this initiative with Jordan Media City. We have recently opened uplink facilities in Jordan, Cairo, Kuwait, Dubai, Beirut, Tunis, and we are looking at Algeria and Morocco, as well as Europe. We are expanding, and are open to offers for partnerships, and closer relationships with broadcasters, and are prepared to make investments in studios, play-out and other facilities. ArabSat is prepared to put its cash into such joint ventures where it makes commercial sense. We are

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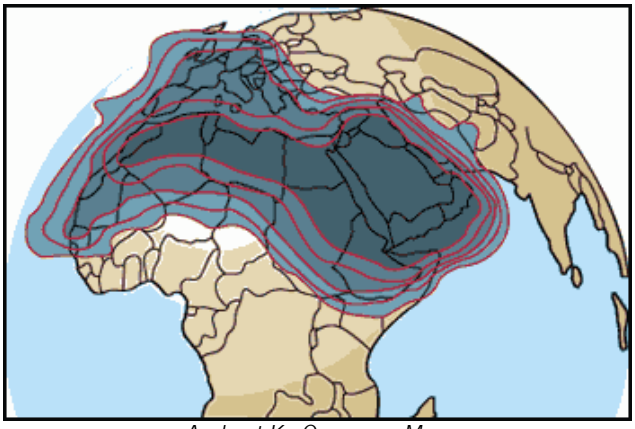
very excited by these prospects, and they will lead, I believe, to ArabSat's golden years. The new Board of Directors have a fresh view, they have cut it loose from the old methods and it is now free to act and move commercially."



Arabsat Ku Coverage Map

Youssif's strategy also embraces HDTV. "We are excited about (HDTV's) prospects. I'd say the HDTV stars are very definitely in alignment, and we're looking to proactively take advantage of that. We don't just want to be a supplier of capacity.

"We feel we are in a good position to be the premier supplier of HD services over the Middle East," said Youssif. "HDTV needs capacity, and we have capacity today and have ample capacity coming on stream. We have to take this initiative and propel the HD concept to the consumer. We have a number of options and are not sitting back waiting for the market. Many broadcasters are sceptical over HD. They are worried about the extra costs of HD, and we have to overcome this hurdle. Even those who have started thinking constructively about HD, and even making HD programs, as yet have nowhere to showcase their efforts. And showcasing those programmes is also expensive given that the price of capacity is about triple the price of an ordinary SD channel.

"We have to break this cycle," adds Youssif. "So we have said to broadcasters that we want to help, to take some of this burden and anxiety from them, and help them promote themselves and HDTV, without too much extra cost and bankrupting them into the process. The Middle East is the only region in the world, which is totally dominated by free-to-air. People will not pay for TV the way they do almost everywhere else."

One of the concerns in the market is the proliferation of set-top boxes. "In order for HD to succeed everyone has to chip in: broadcasters, satellite operators, set-top box suppliers, uplinkers, play-out facility houses...everyone has to play its part. We are trying to use ArabSat's name as the umbrella, which everyone will come under and thus eliminate the need for worry. One of the immediate benefits could be the elimination of multiple set-top boxes, already a concern in some homes. If *Orbit*, *ART* and *Showtime*, the three pay-TV operators, were to go high-def, then this would force viewers to have a set-top box for each of them. This will deter people from making any investment. With an ArabSat 'umbrella', we would make it easy for them, easy for consumers and propel their take-up in the market."

"New" ArabSat's market position*

	2005	2007
Satellite TV penetration of MENA population	58.2%	85.7%
Digital homes amongst Sat TV	79.4%	93%
Digital TV amongst population	46.2%	79.7%
ArabSat viewership	129.5m	163.8m
ArabSat digital viewership	90.6m	150.7m
% viewing ArabSat exclusively	-	30%
% of Sat TV homes receiving ArabSat	-	56.9%

*MENA: Middle East, North Africa
Data: IPSOS survey, Dec 06-Mar 07; sample: 10,425 HH

And NileSat is also busy adding capacity with its **NileSat 103** satellite, due on station in about two years. And this seems to be the mantra for all operators, with SES and Eutelsat both adding orbiting assets. This also applies to SES subsidiary **Sirius** which is due to orbit a new Scandinavian satellite in late November, and arch-rival **Telenor** launching their **Nordic** alternate this coming February.

In other words, rivalry, competition and hard work are at play—but that's what satellite broadcasting has always been about.

London-based Chris Forrester is a well-known entertainment and broadcasting journalist. He reports on all aspects of the TV industry with special emphasis on content, the business of film, television and emerging technologies. This includes interactive multi-media and the growing importance of web-streamed and digitized content over all delivery platforms including cable, satellite and digital terrestrial TV as well as cellular and 3G mobile. Chris has been investigating, researching and reporting on the so-called 'broadband explosion' for 25 years.

MSS WINNERS & LOSSERS

by Tim Ferrar, TMF Associates

During 2007, the **Mobile Satellite Service** (MSS) sector was clearly split into winners and losers. **Inmarsat** and **Iridium** are the big winners for the year. Both experienced surging revenues and strong subscriber growth.

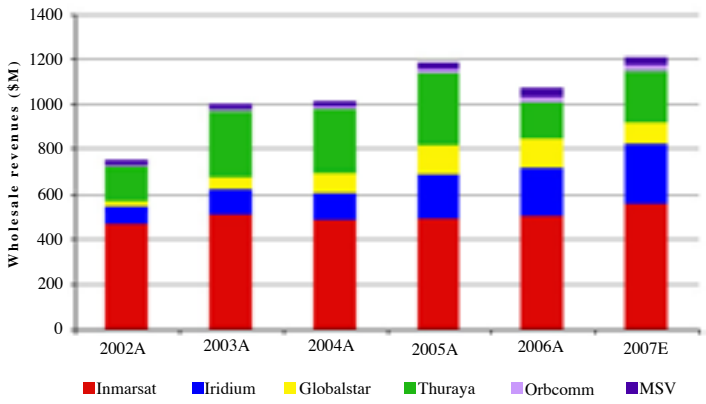
Inmarsat's growth has been driven by continued demand for data services in the maritime and aeronautical market, accompanied by the renewed growth in land-based usage resulting from its new **BGAN Broadband Global Area Network** product. Iridium has enjoyed strong growth in handheld services, gaining subscribers from Globalstar, as well as increased demand for its Short Burst Data services.

On the other hand, **Globalstar** and **Thuraya** suffered in 2007. Globalstar experienced satellite problems that led to a loss of high usage handheld subscribers and a resulting drop in ARPU (Average Revenue Per Unit). Thuraya experienced delays in availability of its new handsets and launch of its third satellite as well as lower usage levels as terrestrial GSM networks continued to be built out in many of its key markets in the Middle East and Africa. However, Thuraya has witnessed its overall revenues bounce back somewhat from very depressed levels seen in 2006, when an overhang of prepaid cards and a lack of handsets led to a steep fall in its revenues (down 51 percent between 2005 and 2006).

Among the smaller players, **Orbcomm** can be counted in the winner column. The company continued growth in its subscriber base and a clearer path was established towards profitability. However, it has seen a sharp drop in its stock price as certain contracts have been delayed and subscriber additions have fallen short of expectations.

Conversely, **MSV**, **TerreStar** and **ICO** have been losers. MSV experienced a dramatic drop in its stock price as it attempts to garner as much as $500M in additional funding in order to complete its new satellites. In addition, TerreStar and ICO are both suffering from lengthy delays in launching their first satellites.

Overall, we estimate wholesale revenues for the six MSS operators with satellites in orbit (Inmarsat, Iridium, Globalstar, Thuraya, Orbcomm and MSV) grew from $1,067M in 2006 to approximately $1,207M in 2007, an increase of 13 percent. While this growth appears, at first sight, to be quite healthy, and far exceeds the current rate of growth in FSS, in fact it is only 2 percent higher than the revenues of $1,182M as seen in 2005. When we remove the distortions introduced by Thuraya's overhang of prepaid cards in 2006, wholesale revenues were roughly flat between 2005 and 2006 and grew by just under 8 percent in 2007, in line with the growth rates seen in the FSS business this year.



Turning to the individual MSS services, data applications stand out as the dominant source of growth. The number of terminals used for low data rate MSS services such as **Orbcomm**, **Iridium SBD**, **Inmarsat D+** and **Globalstar**'s simplex tracking, is estimated to have grown by around 250K, reaching 950K by the end of 2007 and almost doubling since the end of 2005. Higher speed data services, including **BGAN**, **Fleet** and **Swift64**, generated roughly $300M in wholesale revenues for Inmarsat in 2007, up 15 percent in 2006, from about 65,000 active terminals.

In contrast, while the number of handheld MSS phones in use increased by around 50K to reach 600K at the end of 2007, we estimate that wholesale revenues from handheld services remained broadly flat during the year, at around $350M. As a result, declines in ARPU from Globalstar and Thuraya users cancelled out Iridium's strong subscriber and revenue gains.

As we look forward to **2008**, we expect the positive trends in data services to be maintained. Inmarsat has recently launched its **Fleet** and **Swift Broadband** services, offering BGAN-like speeds to the maritime and aeronautical sectors, which will sustain its strong momentum in these areas. Equipment costs for asset

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tracking terminals continue to decline, while the network of value-added resellers is expanding, facilitating installation of these devices in a wider variety of heavy equipment, transportation and fixed asset monitoring applications.

The outlook for handheld services is more uncertain, as Globalstar's satellites are expected to continue to deteriorate and may stop providing any reliable two-way service some time in 2008. If this happens, then there will be even greater subscriber churn over the next year. Some Globalstar subscribers in North America may prefer to wait for the lower cost handheld services being launched by Inmarsat and TerreStar in late 2008 or early 2009, rather than opting to immediately take-up the more expensive Iridium services. The move by Thuraya to offer its new, more attractive dual mode handset as a solution for low cost satellite roaming in certain African and Middle Eastern markets is also fraught with difficulties and potentially could undermine its existing higher value satellite business in some vertical markets. In addition, Inmarsat will progress with the development work needed to offer satellite phone services over a wider footprint and may begin to introduce further competition for current handheld MSS users.

Finally, during 2008 we should begin to see the impact of ATC on the North American market. Although ICO and TerreStar are not expected to offer commercial services on a large scale until 2009, they will need to strike distribution deals over the next 12 months and secure further investments to support the launch of commercial service. As a result, the degree to which ATC will change the MSS landscape should become much clearer. One thing is for certain; we look forward to interesting times for the MSS sector in the year ahead.

Telecom, Media and Finance (TMF) Associates, Inc. publishes the only research service focused on the MSS market, which includes analysis of new developments and revenue projections for all of the leading operators.

Contact Tim Farrar by phone on (650) 839 0376 or by email at tim.farrar@tmfassociates.com or visit www.tmfassociates.com/reports for more details about this research.

VIEW FROM ASIA AND THE ENTERPRISE MARKETS

by Michael Fleck, Global Vision

Any year that begins with an earthquake cutting most of the telecommunications with China and East Asia was always going to be 'interesting' — and this year did not let us down. The tremors that followed through 2007 were not as apparent but much more positive and no less significant.

In general, we saw major multinational corporations begin to sit up and look around after a year's focus on the West to realize this place called Asia has become not only their largest potential market, but also accounted for a rapidly growing number of their employees. This lead to a shift in perspective by the hard-core satellite players. Enterprise applications in Asia became mainstream for the first time. An earthquake indeed.

Consider some of the innovations and new applications that started to roll out in Asia during 2007 and are set to gather momentum in 2008...

MPEG-4 has moved from an interesting toy to an accepted professional standard, with the added bonus of relatively easy integration within corporate LAN systems. This means that good quality, standard definition video is being delivered to the desktop with as little as 1 Mbps. Exceptional quality SD is at the desktop and on large screens using just 2 Mbps.

High definition MPEG-2 is taking us back to full transponder use (what would it take in analog!) Trials of HD using MPEG-4 earlier this year will lead to 6 to 10 Mbps delivering great HD signals from New Zealand in the east to Dubai in the west—with a single feed and into antennas as small as 1.8 meters. The first MPEG-4 high definition MCPC services across Asia will be launched around mid year.

One of the exciting markets for the high-end services is satellite distribution of digital cinema. The first pilot network (SD, so far)

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has been installed in Australia to deliver live events into regional towns spread across the continent. The service is set to convert to HD and grow quickly in 2008 to cover all major population centers before expanding into India, South East Asia and China.

The first event will be on December 7th when the Australian Ballet Company and Australian Film Commission present The Nutcracker live from the Sydney Opera House. This will be the first time in Australia that digital cinema technology has been used to give regional audiences the opportunity to experience a live performance by one of Australia's flagship arts companies at the same time as an audience in a metropolitan area. Return feeds from some receiving sites will make it a nationwide, interactive event effectively showcasing the benefits and potential of the technology.

At the other end of the bandwidth spectrum is an untapped market for satellite distributed digital signage. The uptake of this application has been hampered in Asia because of poor access to reliable bandwidth and in-country infrastructure and support. Satellite delivery is making it a reality by giving users the same degree of quality, and control, as experienced in the U.S. and Europe.

These trends are set to accelerate in 2008, but the focus in Asia remains China and, in particular, the Olympics in Beijing. The opening ceremony is scheduled for 08-08-08, a lucky number in Chinese numerology and all concerned are hoping it does the trick!

However, access to satellite services for the Beijing Games has been hampered by incomplete, confusing and, at times, contradictory announcements and regulations. There's just over eight months to go, so watch this space for updates and progress reports.

Traditional BTV networks will continue to expand into Asia in 2008, but there is an enormous untapped potential for other enterprise application. As VSAT costs continue to fall, we will see more and more companies rolling out Disaster Recovery systems. Watch for an increase in Distance Education, especially in India and China, as well as developments in the low bandwidth areas such as digital signage. Developments of earthquake proportions!

Michael Fleck is managing Director of Global Vision Networks, the Asia Pacific region's leading provider of services to the corporate world. Based in Sydney with representative offices in Hong Kong, Singapore, Chennai (India) and soon in Beijing, Global Vision offers complete turnkey solutions for everything from downlinks into hotels to disaster recovery capability across the region.

Global Vision Networks is ISO 9001 certified, a big plus for maintaining quality in the design and management of permanent and occasional solutions for the enterprise market in 17 countries of the AP region. Since 1992 the company has assisted multinational corporations with a range of solutions including location television production, fixed and SNG uplink, temporary and permanent downlinks and an extensive network of satellite equipped five star hotels for special events.

THE VIEW FROM XIPLINK

by Jack W. Waters, CEO of XipLink, Inc.

Looking at the satellite Industry for the past year evokes images of great progress, energetic debates and trade show hijinks. While we often parallel the broader telecommunications market, the satellite market has its own unique set of challenges and approaches to the issues before our customers and us. The outlook in this article is a review of some of the major market trends established in the satellite equipment segment of the satellite industry during 2007, and how these actions will likely progress into 2008 and beyond.

Over the last ten years, the satellite industry, in general, and the equipment providers, in particular, have been through some serious, short-term expansions and dot-com style crashes. In the past two years, however, there has been a steady pace of increasing business based on a solid economic foundation. While 10 to 14 percent growth in the satellite equipment market pales in comparison to some new industries, this growth rate is quite respectable for a mature business, especially considering the average price per unit of most satellite equipment is lower today than it was just 12 months ago. Thus, the unit growth is much larger than revenue growth.

There were a number of macro market factors having a positive influence on the satellite equipment market in 2007. Some of those influences include a more favorable adoption of residential services than planned with services from providers such as **WildBlue Communications**, **HughesNet**, **IPSTAR** and others. Another macro factor providing headlines was the continuing use of satellite equipment in the military market for in-theatre and long-term strategic use. However, I believe there were three major long-term drivers that aided the broader overall market in 2007:

Completion of the cycle to IP-centric networking

Only a few years ago, the dominant satellite network equipment technologies, with the related RF chain supporting this equipment, were based on legacy network protocols. With the leading VSAT manufacturers all delivering IP centric equipment today, the service providers and private network architects made significant new investments in 2007, while completing the long-term cycle by discarding the older, less efficient and unreliable (for broadband) products of the past.

Major new technical advancements

For both the satellite video and the satellite data networking markets, the long awaited DVB-S2 standard began making serious inroads, with deliverable products in 2007 and phenomenal payback periods for users of

Hub Optimized Gateway

the new technologies. Nevertheless, for data networking traffic, DVB-S2 only optimizes the physical layer of the network. When combined with a new generation of acceleration and bandwidth optimization products at the network layer of the link, "early adopters" and "pragmatic buyers" were rewarded with drastically lower cost per bit ratios over the last 12 months, despite some increases in satellite capacity costs. Thus, forward-looking customers were quite confident in making large capital investments during 2007 to obtain years of operational paybacks into the future. We expect that trend to continue with increasing amplitude in 2008 and beyond.

Editor's Note: *DVB-S, the original Digital Video Broadcasting forward error coding and modulation standard for SatTV, was accepted back in 1995 and this is used by satellites serving content all over the globe. DVB-S2 is an enhanced spec developed in 2003, ratified by ETIS in March of 2005 and replaces the DVB-S standard. Expectations are that DVB-S2 will be used for all new digital satellite multiplexes in Europe and satellite receivers will be able to decode both of the specifications. DBV-S2's main use today is for HDTV distribution and the spec development actually coincided with HDTV and H.264 (MPEG-4) video codecs debut!*

Emergence of the broadband mobility market

One of the great historical strengths of satellite technology is wide and ubiquitous coverage. For decades this has served the narrowband/MSS equipment manufacturers and service providers extremely well. Now, with the emergence of a common networking protocol and efficient use of spectrum, broadband applications are economically reaching the masses at both fixed (predictable) prices and on a variable price basis. In 2007, this dual dynamic resulted in significantly higher market adoption rates for maritime broadband, aircraft Internet access and **military satcom on the move** (SOTM). This has led to creative use of the latest satellite equipment technologies and establishment of new service providers that did not compete in broadband access prior to these developments. A good example of this phenomenon is **ARINC**'s (**Aeronautical Radio, Inc**.) positive emergence in the private aircraft broadband services market using both new types of technologies (i.e. **XipLink XE**

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Embedded Acceleration) and a sound economic operating model for delivering these services at a profit.

"Our focus on satellite networking is an overriding benefit to our clients compared to other technologies that focus first on terrestrial connectivity. In 2007 our activities in the transportation sector also underscore our drive to support the market as broadband data connectivity expands to new markets."—*Charlie Younghusband*, XipLink Founder

From an internal company perspective, this past year was especially significant for XipLink in many ways. As one of the first SCPS development mavericks in 2000, it was rewarding to see the first commercial acceleration applications being rolled out over the last few years and, more recently, to witness the mandated use of the SCPS acceleration standard for key military deliveries in 2007. We have seen the market mature to the point that in July, our former parent, aerospace company **Xiphos Technologies**, conducted a spin-off of the SCPS acceleration technology into an independent company called **XipLink, Inc**. As part of that new independence, we obtained a significant round of capital and are doubling our staff size by the end of year.

"With SCPS standard acceleration taking hold in certain markets, and being mandated in the military sector, this will undoubtedly lead Service Providers to offer a standards-based acceleration option at their teleports, as a managed service, since most users will have access to a SCPS compliant client in their remote device."—*Jack Waters*, XipLink CEO

Another major milestone for XipLink in 2007 was the development of three distinct product families for the marketplace. This segmentation into an **Embedded Acceleration Software** product line (**XE**), an industry leading **SCPS** acceleration appliance (**XA**) and a satellite efficient secure **VPN** appliance (**XS**) allows our customers complete flexibility in deploying productive broadband access to the marketplace. Lastly, and most importantly, XipLink delivered a new feature-rich release of our core software, incorporating all the efficiencies developed over the last seven years, into release 2.5 of our signature product, allowing us to double our base of customers in 2007.

"Our latest 2.5 release of XipLink is an exciting evolution of our TCP acceleration technology", said *Charlie Younghusband*, **Vice President of Product Management** and founder of XipLink. "Release 2.5 permits 100% utilization on TDMA networks—which is very important for external accelerators used on military networks. It also permits us to field a new line of network acceleration products at a cost effective price point for the enterprise satellite communications market—something that hasn't happened on a significant level previously. We continue to complement the existing SCPS standard TCP acceleration with significant advances in integrated data compression and enhancements to bandwidth management."

What will occur in 2008? In our business segment, which is wireless acceleration equipment within the broader space of bandwidth optimization systems, 2008 will be an exciting year. The overall bandwidth optimization market is pegged to grow more than 40 percent. While XipLink plans to more than double revenues during this same period due to constriction—if not an outright lack—of space capacity, the most significant impact will be the emergence of new applications for the XipLink acceleration technology. For pragmatic bandwidth users, the argument is compelling to incorporate new technologies to maintain competitiveness. Many of the new applications moving forward will use acceleration on small profile hardware, such as PC-104, to reach highly mobile markets. Or, the applications will be embedded into existing infrastructure to enhance overall performance without managing additional appliances, as in the case of mobile aircraft cited earlier.

We look forward to further evolutions in the satellite market for 2008!

Mr. Waters is Chief Executive Officer of XipLink, Inc., a network communications software company with head offices in Montreal and the Washington, D.C. area. XipLink is the leader in standards-based acceleration technology for optimizing bandwidth over satellite and terrestrial microwave networks. In July 2007, XipLink was spun-off from the aerospace company, Xiphos Technologies, and new capital invested into the company. Mr. Waters was selected to lead the XipLink team due to his long-term success in data communications technologies.

Most recently, Mr. Waters was Senior Vice President of Global Sales at iDirect Technologies, Inc., where he helped the company become a leader in the IP Broadband VSAT business with sales in 2006 of over $120 million. Mr. Waters is a graduate of Michigan State University and holds a B.S. in Accounting—he was also named Captain of the MSU Ski Team in 1979.

SIZING THE TELEPORT MARKET

THE WTO'S 2007 ASSESSMENT

According to a new study from the **World Teleport Association** (WTA), the past three years have been good ones for the global teleport sector, the ground-based side of the global satellite network.

Accessing satellites may be what distinguishes teleports from other communications service providers, but it is only a small part of their repertoire, according to WTA. Today's teleports are the channel by which satellite is integrated into complex networks involving fiber, wireless and mobile technologies in order to expand their reach beyond the edge of the network, broadcast one-to-many, or feed bandwidth-hungry applications. Teleport operators know how to simplify the complexities of space-based networks in order to make satellite links "just another port on the router." They have become among the world's leading experts in adapting Internet Protocol technology for high-latency circuits, "push" applications and other uses never envisioned by the developers of IP.

Leveraging those skills, commercial and broadcast operators increased the total number of teleports in operation 22 percent since 2004 to a total of over 1,780 worldwide, while commercial operators notched up 17 percent revenue growth.

The 2007 edition of the WTA's study entitled "*Sizing the Teleport Market*" provides the first global, regional and national statistics for teleports owned and operated by broadcast, cable and DTH channels as well as commercial operators in 155 nations. Globally, commercial providers operate 50 percent of the world's teleports. They account for **US$15 billion** in transmission services revenues, up 17 percent from 2004, and **US$3 billion** in annual capital spending on communications and information technology equipment, up 19 percent from 2004. Broadcasters, by contrast, operate 43 percent of the world's teleports and account for about **$875 million** in capital spending.

The study estimates the teleport sector is responsible for **$15 billion**, or nearly one-quarter, of the **$62.6 billion** in worldwide satellite transmission revenue. Revenue from value-added services has

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grown even faster than overall revenue for commercial operators. Excluding resale of satellite and fiber capacity, global revenue grew 19 percent from 2004 to reach **$8.5 billion** in 2007.

North America remained the single largest market for teleports services, with **$4.1 billion** in revenues, followed by Europe with **$3.9 billion**. The fastest-growing regions for commercial teleport operations were the Middle East (61 percent revenue growth to **$793 million**), Asia (50 percent growth to **$3.5 billion**) and Russia/NIS (40 percent growth to **$540 million**). By contrast, North America grew at a stately 8 percent (to **$3.3** billion), Latin America at 7 percent (to **$1.1 billion**) and Europe at 4 percent. The 2007 edition of *Sizing the Teleport Market* is available for download at www.worldteleport.org. It is free for WTA members and for sale to non-members.

In early November, the World Teleport Association released their rankings of the **Top Teleport Operators of 2007**. These operators were segmented into three categories: the **Global Top Twenty**, the **Independent Top Twenty**, and the **Fast Twenty**. Rankings are based on information submitted to the WTA by the companies as well as the published results of publicly held corporations. The rankings include companies owning and operating teleports, whether this is their primary business or platform for providing a broader array of services to customers.

The Global Top Twenty

The Global Top Twenty ranks companies based on revenues from all sources and include all operators. As the owner of US telco **Broadwing** as well as international fiber networks and **Vyvx**, **Level 3 Communications** was the surprise leader in the Global Top Twenty. The total revenues of the Global Top Twenty exceed US$12.8 billion, with individual companies ranging from over $3 billion to under $100 million. In order from largest to smallest, the Global Top Twenty of 2007 are:

1. Level 3 Communications (USA)
2. SES Global (Luxembourg)
3. Intelsat (Bermuda)
4. Eutelsat (France)
5. Stratos Global (USA)
6. GlobeCast (France)
7. Telesat Canada (Canada)
8. JSAT (Japan)
9. Shin Satellite (Thailand)
10. Arqiva Satellite Media Solutions (UK)
11. Schlumberger (UK)
12. Hispasat (Spain)
13. Loral Skynet (USA)
14. Space Communications Corp. (Japan)
15. Globecomm Systems (USA)
16. Telenor Satellite Broadcasting (Norway)
17. CapRock Communications (USA)
18. AsiaSat (China)
19. ND SatCom (Germany)
20. Spacenet (USA)

The Independent Top Twenty

The Independent Top Twenty ranks companies based on revenue from all sources, but excludes companies whose core business is ownership and operation of a satellite fleet or terrestrial network. These 20 companies have focused relentlessly on innovation and value delivery. The total revenues of the Independent Top Twenty exceed $2.2 billion, with individual companies ranging from over a half billion dollars to under $20 million. In order from largest to smallest, the Independent Top Twenty of 2007 are:

1. Stratos Global (USA)
2. GlobeCast (France)
3. Arqiva Satellite Media Solutions (UK)
4. Schlumberger (UK)
5. Globecomm Systems (USA)
6. CapRock Communications (USA)
7. ND SatCom (Germany)
8. Spacenet (USA)
9. Satlynx (Luxembourg)
10. RRSat Global Communications (Israel)
11. UpLit (USA)
12. TIBA (Argentina)
13. Datasat Communications (UK)
14. Essel Shyam Communications (India)
15. Emerging Markets Communications (USA)
16. Satlink Communications (Israel)
17. ATCi (USA)
18. Telecommunication Systems (USA)
19. Jordan Media City (Jordan)
20. Newcom International (USA)

The Fast Twenty

The Fast Twenty ranks all teleport-operating companies based on year-over-year revenue growth in their most recent fiscal years. (For individual growth rates, see the WTA website.) Revenues of the **Fast Twenty** exceed $7.5 billion. Israel-based **Satlink** led the pack with a stellar 116.28 percent growth rate. Though the teleport operations of **Vyvx** make up a small portion of its revenue, fiber giant **Level 3** also made the Fast Twenty by virtue of its aggressive series of acquisitions, as did Fast Twenty companies **Arqiva Satellite Media Solutions**, and **UpLit**. From the fastest of the fast, the Fast Twenty of 2007 are:

1. Satlink Communications (Israel)
2. Level 3 Communications (USA)
3. Essel Shyam Communications (India)
4. Arqiva Satellite Media Solutions (UK)
5. Gascom (Russia)
6. Stratos Global (USA)
7. Newcom International (USA)
8. TIBA (Argentina)
11. UpLit (USA)
12. Shin Satellite (Thailand)
13. SES Global (Luxembourg)
14. Emerging Markets Communications (USA)
15. Telecommunication Systems (USA)
16. Hispasat (Spain)
17. Globecomm Systems (USA)
18. CapRock Communications (USA)

9. RRSat Global Communications (Israel)
10. Satlynx (Luxembourg)
19. ATCi (USA)
20. Spacenet (USA)

About the Top Operator Rankings

The Top Operator rankings are compiled by surveying teleport operators around the world on their facilities, services and business results. These unique rankings reflect the often-unappreciated realities of the marketplace, according to WTA Executive Director *Robert Bell*.

"Teleports are critical for adding value for satellite carriers, fiber carriers, technology providers, systems integrators, and a broad variety of specialized service providers," said *Bell*. "Once almost entirely satellite-based, teleports now deploy a broad range of transmission and content management technology to meet their customers' needs. In compiling the rankings, WTA looks at the teleport sector as a whole and broken by individual segments, which allows us to see even the smallest players who are achieving outstanding growth."

The complete rankings are available on WTA's Web site by going to www.worldteleport.org and clicking on the Top Operators link on the News menu.

About World Teleport Association

Since 1985, the WTA has been the only trade association to focus on the business of satellite communications from the ground up. At the core of its membership are the world's most innovative operators of teleports, from independents to multinationals, niche service providers to global hybrid carriers. WTA is dedicated to helping teleport operators to improve their operations, develop their markets and grow their businesses within the $13 billion teleport sector of the global satellite industry. Companies that do business with teleports also find that WTA is the best investment they can make to open new channels to the industry.

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THE VIEW FROM WEGENER

In 2007, **WEGENER,** who provides video and audio equipment for the satellite broadcast industry, upgraded its key product lines and expanded the markets and applications that the company's innovative, patented technology serves. WEGENER experienced growth in its customer base, especially among those focused on broadcast, faith-based and digital signage applications.

DVB-S2 and MPEG-4/h.264

The past year has witnessed a continual push by major content providers to launch additional HD channels. The amount of HD programming production has increased, as has the manufacture of HD monitors. There is also increased availability of MPEG-4 encoders, cameras and editing equipment.

Industries in addition to network and cable television are embracing HD technology. For satellite providers, the ramp-up for HD programming includes the adoption of DVB-S2 modulation. By combining DVB-S2 modulation scheme and MPEG-4 video compression, content providers can look to save 40-70 percent on bandwidth when distributing live content. WEGENER's private network customers look to deploy this technology to reap considerable benefits. They continue to investigate expansion of their SD and HD channel lineups, as well as how to lower the overall cost of their operations.

"The biggest news of 2007 is our support for DVB-S2 next-generation satellite modulation technology, and MPEG-4/H.264 advanced video coding in our new enterprise grade media receiver, the Unity 550-2," said *Gary Pelkey*, Vice President and Principal Engineer for WEGENER. "We recognized that these enabling technologies have reached a critical point of maturity, and that they are available to be incorporated into our products."

"Our customers were expressing strong demand for these advanced compression and modulation standards because they offer dramatic savings of bandwidth and improved network transmission capabilities for live broadcasting with private networks," said Pelkey. "With the more efficient coding supported in the Unity 550-2, customers can offer multiple standard definition (SD) video channels; or a single digital high-definition (HD) video channel in similar bandwidth to prior technologies."

Introduced at the **National Association of Broadcasters** (NAB) convention in April 2007, the **Unity 550-2 Enterprise Media Receiver** replaces the Unity 500, which is limited to MPEG-2 and DVB-S broadcasting. With the step-up from MPEG-2 to MPEG-4 video compression, and from DVB-S to DVB-S2 modulation, the Unity 550-2 is more efficient, with the ability to cut bandwidth usage by 40- to 70-percent. The Unity 550-2 targets customers operating private video networks via satellite, including gaming, faith-based worship, education, government, medical, and retail organizations.

Unity® 550

IPTV Set Top Box

Driven by the ever present need for more flexibility and to control the placement of video screens in out-of-home environments, the adoption of IPTV into satellite applications continues to evolve.

SMD 515 Streaming Media Decoder

"We are encouraged by the opportunities in the private network market for utilizing our SMD 515 IPTV set top box to extend the reach of our iPump media servers," stated *Ned L. Mountain*, President and COO of WEGENER. "MPEG-4 high definition and standard definition video is finally ready for wider-scale deployments, which will allow network operators to significantly lower their monthly operating costs or launch additional services."

At NAB, WEGENER also conducted an end-to-end, bidirectional demonstration to showcase live, simultaneous streaming of one SD and one HD MPEG-4/h.264 video feed over an existing VSAT (Very Small Aperture Terminal) network to an **SMD 515 IPTV** set top box, provided by **SDN Global**.

According to Pelkey, "VSAT is a new area of interest for WEGENER as of 2007. VSAT is typically used in retail networks as a data path over satellite. VSAT always had the capability to support video, but we specifically integrated our SMD-515 and Compel control system to work over a VSAT network so people who have existing VSAT networks can now add Compel control and our SMD-515 receivers giving them a controllable video network."

COMPEL® Network Control

COMPEL® Network Control

The cornerstone of satellite media distribution systems is network control. 2007 saw improvements in flexibility, reporting, and network scheduling. Overall, manufacturers of network control solutions continue to focus on flexibility for linear broadcasting, file-based workflows and delivery, IPTV, digital signage, VOD, and targeted advertising services.

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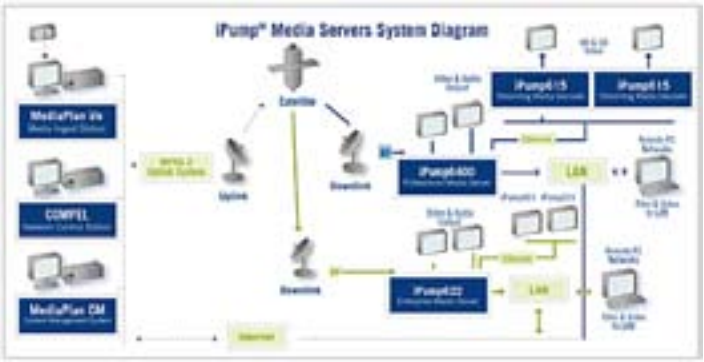
At NAB, WEGENER gave attendees previews of its next-generation COMPEL network control system, called **COMPEL II**. The company plans to unveil this product, upgraded with new features and capabilities, at **NAB 2008**.

COMPEL allows users to control and monitor which video, audio, and data is sent over secure transmission paths to receivers, such as the Unity 550-2. With COMPEL, the receivers can be controlled as individual sites and as a group, with 10,000 ways to segment the target audience.

For retail clients, WEGENER offers system operators complete control over media scheduling, presentation, and delivery of the content through the Compel network control system. System operators can trigger broadcast equipment, insert localized advertisements, configure WEGENER media players, update or delete content, change channels, and manage sound levels across the entire network from that remote control location, with no end-user interaction required.

"While most of our customers are transferring their content via satellite, this year," Merithew said, "We've added IP delivery to our system in the COMPEL and iPump product lines. This benefits our customers who are expanding into places that are not currently served, or easily served, by satellite networks. By adding IP delivery, we've created a hybrid satellite/terrestrial network that is more versatile in serving their needs."



"Most significant here is that these customers can manage their hybrid network as one cohesive network, since their single COMPEL network control system can feed content and manage both their traditional satellite based iPumps as well as Internet-based iPumps," Merithew added.

Eye on Growth Markets

2007 was an active year for WEGENER's many radio network clients, including **Jones Radio**, which is in the process of upgrading their network. Jones Radio is using the iPump media server at radio stations nationwide to insert localized content and ads into their national broadcasts. Other radio customers using iPump include faith-based radio networks: **EMF** and **Horizon Broadcast**; and, new as of 2007, **BBC World Service**, which distributes its programming in many languages to radio stations globally.

In 2007, WEGENER announced the **Big Ten Network** (BTN) is now using WEGENER's broadcast solution to distribute digital HD and SD video content to its affiliate network. The Big Ten Network, which covers sports and academic content emanating from the Big Ten Conference of allied universities, is a joint venture between the Big Ten Conference and Fox Cable Networks.

Also, Merithew noted, "The digital signage market really gained traction this year. We added a new distributor, SSL in Mexico, which employs our technology for digital signage. They're delivering background music, employee announcements, advertising, and point of purchase retail support to a network of retail locations, all equipped with our iPump media servers."

"In previous years, we'd seen many companies doing test trials of digital signage, but now many are starting to commit to using digital signage to strengthen their branding and distribute information in both corporate and retail settings," Merithew said.

In 2008, Merithew and Pelkey said that WEGENER customers would see continued research and development in the areas of digital signage, file-based workflows and HD video.

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THE VIEW FROM VIASAT

by Mark. D. Dankberg, Chairman, CEO and co-founder, ViaSat, Inc.

While the demand for fast and secure IP networking is a general driver of new business in satellite communications, two specific developments—one government and one commercial—continue to generate huge opportunities. The first is the building of the **Global Information Grid** (GIG) by the **Department of Defense**, while the commercial development is the launch of **Ka-band** satellites and services for broadband Internet access.

It's nearly impossible to quantify all the opportunities stemming from the GIG—new needs are popping up all the time. The new generation of dedicated military satellites certainly is behind all sorts of developments, from the satellites themselves to ground systems. And even associated technologies that might otherwise be categorized as non-satellite must be included in prospects generated by the GIG. One example is the government-mandated **Information Assurance** (IA) products that secure GIG data, both at-rest on media storage systems and in-transit. **ViaSat** is providing a number of in-line network encryptors for the GIG in the form of stand-alone products and embedded technology.

Yet all those new dedicated DOD space assets won't be enough to satisfy the need for bandwidth by troops on the ground, so commercial capacity and off-the-shelf products are on government procurement lists as well. That need has generated new GSA purchasing vehicles like **Satcom II**, which means business for dozens of satellite communication companies included in last year's awards. All agencies of the Federal Government, including the Department of Defense, can use Satcom II to purchase satellite communication systems, information assurance products, and engineering services. Under Satcom II, ViaSat received a five-year, $90 million Indefinite Delivery Indefinite Quantity (IDIQ) contract to provide a full range of satcom products and services.

On the commercial side, the past year saw the unqualified—and unprecedented—success of satellite

The Arian 5 payload fairing is lowered over WildBlue-1 and the SYLDA 5 dispenser
Credit: Arianspace

broadband Internet access aimed at consumers and small business. With **WildBlue** surpassing 250,000 subscribers during the year, new Ka-band satellites are now a great investment. **WildBlue 1**, the first all Ka-band spot beam satellite specifically engineered for broadband by satellite, successfully launched, entered service, and immediately began filling up with happy subscribers.

"The launch and implementation validated what we've been saying all along," said *Mark Dankberg*, ViaSat Chairman and CEO. "That by applying new ideas and technologies that lower the cost-per-bit, increase capacity, and provide a great customer experience, broadband by satellite is a great business."

Major ViaSat Milestones for 2007

The past year has continued the strong financial performance of ViaSat. Fiscal year 2007 was the fourth consecutive year of record results in sales, new orders, earnings and earnings per share. The average compounded annual growth rate for these metrics has been very strong:

- Revenues up 23 percent per year on average.
- GAAP net income up 32 per year per year.
- New orders up 15 percent on average, and increasing to a record $515 million total for the past year.

That financial performance earned ViaSat a spot on the *Forbes* "Best 200 Small Companies" list for the sixth time.

"It's important that service providers and operators have solid technology partners," said Dankberg. "As we grow, we increase our ability to take on larger and more complex programs."

On the business side, ViaSat counted a number of successes for the past year:

- Introduction of the first ruggedized military **BGAN** terminal with integrated Type 1 encryption.
- Continued rollout of our DVB-S2 technology for VSATs, including **Adaptive Coding and Modulation** (ACM).
- Winning an award to update the **Blue Force Tracking** system for the U.S. Army.
- Additional applications of **ArcLight®** mobile broadband technology:
  - First flight on a military helicopter to create a "command post in the sky".

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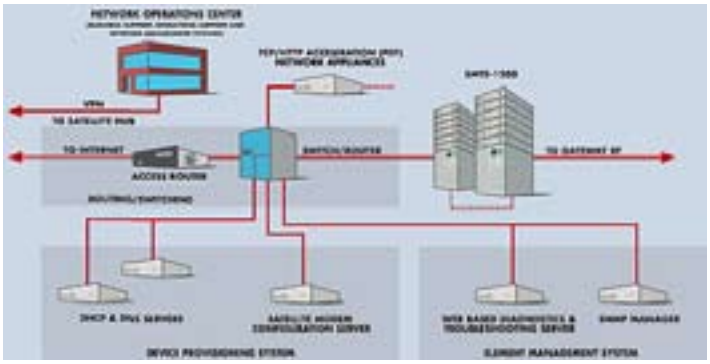
  - Introduction of **KVH TracPhone V7** small maritime broadband terminal.
  - Increasing installations on **GulfStream** and **Bombardier** business jets.
- Launch of **Tooway℠** broadband by satellite in Europe with our partner **Eutelsat**.
- Shipments of our **SurfBeam® DOCSIS®-for-satellite consumer/SME terminals** surpassed 300,000.



ViaSat's SurfBeam broadband satellite access network

Looking Ahead

As the networking technology behind WildBlue, the SurfBeam product is the fastest growing, most popular two-way satellite terminal ever produced—and other regions of the world are noticing this fact. That success has opened doors to two adjacent markets, each of which could be substantially larger than revenues associated with this technology.

International satellite operators and telecom companies are seeking to introduce Ka-band broadband access into new geographic markets. The Tooway service in Europe is just one example. The other is to define a new Ka-band satellite system in the U.S., so the market pioneered by WildBlue's **WB-1** and **ANIK F-2** satellites can expand. The **FCC** has granted ViaSat two U.S. Ka-band orbital slots.

"While new Ka-band satellites will not be in service before our fiscal year 2011, we anticipate executing new agreements during fiscal year 2008 that will pave the way to exciting growth," said Dankberg.

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Mobile Broadband and MSS band mobility is another area that holds great potential. The abundance and price of Ku-band satellite spectrum gives it compelling advantages in certain markets for mobile data connectivity and entertainment. ViaSat entered the market as the satellite modem supplier to Boeing's **Connexion** in-flight broadband service. Despite Connexion's demise, there has been steady growth in mobile broadband equipment and services for business jets as well as defense applications.

"We think this is a very attractive growth area and this next year will be a key indicator of how the market will go in the years ahead," said *Bill Sullivan*, Director of Mobile Satellite Communication at ViaSat. "We're bullish on that market, and we've filed for, and received, an FCC license so we can offer Ku-band services of our own."

Sullivan cites a number of new initiatives in play:

- Restoration of in-flight commercial airline service, led by the former Connexion customers.
- New antenna technologies that will extend Ku-band service availability to smaller private aircraft.
- New small vessel maritime service extension, beginning with the partnership with KVH.

Another source of growth on the horizon is the Mobile Satellite Services (MSS) band.

"Last year we started on the **Ground Based Beam Forming** (GBBF) system for the **Boeing MSV** satellites," said *Prakash Chitre*, VP and General Manager at the Comsat Laboratories division of ViaSat. "That's our single largest commercial development program ever, which is a very telling indicator of the potential for this market."

ViaSat IP core networking expertise, proven in the SurfBeam DOCSIS broadband program and coupled with on-going terrestrial fixed/mobile convergence technology initiatives, creates the potential for new MSS networking ideas with game-changing performance, flexibility, and cost points.

Finally, one of the most exciting potential areas is to bring the **HAIPE IS** (High Assurance IP Encryptor Interoperability Specification) technology that is at the core of the information assurance products into space. Should the **Lockheed Martin TSAT** team win the contract award, such would become the largest satellite on-board electronics program ever managed at ViaSat.

Mr. Dankberg co-founded ViaSat Inc. in 1986 and has led the company to become one of the fastest growing high-tech companies in the world. He has held the position of Chairman of the Board and Chief Executive Officer since the firm's inception. Before its initial public offering in 1996, ViaSat was named three times to the Inc. 500 list of fastest growing privately held companies. Since then, the company earned recognition in the BusinessWeek "100 Best Small Corporations" list, the "200 Best Small Companies in America" by Forbes, the Business 2.0 list of "100 Fastest Growing Technology Companies", and Red Herring magazine's "Small Cap 100".

After earning his BS and Masters degrees in electrical engineering at Rice University, he began his career at the Collins Radio division of Rockwell International as a systems engineer. Next he became an engineering director and then a vice president at M/A-Com Linkabit and helped to establish that company's Linkabit's VSAT business, which, along with other M/A-Com divisions, became Hughes Network Systems.

THE VIEW FROM SSPI

by Louis Zacharilla, Director of Development,
The Society of Satellite Professionals International

The best-selling author *Stephen King* would later recall that it was the day that terrified him more than anything he could have ever imagined...

It was October 4, 1957, and the young boy, along with the rest of the human race—and specifically the free people of the world—experienced one of the most traumatic and threatening moments since the attack by Japan on Pearl Harbor 16 years earlier. On that day, a 184-pound radio transmitter, named **Sputnik I**, appeared in what the ancients once called "the heavens."

But that first bird was not launched with angelic intentions. It was a strategic political tool, blunt and malicious, whose intention was to scare the West into believing that it was technologically inferior and that its survival was dependent entirely now on the whims of dictatorship in a closed, dark and musty closet of a society called the Soviet Union.

However 50 years later, in Washington, DC—in the very city that holds the heart of the government Sputnik was trying to destroy—the year 2007 began with a celebration of that day's activity. *Konstantin Seredenyakov* of the Embassy of the **Russian Federation** joined the CEOs and representatives from private and national satellite operators from around the globe, as well as *Anousheh Ansari*, the first woman private citizen to visit space (aboard a **Soyuz** rocket!), to celebrate the **Society of Satellite Professionals International**'s observance of the first 50 years of satellites in space. The event took place at SSPI's annual **Gala in Washington**, the evening prior to the annual Satellite conference.

From that evening in February through the end of the year, 2007 was one that showed how the satellite industry has changed

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since its tough birth, and demonstrated dramatically how much the world has been changed by satellites.

2007 was the year when companies, large and small, entered into a furious round of financial kabuki, ventures, mergers, and acquisitions, which will forever change the competitive landscape and focus of the industry. The high profile consolidation in the fixed operator world, culminating with the completion of the **Loral Skynet/Telesat** deal, was among the marquee events. But what was bubbling beneath the surface was also of importance: **Arqiva** purchased **BT**'s satellite services and assets, while **Datapath** snapped-up **SWE-DISH** and mighty **Cisco**, in a rare show of respect, allowed **Scientific-Atlanta** to do business as Scientific-Atlanta, an acknowledgement of the power of the brand and its satellite heritage. **Andrew** decided to sell its satellite business and others also found private equity partners willing to help cash out or continue to expand their presence, as the world's appetite for communications grew more ravenous. In 2007, the trend of smaller and smaller businesses and industries embracing satellite continued, which impacts the life of more and more individuals. By May, policy makers and analysts began to accept the claim by a satellite industry-formed think tank, the **Intelligent Community Forum** (www.intelligentcommunity.org), that we are now experiencing life in "*The Broadband Economy*," and that much of the transformation is being fueled by satellites.

While the satellite industry's headline deals and activities are always the main topics at conferences and their panel sessions, a peek into other interesting corners of the industry also reveal that initiatives once thought to be stalled, or questionable, began to flourish.

In September, at the **World Satellite Business Week** event in Paris, **WildBlue Communications**, which is bringing satellite broadband to rural North America, reported that it was exceeding its subscriber projections—and then some! Satellites began to make their presence felt in movie theatres; in Africa (where Internet growth reached nearly 700 percent) and even in parts of the world where fiber is the rule—such as Taipei, where a devastating earthquake proved that terrestrial systems are vulnerable to forces of nature which do not impact satellites. Were it not for satellites, the nation, which produces the lion's share of the world's information technology components, would have gone silent.

In the small town of Evandale, Ohio (USA), satellites even helped law enforcement do its job and helped to catch a couple of bank robbers. On September 14th Kenneth Maples climbed into his white Ford pickup, with his wife at the wheel, and slipped into heavy traffic on the Interstate, convinced that he had safely gotten away with stealing $7,000 from PNC Bank. Bonnie and Clyde they *ain't*. Mr. and Mrs. Maples never had a chance... a GPS tracking device tucked inside the stolen cash allowed local cops and the FBI to follow the signals until, with laughably minimal effort, the two were stopped at a roadblock and informed that the satellite industry had done them in!

The industry continues to be a key backbone and enabler in the emergence of HDTV, cellular backhaul—which gives telecommunications carriers more customers in remote regions, and fresh bouquets of content to TVs and devices. In Korea, a "*U-City*" initiative (as in ubiquitous) mandated any form of content will soon be delivered to any device, anywhere. The satellite industry, including leading thinkers and technologists like VOD pioneer, **TVN Entertainment**'s CTO *Dom Stasi*, acknowledged that only satellite would make the Korean vision truly universal.

The year also saw both **Sea Launch** and **International Launch Services** recover from failed launches to bounce back again to deliver the goods in October and November, respectively. Sea Launch, with an impeccable recovery and management of the facts surrounding the event, categorized and reported by *Paula Korn* in the October issue of **APSCC**, highlighted again that satellites are like life—not risk free. But as in life, they truly offer redemption and successes beyond anyone's imagination 50 years ago.

The industry again showed its magnificent heart and capabilities. When devastating fires struck the American state of California in October, **Globecomm Systems** contributed a 1.2-meter antenna, space segment and its expertise to a relief agency struggling with the impact of an exodus from the flames that dislocated a reported 500,000 people. Thanks to an Internet Café set-up to provide access for people, including firefighters, the Red Cross and volunteers (many of whom were able to remain on site and manage their affairs back home thanks to the access), Globecomm again proved that its tag line "*A Little Bit of Satellite Goes a Long Way*" pretty much nails it.

And finally, in Europe, the **World Radio Communications Conference** (WRC-07) rejected requests from terrestrial companies seeking access to C-band spectrum. The users of C-band were protected, but more important, the millions and millions of people who rely on satellite communications for essential communications and entertainment in Digital Age, *no longer have to life in fear that another "attack,"* like the one in 1957, will create a scary day.

It's been a remarkable launch since 1957—and the ascent continues to point toward the heavens.

Louis Zacharilla is the Director of Development, The Society of Satellite Professionals International (SSPI), a nonprofit member-benefit society that serves satellite professionals throughout their careers. The Society promotes the development of, and access to, high-quality, satellite-related education on the post-secondary and continuing (adult) levels through scholarships, development of curricula, hosting conferences and publishing the world's first online journal on space communications.

THE VIEW FROM SPACE DATA

by Jerry Quenneville, Vice President, Business Development, Space Data

Advancements in lightweight, portable communications platforms are providing our warfighters with significant options on the rugged and unforgiving battlefield, and building on successes. In the commercial market, several new technologies are being applied to the military's needs by providing low cost, reliable solutions for tactical communications.

One new piece of technology helping our warfighter is the brainchild of **Space Data Communications** founders *Jerry Knoblach* and fellow MIT classmate *Eric Frische*. Together, the Space Data team has efficiently and cost-effectively combined three well-established technologies—weather balloons, microelectronics, and GPS—to produce its high altitude balloon-borne communications platform, which provides an ease of launch and broad coverage footprint to customers.

Space Data provides "*Near Space*" wireless communications to the military, public safety agencies, homeland security organizations and industry, as well as to individual and commercial customers. In addition, Space Data provides reliable and secure wireless solutions to rural and remote areas where terrestrial towers are impractical, or are not cost-effective due to population, and satellite bandwidth is too costly or unavailable.

Wrapping up a tremendous growth year in 2007, Space Data continued to rack up flights on its commercial data network, primarily in support of the oil and gas industries and vehicle fleet tracking. This year, the company also made tremendous strides in developing PCS ("cellular") voice and associated broadband data capabilities.

Among its major milestones for 2007, Space Data ramped up to a full production status on its government **StarFighter™** Military-UHF repeater platform. The full production resulted in delivering several hundred of the repeaters to the U.S. Air Force under the $49 million "*Near Space Communications System*" contract with the **Air Force Space Command**.

The StarFighter Platform provides a communications footprint up to 600 miles in diameter for standard tactical radios such as the **PRC-148**, **PRC-117** and **PSC-5**. Secure, or clear communications, can be made with significantly less power than required for terrestrial or satellite communications, thus conserving precious battery power and reducing the weight the tactical warfighter needs to carry. With the ability to use standard low profile, flexible antennas, the StarFighter Platform supports critical dismounted *comms-on-the-move* without the challenge of antenna pointing.

Additionally, the StarFighter Platform recently was selected as one of two communications' platforms demonstrated at the Air Force Research Laboratory's **Commander's Challenge**. Subsequent demonstrations were also conducted for Army Special Forces as a tactically oriented data transfer capability using **ViaSat** data controller cards in a laptop, linked into **Thales MBITR** handheld radios communicating through a StarFighter repeater. This combination applies a capability commonly used by the detached warfighter via military satellite systems; but with a dedicated balloon-borne service that complements heavily tasked satellite links and can be used over areas where terrain all but prevents satellite access.

In 2008, Space Data will expand its military activities with the first operational deployment of its StarFighter Platforms and the introduction of a second version of the military repeater platform. This new balloon-borne repeater will provide repeater functionality specifically geared toward tactical ground forces that use the 30-88 MHz (or SINCGARS) band. Indications are that a number of "truck" applications are in the works, which will provide communications and intelligence, surveillance and reconnaissance (ISR) applications. Overall, the company plans to build on its successes with its Air Force deployment contract, introducing and inte-

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grating its **Near Space** balloon platforms into the toolkits of the other service branches and the special operations community.

Further government activities in 2008 will focus on the emergency response and public safety sectors. The communications and tracking capabilities will be suited to FEMA, Forest Service and border management missions.

"This has been a monumental year for us, filled with major accomplishments and exciting new prospects. Our commercial technology, now with well over 13,000 flights of our balloon-borne platforms above 65,000 feet, has been applied to key military needs, filling a critical gap in tactical communications and surveillance capabilities," said Space Data Chairman and CEO *Jerry Knoblach*. "We're on our way toward several major developments and new applications in 2008, with a significant expansion in our commercial and Government business areas."

Space Data also has the **SkySite®** Platform which, unlike comparable satellite capabilities, floats at altitudes about 30 times closer than low Earth orbit (LEO). This affords users the ability to achieve satellite-like services while using standard terrestrial communications devices and no special antennas. Unlike comparable satellite capabilities, the SkySite Platform floats at altitudes about 30 times closer than Low Earth Orbit (LEO), enabling users the ability to achieve satellite-like services while using standard terrestrial communications devices and no special antennas.

This past year, Space Data's commercial sector saw the introduction of the **SL-3100 Locator**, a combination GPS location and data terminal that is ideal for fleet operations and critical, up-to-the-minute tracking requirements. While developed in response to commercial vehicle fleet requirements, the lightweight, low-power SL-3100 is ideally suited to homeland security applications such as post-disaster response and remote tracking requirements typical of wild fires. In addition to GPS location, this device allows critical situational data to be carried back to a central location when other communications are unavailable.

Next year we will also see an important melding of Space Data's commercial data technology with modern personal medical instruments. Space Data will work with Federally sponsored support to the Navajo Nation for the introduction of wireless diabetes monitoring.

"We are very excited to have our balloon-borne technology selected to provide critically needed communications of blood sugar levels and other vital signs from very remote regions of the Native lands, many of which are without any other form of telecommunications," Knoblach said.

Through the use of reliable and responsive balloon platforms coupled with modern microelectronics, Space Data Corporation is bringing wireless coverage to new areas. They are also supporting critical needs in both the military and commercial sectors. These products and services are providing affordable communications via the company's virtual satellite platforms, yielding unprecedented expanded coverage to Government, commercial and personal users alike. Look for a continued expansion in markets and capabilities from Space Data in 2008.

Jerry Quenneville is the Vice President, Business Development, of Space Data and he is responsible for identifying new customer opportunities, secures new business, steers new areas of technology development, and maximizes the business impact of partnering relationships in Space Data's Government Division.

Before joining Space Data in 2001, Mr. Quenneville spent over 20 years in the U.S. Air Force in various engineering, research and technical program management capacities in support of the U.S. intelligence community. He retired as a lieutenant colonel with responsibilities that included the engineering, development and deployment of intelligence systems; high-reliability space and terrestrial communications systems; modeling and simulation systems; and special-purpose digital and software-based applications. Mr. Quenneville earned a B.S. from the University of Massachusetts at Amherst, and an M.S. from the California Institute of Technology, both in electrical engineering.

THE VIEW FROM PROACTIVE COMMUNICATIONS

by Marc LeGare, CEO, Proactive Communications, Inc.

When I look back at 2007, I see a great deal of progress, not only for our own business, but also for our customers. As some of you may have learned in the last issue of *MilsatMagazine*, our company, **Proactive Communications, Inc**. (PCI) became the *first* US company to sign an IT contract with **the Iraqi Ministry of the Interior** in May of this year.

We provide 6,000 internal security officials, police and commandos, ports of entry, border enforcement camps, passport control, and provincial joint coordination centers with secure satellite communications in Iraq. As with some satellite telecom businesses, we must eventually hand the reigns to our customers when we leave their environment. With the new agreement in Iraq, we successfully transitioned the day-to-day operations and management of the network to this burgeoning new government.

It has been especially rewarding to work with the Iraqis. When we started working with them, the communications infrastructure had outdated connectivity and the Iraqis had limited technological skills. We worked closely with them to train them on how to design and construct a local area network, install and commission a VSAT system, deploy and train users on office productivity software, and trouble shooting across the range of products they install. This year we empowered the Iraqis by teaching and training them to operate and run their own communications infrastructures, such as their own network operations center. And we also got to witness a great deal of camaraderie and teamwork among Christians, Sunni and Shiites on our team.

Through our work with the Iraqis in 2007, we've been able to expand satellite coverage from 170 nodes to 250+. We have upgraded the VOIP capability and migrated to more capable management systems and deployed these to Iraq. All of these advancements have enabled the various government units and agencies within Iraq to be interoperable. This has enabled them to easily and securely communicate with one another, which is an essential ingredient to running and protecting a government.

We've also seen progress in Afghanistan, where we expanded coverage from Ku band to C-band and increased the size of the networks by 50 percent. On the US front, we've added a Gulf Coast regional medical center and its affiliates, as well as begun work in support of the Florida National Guard.

With the progress achieved in 2007, we look forward to beginning the New Year with strong momentum and a renewed vigor.

Marc LeGare became CEO of Proactive Communications, Inc. (PCI) in 2006, after serving as the company's Chief Operating officer and Operations Manager since 2003. Prior to joining PCI, Mr. LeGare was Senior Consultant and Operations Manager for Force XXI Battle Command Brigade of TRW/Northrop-Grumman. From 1981 to 1999, Mr. LeGare served various command and staff positions for the U.S. Army worldwide, including Battalion Commander from 1999 to 2001. LeGare earned a B.S. from the United States Military Academy, West Point, a Master of Science from the Air Force Institute of Technology and a Master of Military Arts and Sciences from the School of Advanced Military Studies. Proactive Communications offers satellite communications, enterprise services, IT consulting and field support services.

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THE VIEW FROM PACSTAR

by Robert Frisbee, CEO, PacStar

For **PacStar**, 2007 was an important year of "transition under pressure" for our customers, mainly the United States Military, federal agencies, state and local governments and first responders. They are all under tremendous demands to provide critical, real-time information to the front line, whether a soldier on patrol in Iraq, or a city government in California preparing for the next fire storm or earthquake. Real-time flow of information is now considered a significant success factor when determining whether or not a mission or an operation will succeed or fail.

These information flows deliver voice calls, video, mapping, surveillance information, incident response and a host of other applications. This type of data is often most critical in the places where it is the most difficult to deliver—remote, dynamic and infrastructure-barren environments.

Available solutions are a mixed bag. In the commercial space, technologies such as DSL, Wi-Fi, WiMAX and others are delivering broadband entertainment and business information to expanding geographic "pools" of information-rich regions. These technologies have less impact on military and disaster response operations as they still require fixed facilities, and also due to the security concerns relating to some wireless technologies.

Satellite is the one technology not dependent on geography. In addition, satellite-based systems have become quick to set up, deploy, move and redeploy. That is why satellite communications systems are on the forefront of delivering the new information-rich applications.

The communications systems users currently manage are not able to deliver the complex voice, video and data our soldiers and disaster response personnel rely on to make critical decisions. Thus, our customers have been put in an unenviable position of transitioning to new capabilities while still having to maintain and manage existing systems that have difficulty handling IP-based communications. It's like trying to build a freeway and drive on it at the same time. While your clients are literally getting shot at, chased by hurricanes and forest fires, they are required to function at the highest operational levels possible in exceptionally difficult and taxing environments.

To meet the new challenge, the trend is to leverage the broad capabilities of satellite as the back-haul in deployed situations and move to what is known in military and disaster response circles as **Everything over IP** (EoIP). EoIP will allow organizations to send complex information—voice, video, and data—easily and cost effectively. Our clients are taking this transition seriously. The new CIO of the Army recently stated communication systems for the information war fighter are of the same importance as every other major battlefield weapon system. Dependability, performance and satellite bandwidth are all of critical importance.

Recognizing the need to change, the government is shifting its resources to an all IP infrastructure. In the last year alone, major initiatives have been launched, including the **GIG-BE** backbone initiative, new standards for digital voice exchanges and a shift in military base IT infrastructure to IP-based technology.

PacStar was able to successfully introduce and implement a number of initiatives during 2007. We expanded our leadership in the advanced deployable communications market by delivering integrated communications networks offering best of class capabilities tied together with easy to understand software wizards that allow the military and the government to easily deploy, manage and maintain complex networks. These capabilities use satellite bandwidth as the conduit to deliver enhanced IP-capabilities to military installations, forward operating bases, National Guard units and disaster responders.

We saw increased satellite-based deployments by the US Military in Afghanistan and by the National Guard for disaster response in the United States. We have also been extremely active in deployments to remote corners of the world. The following two examples illustrate how PacStar is helping our customers meet end users' needs.

The satellite enabled **PacStar 5500** was chosen by **United States Central Command** (USCENTCOM— the command structure overseeing operations in Afghanistan and Iraq) to provide a reliable and secure voice, data and video communications system easy to deploy, use and manage and one that could also be used by the Afghanistan National Army (ANA). Additionally, PacStar provided on-site support to deploy the system and train the ANA personnel who had little to no IT experience. We went as far as to translate thousands of pages of technical manuals into Dari, the language

most commonly used in Afghanistan. Training on the system is made easy with PacStar's proprietary **IQ-Core™** Software that automates all normal functions with user-friendly wizards and allows the unit to be fully operational in less than 10 minutes. This eliminated the need for highly specialized IT technicians in the field.

Commenting on the success of the program, Lt. *Gul Agha* of the **Afghan National Army** stated, "I had never seen a computer before I started this training and was very unsure of the benefits, but with the training they explained everything to us and now I can understand the benefits. It saves so much time and manpower and makes our army as good as other armies. As an Afghan that makes me very proud."

Additionally, PacStar and **LGS**, a subsidiary of **Alcatel-Lucent**, are working together to provide the **U.S. Army Reserve Command** (USARC) with a rapid response cellular solution and satellite capabilities to communicate in and out of the disaster area. The U.S. Army Reserve Command has positioned the **LGS Tactical Base Station Router** (TacBSR) and the **PacStar 5500** to support a number of its posts across the country for Disaster Response (DR) and Continuity of Operations (COOP). The system can also be used as a portable mobile communications package to support both forward deployed operations and communications capability during man-made or natural disaster support efforts.

"We needed a reliable solution that allowed us to continue to use our mobile phones even if there was a total communications outage," said Lt. Colonel *Lenell White*, signal operations chief, USARC. "LGS and PacStar were able to provide us with a deployable network system with full cell phone capabilities that gives us the vital back-up we need to accomplish our missions."

Peering ahead into 2008, we see two issues challenging our industry segment near-term... they are the global issues of abundance and scarcity

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Abundance describes the sources and the demands within our client base for information, delivered through complex voice, video and data networks. It is transforming our business and creating sensational new requirements. These requirements stem from the operating effectiveness of high quality information delivered in real-time to the right person over secure lines to ensure it is shielded from enemy hands.

Information for our troops is now considered a critical weapon and key to the warfighters' effectiveness and survival. Required information ranges from images (coming from satellites, drones or a team member), weapons systems availability, maps, enemy and ally identities, command and control directives and an endless list of additional requirements.

Information for disaster responders can mean the difference between life and death, not to mention mitigation of massive property loss. Information for diplomatic missions informs and shapes a successful foreign policy, as well as directs crisis planning and response.

PacStar clients are demanding transformational capabilities. Push-to-talk radios no longer support the soldiers and firefighters in the field. Dial-tone support is no longer effective for the diplomatic mission abroad.

Scarcity, on the other hand, describes the available infrastructure for last-mile delivery. An overbuild of fiber optics in the last century provides excellent transport to major cities and pockets of broadband-to-the-home are transforming play, work and media in parts of the world. However, a large percentage of the world still lacks this infrastructure. It is here that PacStar's verticals live and work, succeed or fail, and in these settings success can literally mean the difference between life or death.

What creates scarcity? Last mile to remote or shifting locations almost always means satellite communications. This is the one technology that can reach anywhere efficiently, regardless of geography and market density. But global satellite capability is ailing. There has not been a major systems launch since **Iridium** in 1996.

Our troops, our embassies, our disaster response personnel face skyrocketing needs for bandwidth delivered to regions of the world that lack built-in network infrastructure. The war on terror, efforts against global poverty, demands caused by increasingly frequent disasters, all focus on that large percentage of the world without broadband infrastructure. And no viable long-term investment plans have yet developed.

What can be done? There are partial solutions available on the technology side. The inherent efficiencies of IP systems can condense large amounts of information into smaller pipes and deliver it efficiently on available systems. Use of alternate delivery systems such as WiMAX, Wi-Fi, 3G, free space optics and others can push bandwidth deeper into the unsettled (disrupted, developing, remote, damaged, etc.) parts of the world. Long-term solutions must include new technologies launched in satellite configurations. Such will require smart, realistic planning and serious investment.

"We are looking forward to commercial and government organizations coming together to address the critical shortfalls in satellite deployments, and to give our customers access to the information they need in the field, any time, any place." said *Robert Frisbee*, CEO of **PacStar**.

In the meantime, PacStar will continue enabling our verticals to meet their abundant requirements in this environment of scarcity. We are delivering the first fully converged IP systems meeting new US Military requirements for deployed and base communications systems (the DISA standards for "*Deployed Voice Exchange*" and "*Small End Office*"). These deliver huge economies of scale and innovation for converged communications systems.

We will continue to lead the design and delivery of software-enabled IP systems that support capabilities in the field. We will work with partners and clients to maximize information, security and manageability of the new communications capabilities.

PacStar will remain dedicated to keeping our troops, Guard units, first responders, diplomats, government officials and others safe and effective through modern communications, in this challenging age of abundance and scarcity.

Robert Frisbee joined PacStar in April 2000 to provide executive leadership, strategic planning, and organizational development expertise. Mr. Frisbee has more than 30 years of senior executive experience in conceiving, implementing, and managing successful large-scale initiatives in the telecommunications sector.

PacStar Proven Communications Technology

Before joining PacStar, Mr. Frisbee was the founder and chief operating officer of FirstPointe Communications, a fiber-optic-based telecommunications company with revenues exceeding $150 million the first year. Prior to that, he was a founding officer (vice president of sales, marketing, and business development) of Electric Lightwave, a competitive local exchange company that attained revenues of over $100 million per year, and completed a public offering in 1996. Mr. Frisbee holds an MA in public administration from Harvard University, where he specialized in international telecommunications policy, and a BA with honors.

MOBILE SATELLITE COMMUNICATIONS: THE VIEW FROM NSSL

by Sally-Anne Ray, Sales Director, NSSL

2007 certainly was an exciting year in the satellite industry, and not just because it has been 50 years since the launch of Sputnik by the former Soviet Union. There was the commercial distribution of BGAN, which was extremely exciting as thousands of new users received the opportunity to use the most up to date communications equipment. Mergers and acquisitions were rife and Fleet Broadband was launched.

Looking ahead, 2008 promises to be an even more exciting year. Inmarsat is adjusting its constellation, **Fleet Broadband** take up is expected to be huge, and, of course, the long awaited *Beijing Olympics* will occur—with communications technology likely to play a big part in the event coverage.

2006 will be remembered for the launch of BGAN, and for good reason. BGAN was the major technological development in decades, bringing a level of communications capability to ordinary individuals and businesses as never before experienced. The system has made a big splash, with individuals, the media, military, aid organizations, adventurers and oil companies—they are buying the equipment in droves. As a result, at the close of 2006 and during the first six months of 2007, work was largely taken up with stabilizing the BGAN innovations of early 2006.

rife they will be taken over by **Iridium**. Demand for Iridium handhelds remains strong, but even they have issues. Iridium urgently needs to invest in new satellites, but with estimates that such will cost between $1.8 and $2 billion, such a funding allocation seems "shaky".

Another big issue for the satellite industry in 2007 was the confrontation with **International Mobile Telecommunications** (ITU) networks, which have recently been trying to muscle in on the prized C-band spectrum. For over 40 years, this has been dedicated to the satellite industry, which has given the sector the assurance needed to maintain investments. Over the last few months, however, IMT networks have been using C-band capacity, especially in the Asian market, and that has caused problems for satellite operators.

The good news is that at the **2007 World Radio Communication Conference** (which is part of the UN's International Telecommunication Union), where 191 Member States assemble every four years to work out the rules by which countries get to use the radio frequency spectrum, there was a ruling that this frequency belonged *exclusively* to satellite operators.

This was an extremely positive development for the industry as the decision ensures operators will have adequate bandwidth to

NSSL's BGAN Terminals

BGAN was but one of the big developments during 2007. There was significant consolidation in the industry. **APAX** bought **Telenor Satellite Services**, **BC Partners** bought **Intelsat** and **NSSL** bought **TET Satellite Solutions**. What drove all this consolidation? Broadly speaking, it all comes down to money. Operators need to start pushing out new products and services if they want to remain competitive. The latest equipment doesn't come inexpensively.

Consolidation allows companies to pool their resources, wealth, capacity and expertise so the latest systems can be acquired. Those companies unable to maintain viability are likely to fall by the wayside. Look at **GlobalStar**. The company has an "official" funding gap of $150 million and rumors are

roll out future services. *Andrew Sukawaty*, Chairman and CEO of **Inmarsat**, best summed up the industry's feelings following the ruling. He said, "Their decision to protect the C-band will enable us to continue offering essential communications to mobile users where terrestrial networks cannot reach, including aeronautical and maritime safety services."

Another great development in 2007 was the continued growth in the military-satellite sector. Demand from Western nations, especially the US and UK, who are engaged in intensive wars in Afghanistan and Iraq, has been particularly strong. The US defense budget has grown massively under the Bush Administration, reaching a record $459 billion a years—and this excludes extra money for the ongoing wars. The satellite industry has benefited hugely from this extra demand for remote communications. **Stratos** and **iDirect** have secured many contracts within this industry segment. In fact, those companies

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have had to establish specific departments to deal exclusively with their military-government contracts.

What does 2008 hold? Inmarsat's FleetBroadband service will be launched to market, with the first few months of the year witnessing providers selling the product and dealing with any of the hitches that usually accompany any new service. Inmarsat will also be kept busy with the biggest ever re-jigging of its satellite constellation. Inmarsat is also launching the 2G version of its popular handset, the **ISAT** phone, which will be welcome news to its many users and BGAN is likely to continue its popularity.

The good news is satellite operators are continuing to invest in their products and with **Thuraya** launching its first mobile broadband system and **NSSL** expanding and enhancing its fixed broadband offering. The Beijing Olympics take place in August, which will be interesting as it is the first Games since BGAN was released. The world's media will certainly have fun using it! The gap left by Boeing Connexions will continue to be filled by innovative service providers such as NSSL who continue to expand and grow their next generation broadband services, like CruiseIP and BroadIP.

All in all, 2007 was a busy and important year. New technology was stabilized and launched, the military sector continued to boom, and the satellite industry protected itself against potential problems by consolidating and providing innovative new services. 2008 will likely be just as exciting, if not more so. I can't wait. Happy New Year from NSSL!

Sally-Anne Ray is the Sales Director at NSSL Ltd. The company is an independent service provider for satellite communications solutions, and one of the top Inmarsat service providers worldwide. With a wide range of services and extensive experience of systems integration and application development, NSSL is strong in the maritime, government, energy, media, finance and corporate sectors and provides voice, data and broadband solutions anywhere in the world.

Established in 1969, NSSL plays a key role in developing new systems and applications for the Inmarsat network. Based in Redhill, Surrey, NSSL has 60 employees and a network of agents and engineers worldwide to provide service support to our global customer base.

FINANCIAL OVERVIEW: THE VIEW FROM NEAR EARTH

by Hoyt Davidson, Founder & Managing Member, Near Earth LLC

It's December and time to reflect on the major satellite industry events and trends of 2007 and extrapolate and squeeze out some predictions for 2008. It may be interesting to start by looking at those events that were expected or hoped for in 2007, but that, for one reason or another, simply didn't occur. Some of these events may happen in 2008—the correct conditions frequently take longer than planned in the space business. Then, it may be helpful to spend time following the longer term trends affecting the industry and, together with the delayed events, take an educated guess at 2008. With these goals in mind, let's start with a look at the industry, sector by sector.

Fixed Satellite Service (FSS)

We were expecting the economic logic of consolidation to prevail mightily in 2007 and did witness the impressive combination of **Telesat** and **Loral**. The long awaited sale of **SatMex**, however, cratered on low bids and rumored Mexican government intransigence. Instead of further consolidation, we saw **Protostar** emerge as a new viable source of Asian capacity and **General Electric** return to the game through a swap of **SES** shares for satellite operating assets. Thus, the number of satellite operators did not really shrink in 2007, although capacity utilization did improve somewhat on more "rationally exuberant" capacity additions accompanied by continued growth in video and data applications and newer growth sectors like GSM back-haul in Africa. The industry can also breathe a sigh of relief after the ITU preserved C-band for incumbent satellite services.

Going forward, the strong economic growth in many regions of the world suggests further demand growth for satellite capacity, albeit offset partially by continued improvements in bandwidth efficiency. With these factors in mind, most analysts are predicting mid-single digit revenue growth for the industry in 2008. The more interesting questions are the availability of free cash flow after debt servicing to fund growth and fleet replacement

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and how much of the growth in demand will need, for political reasons, to be served by indigenous suppliers versus the larger global operators. It has mostly been national pride and regulatory hurdles that has prevented further consolidation.

The key decision point for these smaller operators comes generally when it is time to finance a satellite replacement, especially if the satellite is only partially filled. With smaller GEOs (Geostationary Earth Orbit satellites) available and the emergence of new lower cost alternatives, particularly from China and India, we would expect the regional and national FSS companies to have a better chance of financing any required fleet replacements and perhaps avoid, for a little while longer, the consolidating arms of the giants. We may even see a counter trend of new market participants joining the party, as every emerging country wants to join the space age.

From a Wall Street perspective, the major players are fully levered and, from an operating point of view, perhaps dangerously so. Given the difficult debt financing environment due to the subprime mess, a lack of good consolidation opportunities may not be all bad, as such deals would be challenging to finance anyway. However, the high leverage did not stop BC Partners from buying heavily into Intelsat, after Intelsat's successful integration of its PanAmSat acquisition. Let's hope the timing works out for them.

Direct Broadcast Satellite (DBS) & Direct-To-Home (DTH)

Many expected 2007 to be a tough year for DBS in the North American market given the competitive pressures of triple play bundled offerings from the cable industry, the emergence of IPTV, stepped-up investments by telcos in fiber offerings and continued growth in video streaming. Indeed it was, but once again the DBS sector managed to add video subscribers, although perhaps at a slower pace (1.19 million net new adds for DISH and DIRECTV for the first 3 quarters of 2007 versus 1.32 million for the same period in 2006).

The competitive threats are still out there, but were kept at bay another year, largely through significant HD and niche programming additions by DBS operators and larger subsidies for upgraded set top boxes with HD and DVR capabilities. As a result, DBS experienced subscriber additions as well as increased ARPU (Average Revenue Per User) and, in the case of DIRECTV, lower churn.

The question for 2008 and forward is one of economic sustainability as these investments in subscribers come at a material hit to cash flow and require significant ongoing investments in new satellites and the exploitation of new orbital slots and spectrum. EchoStar's acquisition of **Slingbox** was another example of an attempt to stay relevant in a rapidly evolving digital video marketplace.

Meanwhile, the competitive threats should become even more pervasive and powerful as the years go on. Verizon's **FiOS** and AT&T's **U-verse**, in particular, collectively added 277,000 subscribers in a recent 3-month period. This could be a sign of things to come. With this magnitude of impending competition, something major may soon need to happen in the U.S. DBS market, either acquisitions of the DBS companies by telcos or other strategic firms, or a merger of the two companies.

As this article is being written, rumors of an AT&T acquisition of **EchoStar** are again rampant with a most serious stock price move at **DISH**. If a strategic acquisition of these firms does not happen in 2007-2009, we would expect them to have an excellent argument for a merger in the 2010 time frame, especially if the **Sirius / XM** deal gets approved. Alternative video competition should be well in evidence by then, even for the rural markets. Outside of the developed markets, the thirst for DTH video remains insatiable, especially in Asia, blocked only by government interference and the difficulties of distribution and customer servicing.

Satellite Radio

XM and **Sirius** announced their intention to merge in early 2007 and each has continued to add new subscribers, although at a slowing pace. Sirius continued to close the gap with XM, largely due to higher market share in the after-market from its slate of premium programming, in particular *Howard Stern*. In 2008, the trend seems to be a shift to factory installs as the key growth driver, as satellite radio is now becoming a standard option in more and more vehicle models. On the downside, meaningful cash generation has still been elusive with rising content costs and royalty rights looming on the horizon.

If ever there was a case for a benevolent "monopoly", this is it. The benefits to consumers are huge in our minds, not to mention some much needed relief for satellite radio investors who, to date, have lost many billions of dollars. The FCC knew this would be a tough business when they only allowed two entrants. However, it turns out that two is a big number in most sectors of the space industry. It is hard to predict whether or not rationality will prevail over knee jerk reaction and heavy NAB lobbying during an election cycle. XM/Sirius is a merger that many believe should be approved.

Beyond the North American market there is only **Worldspace** and a few early stage contenders hoping to develop services for Europe and elsewhere. In the case of Worldspace, even a "monopoly" position proved insufficient without the spectrum on the ground for terrestrial repeaters. The clock is ticking for WorldSpace and funds are scarce. If the company's trials in Italy and perhaps later China for the Olympics do not restore momentum, 2008 could be quite a dismal year. As for the new entrants, satellite radio in Europe is a much tougher proposition than North America, given the multitude of languages, pre-existing digital

terrestrial radio, and fewer underserved rural listeners. We wish them success, but it will not be easy.

Mobile Satellite Service (MSS)

The big and little LEOs (Low Earth Orbit) (**Iridium**, **Globalstar**, **Orbcomm**) followed up their recaps and rebirths of 2006 with continued growth in subscribers in 2007. However, serious technical issues plague Globalstar's fleet and such is causing the company to lose much of its momentum. Orbcomm's public equity financings this year seem to cover much of its fleet replacement needs, which are expected to commence in early 2008. The ability of Iridium and Globalstar to replace their fleets in coming years is still somewhat in question.

The year 2007 was also supposed to be a year of progress on the exploitation of ATC spectrum, particularly for firms like **ICO**, **MSV** and **Terrestar**, but none of the ATC owners were able to line up the strategic relationships they needed to build out their multi-billion dollar, nationwide, hybrid networks. Next year is looking like a pivotal year for these firms, with satellite launches by **ICO** and **Terrestar** in early 2008 and **MSV** in 2009 and cash coffers slowly dwindling.

Luckily, with the **AWS** and **700 MHz** spectrum auctions to be out of the way, ATC spectrum may be the next block of focus for wireless firms. We have long held that once the "easier" spectrum auctions were out of the way, it would only take one strategic ATC driven transaction to spark a domino effect and scramble for partners. Will 2008 be that year? It is hard to tell, but these firms will have to find some way of getting material value out of their expensive space segment and the market may not be large enough for all to do well.

What this industry really needs is consolidation to provide larger swaths of spectrum to entice the wireless firms and greater satellite redundancy. So far, the only meaningful consolidation has been **Inmarsat**'s acquisition of **ACeS**. Perhaps Inmarsat will take another bite in 2008 if one of its competitors stumbles and becomes available at an attractive price.

Satellite Broadband & VSAT

One of the big stories in 2007 was the success of **WildBlue** and **Spaceway**. Finally, there appears to be an attractive broadband alternative for the rural residential, Small Office/Home Office (SOHO) and Small-to-Medium (SME) enterprise markets. Both firms added broadband subscribers at an impressive rate with their respective multi-beam Ka-band satellite systems. In the case of Wildblue, the company even had to curtail marketing efforts in some beams due to a sell-out of capacity. Similar gains were also achieved in the Canadian market. Outside of North America, there was less exploitation of the Ka-band, but sales of satellite systems for broadband connectivity in the standard Ku and C-band frequencies continued to strengthen, especially in Asia. There may even be some progress in the European market in 2008.

Despite the onslaught of fiber around the world, the VSAT industry remained intact, thanks to improving customer value propositions driven by year after year gains in bandwidth efficiency and the general explosion in digital connectivity demand and a proliferation of new private networks. The big questions are how long will the window stay open before terrestrial alternatives eat away most of the market and how big will the ultimate satellite-only market be. Those are difficult questions to answer, other than to say that satellite infrastructure is ultimately a gap filler and a network back-up capability. At some point in the future, the dwindling geographic area of competitiveness will offset the growth in demand we are currently enjoying. But, this crossover point should not be reached for many years to come.

Satellite Manufacturing and Launch

The order backlog for U.S. and European manufacturers appears to have returned to historical levels, with some expectations for further growth. The **ITARS** driven transfer of market share from the U.S. to Europe seems to have abated somewhat in 2007, with strong gains by firms like **Space Systems/Loral** and **Orbital Sciences** with its smaller GEO offering. There are several potential explanations for the return of the U.S. manufactures, including a weak dollar, top tier technology and quality and more customer experience navigating the ITAR process. This year also saw the emergence of Chinese and India satellite manufacturers, which over the longer term will not bode well for the current market share leaders in higher cost countries, but should not be too important a factor in 2008. We do expect the use of small GEOs to grow as new slots and frequencies are developed to serve hard to predict markets.

With **Delta** and **Atlas** leaving the commercial market and a failure at **Sea Launch**, launch capacity was somewhat constrained this year allowing for more robust pricing and a trend toward longer term and volume commitments. With a return of Sea Launch and new vehicles from India and other countries set to join the market in 2008, the launch delays should be mitigated and competition should become more intense.

We had expected **SpaceX**'s **Falcon** to also join the field in 2007, but it looks like their success will have to wait until 2008. Over the long term, we believe it will be quite difficult for countries with high manufacturing costs to make money in the launch business without the support of their governments through mandated launch business or other subsidization. As more and more nations gain the required level of technical sophistication (rocket science isn't rocket science anymore), we believe most of them will view independent access to space as a critical national security priority. This fact should ensure the continued market presence of numerous competing launch vehicles.

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Satellite Ground Segment

The satellite communications ground segment, including hardware and software providers, integrators and teleport operators, is still massively fragmented and in serious need of consolidation. There are dozens and dozens of firms that generate under $50 million in annual revenues that struggle to sustain acceptable profit margins while keeping up with R&D requirements and funding global sales and marketing efforts. In 2006, we saw the beginnings of a growing realization among the boards and senior management of these firms that they needed to either grow by acquisition or seek a buyer. **Arrowhead** was acquired by **CapRock**, **GCS** was acquired by **L3**, **Globalsat** was acquired by **Globecomm**, **Pointecast** was acquired by **Helius**, **Wegener** announced a strategic alternatives process and **Lavell Systems**, a new IPO vehicle, is being floated to raise funds to acquire **Artel**, **SkyPort Global** and, perhaps, **Segovia**. The economics of such consolidation is so powerful, that we would expect to see the pace pick up in 2008 regardless of the difficulties of negotiating relative valuations and navigating very personal issues like who gets to run the combined business. We also expect there will be a few new entrants in 2008 with disruptive technologies and experienced management teams to make things even more interesting.

Lastly, I would like to borrow some perspectives from two current *New York Times* best sellers, "*The Black Swan, The Impact of the Highly Improbable*" by *Nassim Nicholas Taleb*, and "*The Age of Turbulence*" by *Alan Greenspan*, in order to better inform our star gazing.

Age of Turbulence

According to *Greenspan* and others, we are living in an age of increasing turbulence marked by greater market and political volatility. This volatility is due to a greater globalization of the economy and the reliance on high-tech telecommunications for the unprecedented availability of instant information. Much of the friction that used to be inherent in our systems, and that served to dampen wild fluctuations, has been removed by light speed communications linking almost anyone, anywhere, anytime. Computers do most of the trading and capital can move quickly on the slightest rumor. Combined with tightly linked and highly levered global economies, we now live in a very fragile world.

Greenspan also points to these same technologies and linkages as allowing economies a greater degree of resilience to unexpected shocks through better decision making and coordinated responses. Oddly, this turbulence and need for resilience may benefit the satellite industry. In times of market volatility, investors tend to prefer businesses like FSS that have long-term contracts and high cash flow margins, even in cases where growth potential may be less than exciting. Secondly, turmoil tends to lead to more communications (not less) and a greater importance to assured communications, in both the commercial and government spheres. Video and audio distribution and broadband connectivity have also proven to be somewhat recession resistant and increasingly more of a staple than a luxury. As for resilience, satellite connectivity is increasingly seen as a vital means of back up for the world's communication infrastructure.

Black Swans

A **Black Swan** is an event that lies outside the realm of regular expectations, carries an extreme impact, and, in hindsight, appears explainable and predictable (think 9/11). Black Swans are not by their nature predictable, but perhaps there are some **Grey Swans** that are a little more evident and yet still important to keep in mind. One example of a Grey Swan would be an attack upon commercial space assets. Commercial satellites are increasingly instrumental in today's war fighting, for example, in Iraq and Afghanistan, and it would not be beyond comprehension to see an attack upon them. An article in the November issue of *Discover* is in fact entitled "*The 8 Ways to Blow up a Satellite*." China blew up one of its own in a test this year. The results of such an attack would be profound upon the future financing, insurance and operation of commercial space assets.

FSS and MSS companies are, in essence, taking on potentially catastrophic risks not necessarily priced into their current businesses. Other Grey Swans might include cyber attacks, terrorist events or extreme weather that shut down a nation's or region's telecommunications network. In these cases, the Grey Swan might have a positive impact on the satellite industry, demonstrating the ability of satellite systems to quickly restore vital communications links. That should have been obvious after Katrina, but the avalanche of orders is still awaited.

Hoyt Davidson is the founder and Managing Member of Near Earth LLC, a New York–based investment–banking firm focused on the satellite industry and certain sectors of media and telecom. Before founding Near Earth, Mr. Davidson was a Managing Director in the Telecom Group at CSFB and prior to that a Managing Director and co–founder of the Space Finance group at DLJ.

THE VIEW FROM ND SATCOM

by Dr. Karl Classen, President & CEO of ND SatCom

A sporting year for the satellite communications sector, 2007... there were a significant number of executive moves within the industry, several notable product and technology launches for better performance, the focus on HD technology for broadcasting live sports events, and the countdown for the **Beijing Olympics 2008**.

For us as a broadband technology provider, system integrator and system house for satellite-based communication solutions, 2007 was an exciting year in terms of project scope, customer diversity, product launches and market trends. Being a member of **the SES Group** since June 2006, we extended our offering to include complete end-to-end solutions such as ground systems, satellite capacity and managed services.

The Olympics

Of course, the key event for the media is the upcoming **2008 Olympics**, which has already fueled growth for satellite-based broadcast technology. From our customer base we know there are different approaches to broadcasting sports competitions and news from the mega event. Rights holders usually bring their own Satellite News Gathering (SNG) equipment to the country, or they rely on an SNG vehicle fleet, which is already maintained in their local offices. Non-right holders rely on content provided by the **International Broadcasting Centre** or use local SNG uplink services.

ND SatCom offers SNG uplink service before and during Beijin Olympics

ND SatCom is one of the few satellite communications equipment providers to anticipate these requirements. We decided to offer a service package for this niche including vehicle, up- and downlink system, basic production equipment and local service for media companies before and during the Games. With our office in Beijing, we can provide customers with 'hard' technology as well as with 'soft' services, such as navigating around the area, speaking Chinese or driving.

HD and IP

While on the subject of the Olympics, another buzzword comes into play: HD (High Definition). The 2008 Olympics are to be produced completely in HD for HDTV delivery. HD is nothing new for major broadcasters and now smaller media companies are starting to gear up their fixed and mobile transmission equipment to be HD ready.

SkyRAY Light 1200 for government and commercial IPTV applications

Independent from the Olympics, the cost-effective content contribution side for broadcasters becomes more important and requirements are more diverse. There is a clear distinction between broadcasting live sports or cultural events with fully redundant, highly reliable SNG systems and fast news reporting where focus is on mobility, light weight and technology suitable for operation by non-technical staff. In 2007, we extended our portfolio to cater to both needs with a full range of HD uplink systems and an IPTV contribution solution. This allows broadcasters to equip their EB teams or ENG vehicles with a satellite uplink to produce and transmit live IPTV content at comparably high quality and reasonable cost.

Managed SNG Fleets

ND SatCom and rt1.tv developed a strategic partnership for a managed media SNG network

With long-term business partners such as the **WDR** (Westdeutscher Rundfunk), a German public broadcaster, German **rt1.tv** and **GlobeCast**, we began working on managed SNG fleets. The idea is to provide non-technical users, such as camera teams and journalists, with the highest level of automation and ease of use when reporting on site. The concept is to create standardized SNG vehicles operated by remote control via database. In these networks, ND SatCom shows its ability to create an end-to-end solution by combining managed networks services with our core technology. This is clearly a field in which we anticipate growth.

The Government and Defence Sectors

Two other vertical markets are drivers for ND SatCom's core business success: government and defense. At our headquarters in Friedrichshafen, Germany, we run at full speed the development and implementation of equipment for the **SATCOMBw Step**

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Milestone in the SATCOMBw Step 2 program: the Weilheim (Germany) anchor station

2 program, which was awarded to our company by the **German Armed Forces** in 2006. A highlight this year was the handover of the project's anchor station in Weilheim, Germany. In the US, a prototype multi-band 2.4M transportable trailer system was developed to attract the attention of military customers who primarily use **HMMWV** vehicles (High Mobility Multipurpose Wheeled Vehicles).

Examples are commercial customers searching for cellular backhaul or business continuity. The military and government arena is clearly looking for reliable and secure solutions for their out-of-area missions, border control projects, Air Traffic Control or emergency communication needs. It has become more effective to create synergies by adapting commercial satcom equipment to the particular needs of these sectors. Examples are lightweight antenna systems, mobile and transportable solutions and easy-to-use systems. In 2008, we expect governmental demand for end-to-end VSAT and hybrid solutions to fuel growth. We are prepared to deliver equipment meeting the highest levels of security as well as offer transponder capacity, modular network operations or complete managed networks.

What 2008 Holds For Us

What do we at ND SatCom expect to occur next year? What environs will be the drivers of our business success? What new grounds will we break through?

From a business perspective, we will continue focusing on our core strengths in the broadcasting, governmental and defence sectors. It is a clear goal to enlarge our end-to-end solution portfolio and to capitalize on our abilities for managed network services as an **SES ASTRA** affiliate. The commercial market for cellular backhaul, energy networks and corporate connectivity is definitely a promising opportunity for the mid-term.

We have a competent, international and innovative team at ND SatCom, one dedicated in providing our customers with customized solutions fitting their particular business environment and needs. This is definitely the most important pillar our business success relies on, one that positions our company as one of the global players in satellite communications.

From a corporate perspective, and in terms of global presence and capabilities, we will continue in 2008 to build on initiatives already started in 2007.

- Our American headquarters recently moved to a state-of-the-art, 23,000 square foot facility that houses design, integration and testing of both fixed and mobile satellite earth terminals.
- Extended training and integration facilities highly prepare us for the needs of the North and South American markets.
- The SES joint venture with the Dubai-based technology integrator and broadcast equipment supplier **GloCom** is a strategic fit with the SES group of companies. This is especially true with our office in Abu Dhabi (UAE), which strengthens our position in the whole Middle East and Africa.
- We can build on our own experience and complement it with GloCom's reputation and knowledge in the market. ——ND SatCom will continue to maintain and seek new strategic partnerships to enter new markets or push forward new standards and technologies.

Dr. Karl Classen is the President and CEO of ND SatCom GmbH and has held that position since July of 2000. In 1995, Dr. Classen became Chief Financial Officer of Nortel Dasa, the company from which ND SatCom originated. Prior to this, he was VP of Finance and Controlling at DaimlerChrysler Aerospace.

Dr. Classen began his professional career in 1985 in the financial department of Mercedes Benz. From the period of 1989 to 1991, he was Director of Corporate Planning at Daimler-Benz AG. In the early 1980s, Dr. Classen was a research fellow for the German Research Committee. He holds a doctorate in economics from the University of Bonn.

THE VIEW FROM IRIDIUM

by Matt Desch, Chairman & CEO, Iridium Satellite LLC

For **Iridium® Satellite LLC**, 2007 has been a year of incredible growth and innovation, all in an effort to position the company as a mobile satellite services leader and the only provider of truly global satellite voice and data solutions.

"2007 has been a watershed year for Iridium," said *Matt Desch*, CEO and Chairman of Iridium. "Thanks to the strong support of our growing partner ecosystem, superior performance and reliability of the Iridium network, exciting new applications and programs, and the launch of NEXT, Iridium has gained market share, revenue, and a strong leadership position in the industry."

Highlights of 2007 include:

Iridium NEXT Launch

At SATELLITE 2007, the company announced plans for its new satellite constellation initiative, **Iridium NEXT**. NEXT will be an IP-based, broadband network taking into consideration the latest satellite and wireless technologies available to support powerful new devices and services for commercial and government users. Network design is already under development. Over the course of 2007 and 2008, Iridium will focus on the following program objectives:

- Identifying and defining customer and system requirements,
- Surveying the industry for new and innovative capabilities and technologies,
- Developing the NEXT architecture, and
- Selecting NEXT development and deployment partners.

Network Quality Guarantee

Iridium introduced a network quality guarantee program for new customers with a promise of 100 percent satisfaction with Iridium service. The "*Iridium Network Quality Guarantee*" promises credits of up to 100 minutes of airtime, as well as three months free subscription fees, if the Iridium network fails to complete properly initiated voice calls from customers' new Iridium handsets. If a customer is dissatisfied with the quality of Iridium's network service within the first 90 days of service activation, he or she may submit a claim through their participating Service Provider. To date Iridium has *not had one* customer report a claim against the guarantee.

Frost & Sullivan Study

Frost & Sullivan, an independent research and consulting firm, released an analysis that compared Iridium to another industry satellite phone service. The study revealed that while only 36.2 percent of a competitor's calls were successfully connected and completed without being dropped during a three-minute period, 98.1 percent of those calls placed on the Iridium handsets were successfully connected and completed. Researchers placed more than one thousand phone calls using a variety of Iridium and non-Iridium satellite phones. The results clearly show that the Iridium network is the "*go to service*" for critical, time-sensitive applications in disaster recovery, and for first responders and public safety officials.

China Gateway

China Space Mobile Satellite Telecommunications Co. Ltd. (China Spacecom) announced the company is planning to open an Iridium gateway earth station. The gateway, which will be located in Beijing, will support Iridium voice and data services throughout China and could be operational by the end of 2007. **China Spacecom** expects significant demand for Iridium short-burst data links in water resources management, hydrological monitoring, weather data collection, fishing vessel tracking, heavy machinery automation, environmental protection and other industries, as well as voice and email communications with ships and aircraft on domestic and international routes.

New Earth Station in Svalbard, Norway

Iridium opened a new telemetry, tracking and command/control (TTAC) earth station in Norway. The facility is located in Svalbard, Norway under an agreement with **Kongsberg Satellite Services** (KSAT). KSAT, the owner and operator of the **KSA Svalbard Satellite** station (SvalSat), the world's largest ground station dedicated to supporting polar orbiting satellites, is providing operations and maintenance support for the site.

Strong M2M Growth

Iridium saw continued strong growth for its global satellite communications services in the Machine-to-Machine (M2M) market, a sector the company estimates is worth $1.5 billion globally. As of the second quarter in 2007, Iridium experienced an increase of 216 percent in **Short Burst Data** (SBD) service revenues over the same period last year. This figure compares with a 98 percent increase in the same period from 2005 to 2006. Subscriber activations for SBD have increased 403 percent in 2007 versus 2006. These significant increases in service revenues and unit activations have occurred since Iridium launched its lower-cost **9601 SBD** transceiver in December 2005. Iridium has more than 20,000 asset tracking devices deployed around the world. **Average Revenue Per User** (ARPU) remains strong at four times ARPU dollar amounts of Iridium's closest competitors.

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Aeronautical Market

In the second quarter, Iridium's subscribers in the aeronautical sector increased 59 percent over the last year. The compound annual growth rate in aeronautical subscribers over the last four years was 134 percent. Iridium recently announced that the **International Civil Aviation Organization** (ICAO) **Council** has approved draft **Standard and Recommended Practices** (SARPs) covering the use of **Iridium for Aeronautical Mobile Satellite** (Route) **Service**, or AMS(R)S. The ICAO Aeronautical Communications Council recently approved Iridium's Technical and Implementation Manuals and validated the draft SARP document. Full ICAO approval is expected in November, paving the way for rapid deployment of Iridium-based AMS(R)S platforms early next year to meet the anticipated demand for reliable, low-cost alternatives in safety communications for aircraft on high-latitude routes.

Maritime Market

Iridium's maritime sector continues to show steady growth with the number of subscribers up 18 percent over the same time last year (second quarter). Maritime traffic through the satellite network is growing at an annual rate of 12 percent. The number of ships using Iridium's prepaid **Crew Calling** service increased by 17 percent year over year, buoyed by the increasing number of ship owners and management companies that switched to Iridium last year.

Defense Market

Iridium's military sector business continues to show outstanding growth with cumulative **Department of Defense** (DoD) subscribers reaching 31,000. Military traffic through Iridium's satellite network is up more than nine percent (an increase of almost 10 percent over last year). This growth is 300 percent more than what Iridium had planned for this market segment at the outset of the year. DoD integration of Iridium's SBD services has helped accelerate 2007 subscriber growth. In addition, the DoD is analyzing potential use of the Iridium satellite network as an enhancement to the **Global Positioning System** (GPS), which has become a vital tool for U.S. military operations. Use of Iridium's constellation would give the system more satellites, greater signal strength and added precision.

Marketing Innovation

Iridium launched multiple innovative marketing programs in 2007 to continue to raise awareness about its offerings, in addition to competing aggressively on market pricing. Iridium launched "*Test Your Satellite Phone Week*" in May to coincide with the *U.S. National Weather Service's National Hurricane Preparedness Week*. Iridium's goal was to raise more awareness of what first responders and commanders can do to be better prepared prior to disasters and to increase satellite phone user knowledge. Iridium partners, such as **Telenor**, also embraced this effort by co-branding and distributing Test Your Satellite Phone Week materials, issuing press releases, and featuring the week in trade show booths and during conference panels.

Iridium announced a new North American Pricing Plan, providing prepaid packages that offered rates as low as $0.15 per minute for satellite phone calls with unrestricted roaming in North America. Through this offer, Iridium has been rewarding high-volume and mission critical users who are unhappy with other services and who demand the quality associated with Iridium.

Summing up 2007, Desch comments, "Last year at this time I talked about how excited I am to be at the helm as we unleash the full potential of our unique global network to become the world's most robust, pervasive and fully-integrated global communications network. At this point I cannot understate how gratifying this year has been and how much I look forward to working with our partners, our customers and the industry to build on this success in 2008. This is only the beginning."

Iridium Satellite and the Industry in 2008

2008 will be a year of many new product and service offerings for Iridium and other players, as well. Iridium is excited about the launch of its upcoming maritime broadband device. Plus, the company has several other new devices, which the company will discuss publicly in 2008 that will provide new

features and cost savings for our customers. They will also provide Iridium opportunities for expanding its customer base. In addition, the company anticipates it will continue to see a major increase in the demand for short burst data (SBD) services in 2008. For example, Iridium recently saw the number of asset tracking devices using Iridium around the world top the 30,000 range. In its third quarter earnings release, Iridium announced a 226 percent growth in SBD subscribers over the same quarter 2006. In the same time period, SBD traffic increased 176 percent. This is because many enterprise organizations are seeing the value of global, two-way data communications to track their important assets. Iridium and its valued partners have worked hard to demonstrate the ease and low cost of implementing real-time, low-latency SBD hardware and services to meet those machine-to-machine (M2M) market needs.

Iridium and other MSS players will also continue to grab regional market share based on service offerings and a firm's ability to perform. Iridium has recently experienced a tremendous upswing in North American traffic following a new pricing plan and churn from other satellite communications service providers. Canadian traffic alone nearly doubled by the third quarter of 2007, increasing 80 percent year-over-year. Likewise, usage in the U.S. surged by 77 percent. Traffic in the Asia/Pacific region was up nearly 48 percent over last year, and, in Australia, Iridium continued to win thousands of customers previously served by competing MSS providers. In South America, Iridium recently forged new partner relationships to further serve customers looking to switch from other service providers in the South American market. Strong results are expected in this region as well as in other regions where the demand is great and the company is focused.

Finally, Iridium is also moving forth in its effort to design and build "NEXT," the company's next generation satellite constellation. While many other MSS players are concentrating on their next generation constellation efforts as well, the Iridium differentiator will be that NEXT will well position the company to deliver services even beyond communications. The company recently issued an RFI for development partners for the NEXT network. Iridium had a very strong response from the RFI—more than 61 parties responded—and five or six are now competing to be the prime contractor. Iridium is reviewing the RFI responses and plans to make a selection in the first quarter of 2008.

The company is also pleased to have already been working in 2007 with some of the top players in the satellite sector to work on the early engineering stages of NEXT. These partners have played an important role in working with Iridium on systems engineering, requirements definition and architecture development. Iridium is working through cost analyses, as well as technology design requirements, and will be making more definitive announcements about cost and final capability hopefully around this time next year. Iridium is still comfortably on track to deploy NEXT in the 2013 – 2016 timeframe.

"Our partners have been the lifeblood for Iridium," said Matt Desch, CEO and Chairman, Iridium Satellite. "Together we have built the industry's leading global mobile satellite communications service and have earned a reputation for quality that is unmatched. We are grateful for the ongoing support and feedback they provide. Our success would not be possible without our strong partner network, unparalleled in the industry."

There has also been significant interest within the industry for Iridium to host secondary payloads and, as such, the company is working on several opportunities that should come to fruition over the next 6 to 12 months. Having one or more secondary payload partners in place could afford Iridium the opportunity to substantially offset the infrastructure cost of NEXT.

Matt Desch has more than 27 years of experience in telecommunications management, and more than 16 years in the global wireless business. Mr. Desch joined Iridium in 2006 as Chairman and CEO of Iridium, and CEO of the parent company, Iridium Holdings LLC. Previously, he was CEO of Telcordia Technologies, a telecom software services provider. He spent 13 years at Nortel Networks, and before leaving in early 2000, was President for its fast growing Wireless Networks business and was responsible for its global carrier customers in Europe, The Middle East, Asia and Latin America. Mr. Desch has served on a number of boards including SAIC, Inc., Flarion Technologies, Starent Networks, and as the Chairman of Airspan Networks. He has a BS in Computer Science from The Ohio State University and an MBA from the University of Chicago.

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THE VIEW FROM INTELSAT GENERAL

by Kay Sears, Senior Vice President, Sales, Marketing & Business Development - Intelsat General Corporation

In 2007, **Intelsat General Corporation** saw the realization of the business synergies and market opportunities envisioned by the successful integration of PanAmSat's G2 division into the company. During that year, Intelsat General has diversified its service offerings and repositioned SATCOM from a commodity to a value-added service to the U.S. government and NATO allies.

At the same time, company executives vigorously inserted themselves into the ongoing debate over how much satellite capacity the U.S. military should own versus lease commercially, as the conflicts in Iraq and Afghanistan strained bandwidth capacity worldwide. Intelsat General also embarked on an aggressive program to augment its offerings in 2008 and beyond with customized payloads. As part of this "hosted payload" initiative, the company encouraged Pentagon planners to consider different methods of leveraging commercial assets, rather than relying completely on the prolonged procurement process for military-only satellites.

"It is critical that we keep a robust commercial industry so that when there are military gaps in the future, we are still there, ready with the right capacity," said *Kay Sears*, Intelsat General Senior Vice President, Sales, Marketing and Business Development. "Military planners need to make sure that their messaging to the commercial providers is clear so we don't move away from that market."

Intelsat General is the government services arm of **Intelsat Ltd**. The firm grew out of the consolidation in 2006 of **PamAmSat**'s **G2 Satellite Solutions Division** and of **Comsat General Corporation**, acquired the previous year. While the U.S. military is the company's biggest customer, Intelsat General also provides services to commercial customers, other U.S. government agencies, and to military forces allied with the United States through NATO.

During its first full year of operation after the PanAmSat merger, Intelsat General introduced a number of initiatives designed to move

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away from a focus on purely bandwidth sales. The emphasis today is on offering end-to-end solutions to customers through linkups with third-party providers of terrestrial equipment. Sears said that for the year, the company will be slightly ahead of its financial targets in all areas, and that customer renewals are sustaining the business as demand continues to show slight increases.

This growth was largely fueled by demand for bandwidth from military forces operating in combat zones for unmanned aerial vehicles, global positioning systems, field communications and a host of other activities that make extensive use of satellite capabilities. Largely as a result of the Iraq and Afghanistan conflicts, the U.S. military has fulfilled approximately 80 percent of its capacity requirements through the use of commercial spacecraft, with military assets making up the remaining 20 percent. Some Pentagon planners have said that this ratio should be reversed. A number of military programs are now under consideration to expand the number of government-owned satellites into orbit, a move that could shift the bandwidth balance considerably over the next decade.

To counter the belief that only military-owned satellites can properly and securely serve the warfighter, Intelsat General undertook a number of initiatives. First and foremost was to reposition some of its fleet of 53 satellites, and to relocate customers so that an entire satellite serving Africa and the Middle East was freed up for almost exclusive military use.

"The Department of Defense likes to talk about Operationally Responsive Space, and this was truly responsive," said Sears. "It would have taken years to get a military satellite in orbit with the bandwidth that we were able to provide in a matter of weeks."

IRIS - Internet Routing in Space

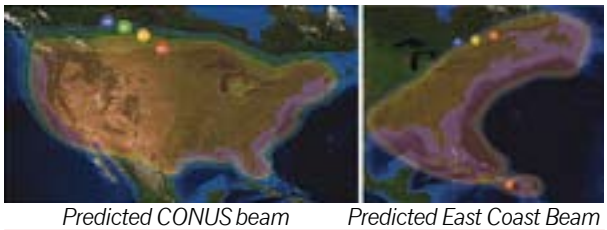
Another initiative was to establish the **Intelsat General Secure Operations Center** (ISOC) at Intelsat's teleport facility at Ellenwood, Georgia. The ISOC has a highly trained, fully cleared staff of satellite network engineers and technicians who have been vetted by law enforcement and national authorities to monitor the most sensitive government communications. Working on a 24 x 7 schedule, the ISOC staff continuously monitors network operations and capacity to ensure that any communications problem is fixed immediately for its government and military customers worldwide. The ISOC has fiber connectivity to Intelsat's worldwide terrestrial network.

Another Intelsat General 2007 milestone was its selection by the **Department of Defense** to participate in a **Joint Capability Technology Demonstration** to prove the viability of enhanced military communications using **Internet Routing in Space** (IRIS). The company is the first commercial satellite operator ever to win such an award. The IRIS payload will be launched on **IS-14** in 2009.

Representing the next generation of space-based communications, IRIS will serve as an Internet router in the sky, enabling direct communication between diverse satellite ground terminals without the use of teleports. IRIS will demonstrate the utility of direct Internet routing in space for the military as well as the rapid development of new space technology using a government/industry joint initiative.

Sears said IRIS has two key benefits: it will test a new approach to satellite communications with broad military and commercial applications; and will demonstrate how a hosted payload can be placed aboard almost any commercial satellite more quickly, effectively and economically than the military can plan and launch a satellite of its own. To support her point, Sears cites research discussed at a November satellite conference in Washington DC showing that the military historically requires just over seven years to plan and launch a new satellite, and that average costs are 37 percent higher than originally forecast.

"With Intelsat General's Hosted Payload offering, we present a capability that gives the military the best of both worlds," Sears said. "We can deliver an operational satellite to orbit in under three years, on budget and with the exact payload the military needs."



Predicted CONUS beam *Predicted East Coast Beam*

Another initiative Intelsat General plans to better serve government customers is the launch of its **Horizons 2** satellite this month. Horizons 2 is an all-Ku band satellite that will be positioned to cover the continental United States (CONUS) and littoral waters over 300 nautical miles out to sea. The satellite is designed to support government and military applications, including unmanned aerial vehicles (UAVs), imagery dissemination within the continental United States, and broad area maritime surveillance along the East Coast of the United States.

Sears believes that these new efforts, combined with Intelsat General's move toward bringing government customers more end-to-end solutions, will position the company for increased success in 2008. This will occur even if the conflicts in Asia and the Middle East begin to wind down.

"We are positioning ourselves to be responsive in all situations," said Sears. "Our solutions are built around finding out what the customer needs and then delivering it."

Kay Sears is responsible for the overall sales and strategic marketing and business development efforts for Intelsat General Corporation. Ms. Sears held a similar position at G2 Satellite Solutions before transitioning with the merger into Intelsat General. She has more than 18 years of experience in the satellite communications industry, including extensive experience in the marketing, sales and operation of managed network solutions to commercial, military and civilian agency customers.

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THE VIEW FROM IDIRECT

by David Bettinger, Chief Technical Officer, iDirect

The past twelve months belong to an important phase of development in the satellite industry. Market reports from **Comsys** and the **Satellite Industry Association** once again revealed healthy growth numbers—across a widening range of vertical markets and throughout the world. It's clear that satellite systems are playing an integral role in providing global, always-on, effortless connectivity.

Increasingly, satellite communications means unfettered IP networking. The idea of an IP network is no longer a fixed system tied to the limits of terrestrial technology. Instead, networks must stretch across entire continents and oceans, supporting a growing list of voice, data and video applications. Connectivity must be guaranteed anywhere and at all times—in the office, in the field and on the move.

In 2007, there were several notable trends shaping the satellite industry's future. Enterprises are increasingly integrating satellite communications into their networks to support multiple needs. While enterprises have been initially slow to adopt satellite communications exclusively to ensure their operations against network failure, they are investing in satellite to play a much larger network role, a role that encompasses VoIP, videoconferencing, digital signage and other IP applications.

Governments and militaries worldwide continue to invest in satellite communications to support global multimedia networks, battlefield logistics, disaster recovery and other mission-critical initiatives. Military organizations have also increased their investments in **Comms on the Move** (COTM). This technology advance enables troops to maintain momentum in battle, extending visibility of commanders and increasing the volume of data that can be transmitted to and from mobile units.

Another major trend that gained traction in 2007 reveals an even larger future role for satellite communications. Terrestrial carriers worldwide are integrating satellite into their core **MPLS** (Multi-Protocol Label Switching) systems. This trend will accelerate as terrestrial carriers continue to build out ambitious next-generation networks. Satellite communications is uniquely qualified to meet the technology requirements of next-generation networks in delivering immediate, ubiquitous reach.

Meeting New User Demands

The trends noted in the previous paragraphs represent intensifying end user needs. Such places new demands on the satellite industry. Systems manufacturers must advance their technologies to provide greater functionality. They must also minimize operating costs and improve bandwidth efficiency.

In 2007, **iDirect** introduced several landmark innovations to strengthen its **Intelligent Platform**™. Here's a quick recap of those accomplishments.

- **DVB-S2 with Adaptive Coding and Modulation:** This year iDirect announced the development of its next-generation platform, **eVolution**, which features the integration of **DVB-S2** with an important new feature of the standard called **Adaptive Coding and Modulation** (ACM). ACM comprises a real-time feedback system that continually adjusts the operating parameters of the outbound carrier. It monitors the return channel to assess the local conditions at each remote and then leverages that information to determine the optimum link parameters based on link performance.

  With ACM, a hub can adapt the specific modulation and coding scheme of each terminal, adapting to changing link conditions, to continually maximize bandwidth efficiency. Until now, network operators were forced to design their networks based on worst-case scenarios—in most cases, just around the single antenna location or size to provide appropriate margins in case weather conditions worsen. Engineers no longer need to design a network based on worst-case conditions and this saves valuable bandwidth.

- **Advancing Quality of Service:** Service providers face the difficult challenge of optimizing the allocation of bandwidth across multiple customers and IP applications. In 2007, iDirect tackled the challenge of bandwidth allocation through a new software feature called **Group Quality of Service** (QoS). This advance enables service providers to subdivide their bandwidth according to deeper levels of user criteria.

  Through Group QoS, service providers can define subgroups based on specific business processes, office locations, IP applications and data formats. Service Level Agreements (SLAs) can be defined on outbound and inbound bandwidth, tailored to the dynamic QoS criteria that must govern real-time applications such as VoIP, real-time data sharing and videoconferencing. With Group QoS, bandwidth can be shared more easily across multiple customers, while supporting each individual customer's application-level requirements.

- **Series 12000 universal 4-slot hub**: iDirect unveiled a compact 4-slot hub chassis, which supports multiple inbound and outbound networks on as many as four satellites. A fifth slot can be used for configuration or redundancy. The new hub delivers functionality comparable to iDirect's larger hub solutions—supporting the entire array of network topologies including star, mesh and SCPC (Single Channel Per Carrier). The 4-slot hub is compatible with iDirect's existing **iNFINITI** series line cards as well as our forthcoming **eVolution** series line cards. With the 4-slot hub, network operators can more economically expand to new regions and markets without deploying a large scale hub. As networks grow, the hub can be daisy-chained with an expansion chassis.

- **Delivering global broadband to the maritime industry:** This year marked the launch of a new global broadband maritime service powered by iDirect and offered by Intelsat. The service features two technical innovations from iDirect. The first is automatic beam switching, which enables a remote router to automatically switch from one satellite beam to another as sea vessels cross multiple footprints. The second is iDirect's global network management tool that enables service providers and organizations to deploy global mobile networks through the integration of iDirect hubs and remote hardware with multiple satellite coverage footprints.

Increased Government Focus

For iDirect, accelerated government demand has lead to the formation this year of **iDirect Government Technologies** (iGT), a wholly owned subsidiary. In 2007, the iDirect platform was also strengthened with new features to support government and military needs. Most notably, iDirect introduced **Direct Sequence Spread Spectrum**, a critical innovation that will accelerate much broader adoption of COTM. Direct Sequence Spread Spectrum enables bandwidth to be spread at a much lower rate than before, enabling ultra small antennas to reduce signal interference with adjacent satellites. This results in more cost-efficient use of extremely small reflector antennas or phased array antennas on aircraft, maritime, and land based vehicles.

Global Growth

The past 12 months witnessed increased global expansion for iDirect. In the EMEA region, iDirect achieved a 40 percent market share leadership in hub sales, according to *Frost & Sullivan*. iDirect also established a regional office in Dubai. The new office, located in Dubai's Silicon Oasis Technology Park, features a customer support and training center to serve a rapidly expanding customer base.

Marking a milestone in the Asia Pacific region, iDirect partners installed their first hubs in China. Two oil and gas industry leaders—**Petrochina**'s **BGP Oil/Gas Exploration Group** and **CrossSat Telecom Technology Co**.—adopted the iDirect platform based on its ability to connect to multiple satellites and support multiple satellite bands. iDirect also announced major contracts this year with **IndosatM2** and **Pak Datacom**, highlighting a year of solid growth in the region.

Our 2008 Outlook

What do we anticipate for 2008? Much more of the same... the satellite industry is well positioned for continued rapid growth, and soon-to-be-added satellite capacity will enable service providers to meet intensifying demands. More specifically, 2008 will be an important year wherein operators and service providers will replace aging technology with next-generation systems.

In 2007, iDirect made several strategic moves to prepare for this growth. We gained an experienced high-tech leader and growth strategist in our new CEO, *Mary Cotton*. Mary joins a strengthened management team committed to continuing iDirect's technical leadership, expanding core offerings and deepening customer support.

Next year, several satellite communications trends will gain notable ground. Mobile communications will continue to be rapidly adopted by military organizations, and we anticipate a renewed interested in mobile communications by the commercial travel industry, as well. The IPTV rage will continue to escalate. Terrestrial carriers will integrate satellite communications into their core services. And enterprises will increase their use of satellite communications with the promise of greater ROI.

At iDirect, our technology innovation is focused on ensuring satellite communications are more powerful, versatile and affordable. In the next 12 months, we look forward to collaborating with our partners, helping them to meet current and emerging customer requirements and run their business more efficiently and profitably. We thank our partners for their support in 2007 and look forward to a promising year of collaboration ahead.

Mr. Bettinger joined iDirect Technologies as Director of Hardware Engineering in 1996 and became responsible for all hardware and software development when named Vice President of Engineering in 2002. Bettinger has won industry acclaim as the lead system architect for iDirect's flagship NetModem and iNFINITI series products. In his current role as Chief Technology Officer, Bettinger is responsible for the oversight of strategic technology decisions and drives the direction of product development. Active in industry organizations, Bettinger is a member of the Telecommunications Industry Association, IEEE and the IPv6 Forum. Prior to iDirect, Bettinger was a senior member of the technical staff at Hughes Network Systems in the Satellite Networks Division. Bettinger is a graduate of Virginia Tech with a Master of Science degree in Electrical Engineering.

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THE VIEW FROM HUGHES

by Pradman Kaul, Chairman and CEO, Hughes

This was a great year for Hughes and for the satellite industry, overall. Demand for broadband is exploding at double-digit rates globally, as evidenced by our own positive financial results and those of other technology and service providers. Indeed, we experienced healthy growth across all sectors, with our consumer and mobile satellite segments leading the way, and with significant new business in our core enterprise markets, both domestically and internationally.

An important trend fueling the growth is that customers in all sectors are beginning to unlock greater value from broadband applications beyond connectivity alone, which has become a commodity. New applications, such as digital signage and business-based IPTV, for example, are opening up revenue opportunities for enterprises both large and small. Distance learning and ecommerce offerings are helping close the so-called digital divide in thousands of towns and villages in developing countries. And emergency preparedness, broadband on the move and high availability VPN services are enabling government agencies to better serve their citizens and respond to disasters.

By the end of 2007, Hughes will have shipped cumulatively more than 1.5 million satellite terminals to customers in over 100 countries, with more than 300,000 shipped in 2007. This confirms our continuing market leadership worldwide. Key strategic wins in 2007 include:

We expanded our enterprise customer base for HughesNet Managed Network Services, and were recently awarded a multi-year contract by Camelot, one of the UK's leading lottery providers. The Camelot agreement covers more than 27,000 sites, solidifying Hughes as the leader in delivering managed network services to enterprises. The Yankee group recognized this leadership in a 2006 report, documenting more than 110,000 sites managed by Hughes in the US alone[1].

1. *Yankee Group Decision/Note℠ Market Analysis, February 24, 2006, "How to Succeed in the $25 Billion Managed Service Market," Anton Denissov.*

THE YEAR IN REVIEW

- Hughes pioneered consumer Internet access by satellite and we continued to maintain the leading market share in 2007, with approximately 365,000 consumer/SMB subscribers to date, a number that is growing at a rate of about 12,000 new customers monthly. We estimate there are 10 to 15 million households in the underserved parts of the US that are potential customers of our HughesNet broadband satellite service.

- We launched a novel initiative to implement Internet kiosks throughout India's villages and towns, bringing high-speed Internet, telephony, e-governance and distance learning services to underserved areas. To date, Hughes has implemented several thousand kiosks and expects to have 10,000 operating by the end of 2008. We also received multiple orders from the Indian Space Research Organization for the Edusat distance-learning project for four new state networks and expansion of two existing state networks. This builds on other such government funded projects in Africa, Brazil and Russia.

Hughes experienced a number of significant technology milestones in 2007.

- On August 14, 2007, the long awaited launch of our **SPACEWAY™ 3** satellite was successfully completed. SPACEWAY 3, owned by Hughes, is the world's first communications satellite with on-board switching and routing, which together with numerous other technology advances, will unlock a wealth of value-added, bandwidth-on-demand services. Operating in the Ka-band spectrum, SPACEWAY 3 employs high-performance packet switching, active phase-array antenna and spot-beam technologies enabling transmission rates of up to 440 Mbps on the downlink, direct site-to-site connectivity of up to 16Mbps and a total throughput of 10 Gbps, which is unprecedented in the industry. Commercial service is expected to commence in North America in early 2008.

SPACEWAY 3 satellite atop its Ariane 5 launch vehicle Credit ESA

Hughes has also led the way in developing advanced technology and equipment for new mobile satellite systems.

- **Thuraya**, one of the world's leading mobilesat operators, uses a Hughes-developed solution that combines GSM cellular/satellite voice and data services with GPS location capabilities in a small handheld. In 2007, Thuraya awarded us follow-on contracts to develop both a high-speed IP data terminal and a new system gateway.

- Our latest generation **9250** mobile satellite terminal, designed to deliver high-speed transmit and receive rates of over 460Kbps while on the move, was approved to operate over Inmarsat's Broadband Global Area Network (BGAN). An earlier transportable version, the Hughes 9201, is employed by CNN reporters to cover news in the field, for which the CNN team (including Hughes) received a prestigious new technology award at the IBC 2007, Amsterdam in September, 2007.

- In 2007, we won several strategic technology development contracts with TerreStar Networks Inc:

- A turnkey satellite base station subsystem (S-BSS) and satellite air interface protocol to mesh with an integrated satellite ground-based beam forming (GBBF) subsystem, also being developed by Hughes under a separate contract, and a key component of the satellite network portion of TerreStar's integrated satellite and terrestrial network;

- A satellite chipset platform based on the 3G cellular UMTS standard to enable wireless mobile devices to communicate over the satellite portion of TerreStar's network.

These contracts build on those awarded last year by **ICO** and **MSV**, making Hughes the technology developer of choice to enable the emerging world of multi-media, mobile satellite services by ATC licensed operators in the US.

As far as 2008 is concerned, *Grant Barber*, the Executive Vice President and CFO of the company, added, "We are very optimistic for the year ahead in terms of the markets we serve, as well as our position relative to the competition in those markets. Hughes is a well-balanced company. In particular, our enterprise sector, both domestically and internationally, has strong recurring revenues with high renewal rates—an average of 3-5 year contracts with existing customers who are very pleased with our capabilities and performance."

All in all, 2007 was a year of many firsts for Hughes and perhaps one of the most successful ever for the satellite industry overall. But it also showed that we have only just begun to scratch the surface of the value potential of broadband applications, in all sectors. Indeed, Hughes' and the broadband industry's success in future will be determined by how well we bring new applications to market and unlock the maximum value for our customers. I look to the future with great confidence in our continued ability to succeed.

Pradman Kaul is the Chairman and CEO of Hughes and he also continues as Chairman and CEO of Hughes Network Systems, LLC (HNS). Before joining HNS, Mr. Kaul worked at COMSAT Laboratories in Clarksburg, MD.

HUGHES. Connect to the future.®

Mr. Kaul received a Bachelor of Science degree in Electrical Engineering from George Washington University and a Master of Science degree in Electrical Engineering from the University of California at Berkeley. He holds numerous patents and has published articles and papers on a variety of technical topics concerning satellite communications.

THE YEAR IN REVIEW

THE VIEW FROM HARRIS

by John Delay, Director of Strategic Management for Government Solutions, Harris Broadcast Communications

Video is playing an increasingly important role in U.S. military and government applications, ranging from surveillance and reconnaissance to intelligence gathering and training. The reality is that military and government agencies are using an ever-growing volume of video, much of which is migrating to HDTV resolution. This past year has witnessed the need of video and other media formats to make a critical difference in analyzing intelligence—in 2008, such will only become more crucial to our military, government and public agencies.

As the volume and quality of live and digital media files increase, it's becoming more challenging to deliver content via satellite, fiber, or IPTV as the bandwidth associated with these "network pipes" is a finite resource. File storage and management also become unwieldy as media repositories grow.

At Harris, we recognize that real-time video delivery, efficient storage, transfer, and management of digital media assets by military and government agencies, are all critical to our national defense and homeland security. As military commanders and government leaders often make mission-critical decisions based upon digital media assets, our mission is to provide comprehensive, powerful solutions that make it possible to encode, transmit and decode large video files efficiently, as well as automate the tracking, retrieval and sharing of these media-rich files between agencies.

With the world's most prominent broadcast organizations among our customers, Harris is uniquely positioned to deliver to military and government users the same reliable, full-featured solutions that have proven successful in the demanding television broadcasting business. Just as with broadcasters, military and government users strive to produce the highest video quality possible to discern the detail in every picture frame. They also want to capture key live events on video without fail—the way that sportscasters capture that winning touchdown in the Super Bowl or a photo finish of a race. They also want to employ the same sophisticated digital asset management techniques used by broadcasters to organize and harness video in a way that helps them meet their objectives.

At Harris, we're also sensitive to the fact that U.S. military and government agencies must conform to strict budgets and appropriations. This means some customers may be using legacy gear, while others have the latest in video technology. Our flexible, scalable, upgradeable solutions support the latest standards, such as MPEG-4/H.264 compression, while also remaining backwards compatible. In addition, we offer encoding and decoding tools ideal for satellite transmission as well as an end-to-end workflow for video production and IPTV.

Ever since 9/11, it's become painfully obvious the security of the United States rests upon our ability to gather and interpret accurate intelligence in a timely manner. Lives depend upon it. Possessing good, solid intelligence is more than simply a matter of collecting data. What makes intelligence "actionable" is the manner in which the data has been interpreted—and the speed with which such data is disseminated and digested.

If there is chatter that a terrorist attack is imminent, or if we are sending special operations forces behind enemy lines, government and military officials must have immediate access to intelligence that is organized, relevant and immediately available. Otherwise, it is of no use at all.

Everyday, massive amounts of data pour into military and government agencies from a variety of sources worldwide—such as satellite imagery, airborne sensors, ground-based sensors, satellite and surveillance video—and the process of organizing and managing this huge influx has become a daunting, time-consuming task. We've reached a point where intelligence analysts no longer have the luxury to manually capture and edit all the data at hand and then distribute that information using conventional workflow methods, as time is of the essence.

At Harris Corporation, we worked closely with the intelligence community to develop a new, integrated workflow platform, called FAME™ (Full-Motion Video Asset Management Engine). We demonstrated FAME at the GEOINT 2007 Symposium in San Antonio, Texas, in October 2007. We developed FAME in response to a need expressed by intelligence analysts for a video and audio analysis tool that would allow them to perform "intelligence fusion"—combining information obtained from many sources to form a single composite picture of specific operational environments.

To be especially meaningful, all of the media at hand must be able to be analyzed based upon an accurate, geospatial timeline. If you want to look at media that's been focused on a particular location, you want to be able to place every image frame on a timeline. Then, you can compare the progression of events at that location over a certain period of time.

By leveraging uniform geospatial metadata, intelligence analysts can align essence data—still and moving images—in relation to specific dates, times and places. This metadata is critical to establishing relationships between different essence data to see the way objects have changed or moved over time.

If media assets and metadata are correlated manually, the workload can be overwhelming. Backlogs extending months or years can result. Intelligence planners routinely miss crucial insights that could avert disasters all because their agencies failed to properly catalog and retrieve critical media and then deliver it to decision-makers in time for it to make a difference in our national security efforts.

The digital ingest of newly arriving media assets also involves the extraction of any metadata that cameras may have recorded, such as date, time, place and timecode. To the extent possible, this process of extracting the metadata must be automated. Once metadata has been extracted, the essence media can be rapidly searched, retrieved, visualized and correlated along a timeline.

Once the user has analyzed the data, the actionable intelligence that results is also metadata, in the form of notes, reports, and memos. The FAME platform allows for tracking this user feedback in relation to source media in the repository, which essentially closes the loop of integrated content management and delivery.

By automating the media asset management process, military and government agencies can create a dynamic, interactive library that helps their analysts build upon their understanding of the intelligence. Such also fulfills the "Four Rights of Multisensor Intelligence" all intelligence entities strive to attain—delivering the most useful intelligence to the right user at the correct time via the appropriate device.

The FAME platform's automated workflow encompasses the acquisition, processing, management, transcoding, distribution and consumption of media assets in the repository. As media often arrives from different sources in a variety of compression and file formats, these files must be transcoded into formats supported by the central repository, such as a video server, in order for the data to be accessed or shared by cooperating departments and agencies. The automation of this "media lifecycle" amounts to a powerful system for finding and using relevant assets in the timeliest way.

At Harris, we believe that our solutions, which support next-generation technologies such as MPEG-4/H.264, digital media management and IPTV, can contribute to our nation's ability to convert media-rich data into actionable intelligence in time to prevent disasters—save lives.

John Delay is Director of Strategic Management for Harris Corporation, Broadcast Communications Division's Government Solutions business unit based in Mason, Ohio. John has provided technology and marketing leadership in media for over 20 years.

Prior to being named to his current position, John headed the digital television studio product line, identifying, developing and marketing technologies for evolving broadcast needs. Before that, he held positions in increasing responsibility in product management and engineering. John is well known as a speaker on emerging technologies. He is a graduate of Culver-Stockton.

THE YEAR IN REVIEW

THE VIEW FROM GLOBECOMM SYSTEMS

by Kenneth Millder, President, Globecomm Systems, Inc.

Over the past year, Globecomm Systems, Inc., continued to see strong demand for our satellite terminals and network services for government customers, strong demand for our broadcast engineering and implementation services as well as increasing demand for our mobile soft switch network engineering and hosted switch services.

In 2007, we designed and are continuing to fully implement an advanced Media Broadcast Center that will support current and next generation services, including IPTV and video to mobile devices. We also have designed and are implementing an advanced soft switch based mobile network to support both GSM and CDMA users. This network is the first *major* network to leverage an advanced software-defined base station to support GSM and CDMA on a single platform.

As far as 2008 is concerned, we see continued growth in the application of commercial satellite communications to meet government communication requirements. We also believe growth will be experienced in next generation broadcasting solutions aimed at providing video using the Internet Protocol, whether over fixed facilities such as Fiber to the Home or over mobile facilities such as video to mobile devices. We also expect continued growth in application of satellite communications in support of mobile networks that require more bandwidth for next generation services as well as coverage extension to remote areas. As content demands grow in a range of areas, we believe a little bit of satellite is going to go a long way to service the demand.

Quotes from members of the Globecomm Systems' executive / engineering team as to their thoughts on the past and coming year

"The past year saw significant growth in our government business as well as our service business. In the coming year we look forward to continued growth in these business areas and believe the demand for satellite communications infrastructure and services will remain robust to support growth."

Kenneth Millder is the President of Globecomm Systems and he said the company reported $150.7 million in revenue in its most recent fiscal year. That happens to be a company record; it represents a 20 percent growth rate over the prior year and a 74 percent increase over the $86.6 million reported five years earlier in FY 2002. He added that contributing to such strong growth was the May 2007 acquisition of the GlobalSat division of Lyman Brothers for $18.5 million in cash, which deepened Globecomm's penetration of the US Federal market for civilian and military applications. At the same time, Millder offered that Globecomm has entered the mobile solutions market with SatCell, a service providing IP-based mobile backhaul and hosted switching or low-density rural markets. He said the company is also moving into the top ranks of content management companies by designing, opening and helping to operate, at its corporate headquarters, a state-of-the-art program origination center for a premier cable network. He stated that these achievements have confirmed the company's unique ability to design, integrate, build and operate complex systems and services for government and military, communications service provider, enterprise and media & enterprise customers.

THE VIEW FROM COMTECH

Based on market indicators, we see the satellite industry continuing to rebound, with growth in the ground equipment sector. Broadcast continues to account for a majority of transponder usage. But, new customer applications and developing regions of the world are starting to have a significant impact on satellite demand. The requirement for additional value continues to be paramount in many markets. Customers are seeking solutions that enable them to lower their total cost of ownership and reduce space segment costs.

At our core, **Comtech** is a technology company focused on innovation and technology leadership. Our decision to invest in new satellite earth station products and technologies is founded upon what we believe are compelling growth catalysts in the global satellite communications market.

With the addition of millions of broadband and wireless subscribers across the globe every year, and the increase in bandwidth-intensive applications, the amount of network traffic being transmitted is increasing exponentially. With much of this growth arriving from emerging markets, where terrestrial capacity is often unavailable, unreliable and costly service providers often rely on satellite as the preferred transmission medium.

Paralleling the market's requirements, **Comtech EF Data**'s product development has focused on delivering technologies and solutions to enable rapid return on investment to be realized. To name a few benefits, our technologies provide link efficiencies, superior performance, flexibility and on-demand bandwidth. We expect to continue to expand our leadership position by offering new products and solutions to meet the demand of our commercial, government and defense customers.

The focus for Comtech EF Data in 2007 was on delivering satellite bandwidth efficiencies. In February, we were awarded the esteemed "*Teleport Technology of the Year*" by the **World Teleport Association** (WTA) for our **DoubleTalk™ Carrier-in-Carrier®** technology. A unanimous selection by WTA's Technology of the Year committee, DoubleTalk Carrier-in-Carrier by Comtech EF Data was cited for its ability to reduce bandwidth requirements by 50 percent nominally, while maintaining equivalent throughput and performance.

THE YEAR IN REVIEW

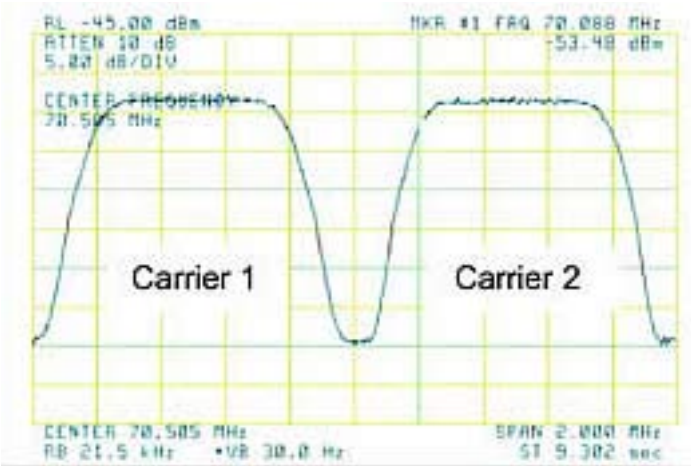


Figure 1 - Without DoubleTalk Carrier-in-Carrier

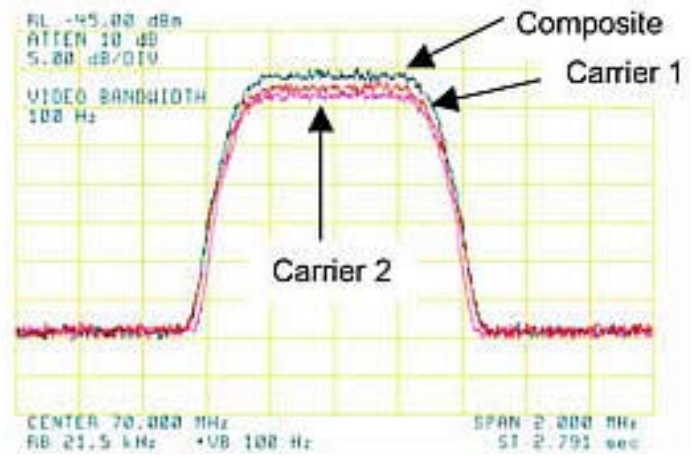


Figure 2 - Without DoubleTalk Carrier-in-Carrier

Figure 1 shows the typical full-duplex satellite link, where the two carriers are adjacent to each other. Figure 2 shows the typical DoubleTalk Carrier-in-Carrier operation, where the two carriers are overlapping, thus sharing the same spectrum.

The technology allows for both sides of a duplex link to be transmitted concurrently in the same segment of transponder bandwidth. Such is of critical importance to teleport operators seeking to drive down costs and gain efficiencies as they serve customers.

We acquired the assets and product lines of Digicast Networks, Inc., a Maryland-based company that designs high quality Encapsulators and Receivers. On the acquisition, Daniel Enns, Senior Vice President of Strategic Marketing and Business Development, stated, "The combined solution of the Digicast Products and Comtech EF Data's bandwidth-efficient modems will enable service providers delivering IP-based broadcast connectivity to minimize operating expenses."

Relative to supporting the U.S. government's future communication systems, Comtech EF Data made strategic announcements. We completed operational testing in conjunction with **L-3 Communications NARDA Satellite Networks** (NSN) and **XTAR, LLC**. The testing was conducted at the **Joint Interoperability Test Command** (JITC) in Indian Head, Maryland. The testing encompassed Comtech EF Data's **SLM-5650 Satellite Modem**, L-3 Communications' (NSN) **Ground Multi-band Terminal** (GMT) System and **3.9 Meter Transit-Case Quad-Band Antenna** used by the armed forces, and **XTAR**, LLC's high power X-band satellite system.

The SLM-5650 Satellite Modem operated effectively at 155 Mbps with 7/8 rate Turbo Product Coding forward error correction and 8-PSK modulation over XTAR's XTAR-LANT satellite, located at 30° West, utilizing both 2.4 and 3.9 meter antennas. These operational tests confirmed the SLM-5650's ability to support high data rate applications in a variety of military environments, including fixed, at-the-pause and on-the-move.

The U.S. Air Force awarded us a $5.3 million development contract for **the High Data Rate Radio Frequency** (HDR-RF) Ground Modem. The HDR-RF Ground Modem will provide high data rate capabilities on next generation Wideband Global Satcom (WGS) satellites. The modem will support future intelligence, surveillance and reconnaissance applications as well as disseminate large quantities of strategic and mission-critical information. The HDR-RF Ground Modem is expected to be an important component of future high-speed satellite communications on the Government's Global Information Grid (GIG) network.
Use of the HDR-RF Ground Modem to provide satellite connections within the GIG will provide users with a seamless, secure and interconnected information environment, meeting needs of both the warfighter and the business user.

As the year progressed, we continued with strategic announcements applicable to both the government and commercial sectors—new products, the award of key contracts and customer testimonials of those using our bandwidth-efficient technologies to minimize operating expenses and maximize satellite transponder utilization. Our parent company, **Comtech Telecommunications Corporation** [NASDAQ: CMTL] had another record year in 2007, with **$445.7 million** in net sales with all three-business segments remaining strong.

Commenting on the upcoming year, *Fred Kornberg*, President and Chief Executive Officer of Comtech Telecommunications Corp., stated, "As we look forward to fiscal 2008, we are confident that we are well-positioned for another year of record sales and earnings."—*Tempe, Arizona*

THE VIEW FROM BRIVO NETWORKS

by Timothy Waters, VP, Marketing

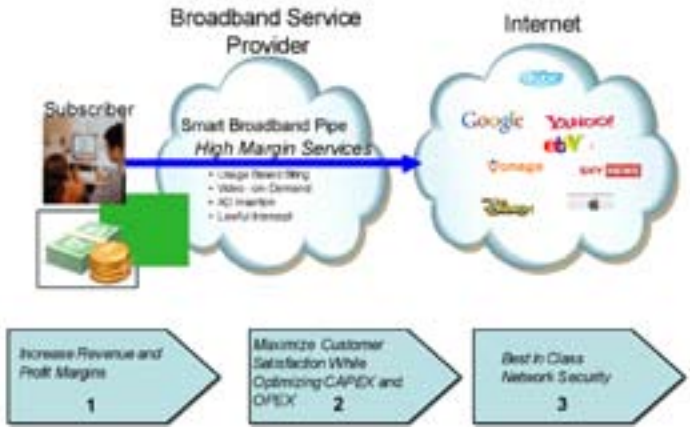
In 2007, the deep packet inspection industry experienced a fundamental shift in the role of the network infrastructure, from one of basic network connectivity to now a software driven, policy-centric network whereby IT professionals have significantly greater understanding and control over packets traversing their network. While network connectivity infrastructure is primarily a hardware discipline, the most suitable architecture supporting policy-centric networking is one that is software-defined, leveraging deep packet inspection and processing (DPI/DPS) technology.

During this past year, enterprises as well as service providers around the globe moved forward in the planning and implementation process of converging legacy and future network services to a common, policy-centric, IP infrastructure. While global policy-centric IP networks continued to provide great opportunities for growth and business transformation in 2007, they also presented a new set of challenges for the IT professionals operating these networks. Specifically, as legacy cash-cow services migrated to IP, service providers aggressively moved to create new value-added, policy-centric IP services (above and beyond basic Internet access) to generate revenue growth with high profit margins. Furthermore, as threats of DDOS and other network attacks escalated, enterprises as well as carriers were again in need of advanced, policy-centric technologies to further protect their networks from current and emerging security threats.

Traditional network elements (switches and routers) are not designed to meet these emerging infrastructure demands, specifically the combination of increased compute processing and higher speed networking required as part of policy-centric network deployments. This collision of "computing" and "networking" represents one of the most significant paradigm shifts in network system design since the advent of the switch and router. To combine a rich, policy-based system with the demands of high-speed networking requires a new type of network element: DPI Network Appliance Platforms.

Deep packet inspection and processing (DPI/DPS), both the underlying technology and associated platforms and applications, clearly came into the market mainstream in 2007. DPI/DPS network appliance platforms provide a high level of packet inspection and processing power to handle real-time complex analysis and action at core network speeds without introducing significant latencies. From a user perspective, DPI products give IT professionals the ability to monitor and control traffic at all layers of the protocol stack (including the application layer), based on a set of policies. Our industry experienced a proliferation of IDS/IPS, network behavioral analysis (NBA), URL filtering, content management, email security and packet capture solutions, all of which rely on DPI/DPS technology.

During 2007, **Bivio Networks** led the networking industry with an innovative, scalable, software-based computing architecture, realized in a family of 10 Gbps deep packet inspection and processing platforms. Bivio is the leading supplier of DPI/DPS appliance platforms enabling enterprises and service providers the ability to deploy a variety of policy-centric, wire-speed DPI/DPS network applications throughout their networks. Their deep packet inspection and processing platforms combine unparalleled scaling of network performance, processing power, and application agility. They also feature an architecture specifically optimized for wire-speed execution of emerging network services that increasingly demand deep packet inspection and processing combined with high network throughput.



Historically, enterprises and service providers have deployed the first generation of DPI products throughout their networks. These are application-specific point products targeted at solving specific problems in the network; for example, controlling P2P traffic, preventing network intrusions (IDP), or implementing network access control based on identity and policy.

"2007 represented a break-out year for deep packet inspection and processing technology and products as many IT professionals embraced the infrastructure migration to policy-centric networking demonstrated by the rapid deployment of DPI appliance platforms required to more effective manage and control all layers of the networking stack," said Dr. *Elan Amir*, President and CEO, Bivio Networks. "We fully expect a continuation of this paradigm shift in networking in 2008 with the deployment of DPI devices at an even faster pace."

THE YEAR IN REVIEW

Though many of these products are adept at solving a specific problem, they are not flexible enough to resolve the emerging network challenges or implement new services as infrastructure dynamics and requirements change. Application-specific DPI products cannot effectively keep pace with the velocity of change required to respond in a timely manner to new requirements. This means innovative hardware needs to be added to the network as new requirements emerge.

In order to avoid adding new hardware and redesigning networks as requirements change, Bivio Networks has lead the industry with the introduction of next generation **programmable** DPI products. Programmable DPI products allow IT professionals the ability to run multiple DPI applications at line speed, adding new functionality using software only updates. These applications can provide bandwidth-on-demand, traffic management, intrusion detection and prevention, usage based billing, content insertion, security services, and other complex application layer services. Using Bivio's programmable DPI architecture, enterprises and service providers have the flexibility to implement new value added services while optimizing network traffic and securing the network from security threats.

Bivio Networks' 7000 Series 10 Gigabit Programmable Network Appliance Platform

From a product deployment perspective, **2008** should be a year of rapid acceleration of DPI/DPS platforms and associated applications, such as bandwidth and traffic management, data leakage, packet capture, intrusion detection and prevention, usage based billing, URL and content filtering, as well as content insertion.

Market segments, to include service providers, government agencies and enterprises, particularly in vertical markets to include financial and health care services, will continue to adopt DPI/DPS solutions to drive both top line opportunities as well as more effectively manage and control capital expenses (CAPEX), operating expenses (OPEX), network security and compliance metrics.

It is worth noting this phenomenon is global as we predict such DPI/DPS deployments will continue to proliferate onto networks, not only throughout the America's, but also in Europe, Asia, as well as the Middle East.

Tim Waters has more than 18 years of experience in marketing data and telecommunications products and services. He is responsible for overall marketing and product management of Bivio networking appliances.

Prior to joining Bivio, Waters was vice president of marketing and business development at NetDevices, Inc. and he has held similar positions at SkyStream Networks and Onetta, Inc. Waters holds an MBA from the Harvard Graduate School of Business Administration and a BA in economics from College of the Holy Cross.

PTC EYE ON TRENDS:

Video and Mobility Take Center Stage

by Mark Hukill, Senior Advisor, Pacific Telecommunications Council

"The PTC conference in January could not be better timed. Asia is where the major growth is and the Pacific has taken over from the Atlantic as the centre of telecom action. New innovations, explosion of video, rollout of broadband Internet have all combined to create an explosive demand for domestic and international communications. The industry leaders from operators, suppliers, academia, the Internet and content world will come together to meet, hear and discuss how each can carve a role for themselves in the current bonanza. So whether it is submarine cables, satellites, global connectivity, regional and island Internet development, the impact of video or other facets of the industry, the PTC conference in Hawaii will be the place to be in January."— John Hibbard, Member, PTC Board of Governors and CEO, **Hibbard Consulting**, *Australia*

It was bound to happen: full convergence in practice. We are moving well beyond the initial service and market testing of triple play features; Beyond robust, widespread and competitive mobile voice and text; Beyond the very significant changes in music, news and other media/entertainment distribution across a host of telecommunications, broadcasting and ICT networks. Now, the extensive use of video in all forms and across all networks of communication, as well as the demand for high levels of enterprise and user mobility, are defining the new core of telecommunications.

From **YouTube** to enterprise video communications on-demand, the shape of telecommunications networks and their interconnection are being radically altered. The integration of previously separate services and the staggeringly massive inter-combination of entire industries, including telecoms, broadcasting and information, are coalescing around the Internet and digital airwaves, across undersea cable and satellites, from carriers to network peering to homes and offices, and indeed onto all IP platforms. And users are doing what they want, in their own way.

FOCUS ON

Mergers and alliances continue apace. Acquisitions and expansions are global in nature. In addition to the usual push from Western countries, Asian telcos are now investing heavily elsewhere, including Africa. New partnerships and multiple partner projects abound. Market opportunities in rapidly expanding economies are plentiful. A mix of private investment and public funding is reaching lesser-served regions with more appropriate technologies tuned to local conditions. Regulation may not be keeping pace and it probably cannot, but it may at least not get in the way. It may even, in a rare fit of inspiration, provide a reasonable guide to promote further development, investment and a clear explication of market frameworks.

The result? Far more users are actually getting what they want at a price they can afford. Advanced integrated service offerings across mature markets, with innovative delivery of personalized information and entertainment, are quickly becoming the order of the day. Even more dramatically, there are now a half billion more mobile subscribers worldwide, largely in lesser developed countries, where there was hardly any telecom access at all just a few years ago.

Is this the dawn of a true transformation in telecommunications? It is now five years since the greatest downturn ever experienced in the industry.

"The boom-bust cycle raises the question of what's in store over the next few years given we seem to be on the crest of a wave. Will it crash or will we all be able to surf it for another five years at least?" —*John Hibbard*

Despite the usual overly optimistic hype that surrounds many trends, there indeed appears to be a new foundation for the future of the industry. That foundation is being built on broadband, intelligent end-to-end IP networks, both fixed and mobile, all with the robust capability to securely integrate all digital services and applications, including capacity-hungry video. Whether for location-based services, personal and social networks, gaming, entertainment, or business needs, the proliferation of interactive video in telecommunications will bring us to a new scale of operation. This new scale is several orders of magnitude greater than previously provided.

Business models abound to take advantage of services and applications using various combinations of transaction fees, subscriptions and advertising. Mobile communications as a social and business platform will expand rapidly. Mobile devices are not only becoming full scale interactive information, entertainment and communications centers, but they may soon become our wallets too, as consumer payment and banking systems via mobile networks evolve. No one provider has all the solutions. No one entity can provide the necessary flexibility to accommodate all users and the multiple forms of applications demanded, indeed even created by users. Cooperation is as much a necessity as competition is a driver.

There is also new momentum for understanding the important role of telecommunications and ICTs to enhance knowledge sharing that promotes social and economic development. Such knowledge development is a key part of building civil societies. Practical partnership efforts at the local level have been particularly effective at providing appropriate systems and services, including building both human and technical capacity, heretofore unavailable in rural, remote and lesser developed areas.

Today, there is unprecedented opportunity in telecommunications, and as ever, plenty of challenges. PTC'08 trumpets the theme "Telecom with Vision", taking advantage of its dual meaning of the significant development of interactive video and a view toward the future.

Reflecting on all this information, John Hibbard, quoted above, has responded by raising a number of questions that lead us to Honolulu for PTC'08:

- Will the demographics of what has restored our industry and driven growth in all sectors change, and if so where, and with what impact?
- How can the Pacific leverage the current boom to position itself for the future?
- Where is the money currently being made? Will video be the new cash generator or will it still be voice?

As telecommunications and ICTs weave ever deeper into the global fabric of human endeavor, what indeed is our vision?

See you in January at PTC08! Registration and additional information

About Paci c Telecommunications Council

Open new markets, uncover new resources, strengthen relationships, build your knowledge base, network with industry leaders, and make a difference on improving the quality of life in the Pacific Hemisphere.

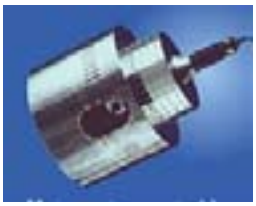
If this sounds like an ambitious agenda…it is! The Pacific Telecommunications Council and its international community of members offer you a tool for expediting the accomplishment of your organization's critical goals. Through a network of members extending across 40 nations, PTC promotes the development and use of telecommunications and ICT (information and communications technologies) to enhance communications in the Pacific hemisphere. PTC does business and is located in Honolulu, Hawaii.

METEOSAT…30 YEARS… AND MORE…

When the **Delta** rocket carrying the first **Meteosat** lifted off from Cape Canaveral in November 1977, Europe gained the ability to gather weather data over its own territory with its own satellite. Meteosat began as a research program for a single satellite by **the European Space Research Organisation**, a predecessor of the **European Space Agency** (ESA).

Launch of Meteosat-1 -- 1977 Credit :ESA

Once the satellite was in orbit, the immense value of the images and data it provided led to the move from a research to an operational mission requiring a dedicated organization to conduct it. In anticipation of the founding of **EUMETSAT**, ESA launched the **Meteosat Operational Program** (MOP) in March 1983. This covered the construction and launch of three more Meteosat satellites and all operational activities until November 1995. EUMETSAT ultimately became reality in June 1986, with the operational provision of Meteosat images and data as its initial reason for existence.



Meteosat operated by EUMETSAT

From 1987, EUMETSAT took full financial and programming control over MOP, although ESA continued to manage the program on behalf of EUMETSAT, developing the space segment and procuring the satellites. **Meteosat-4**, EUMETSAT's first operational satellite was launched in March 1989, followed over the next four and a half years by **Meteosat-5** and **Meteosat-6**.

Between 2001 and 2007, Meteosat-6 provided EUMETSAT's new rapid-scanning service, supplying frequent data of a smaller area to monitor the development of convective storms. Meanwhile, in May 1991, the **Meteosat Transition Program** (MTP) was initiated, with funding covering the construction, launch and operation of **Meteosat-7**. Launched in September 1997, Meteosat-7 was the last of the first generation of Meteosat satellites.

Generation Change

The first generation of seven Meteosat satellites brought major improvements to weather forecasting. But technological advances and increasingly sophisticated weather forecasting requirements created demand for more frequent, more accurate and higher resolution space observation.

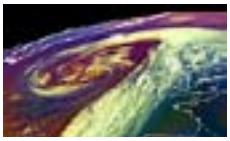
To meet this demand, EUMETSAT launched the **Meteosat Second Generation** (MSG) program, in coordination with ESA, which developed the first satellite and procured all four with EUMETSAT funding. On August 28, 2002, EUMETSAT launched the first MSG satellite, renamed **Meteosat-8** when it began routine operations to clearly maintain the link to earlier European weather satellites. It is the first of four MSG satellites, which are gradually replacing the original Meteosat series. It was followed on December 21, 2005 by the second MSG satellite, **Meteosat-9**, which currently provides the operational service over Europe with Meteosat-8 as backup. Meteosat-8 is preparing to take up rapid scanning as from spring 2008.

Together, the two satellites provide the operational service for Europe of a quality never before experienced from geosynchronous orbit. At the same time, work continues on **MSG-3** and **MSG-**4, which are scheduled for launch in January 2011 and January 2013, respectively.

The first generation is still going strong... Meteosat-5 was only de-orbited recently in April 2007 after more than 15 years of operational service. The remaining Meteosats of the first generation (Meteosat-6 and Meteosat-7) are in orbit over the Indian Ocean as part of the **World Meteorological Organization's Global Observing System**. To enable Europe to meet its obligations to the Global Observing System, EUMETSAT and ESA are currently preparing for **Meteosat Third Generation** (MTG).

Increasing Capabilities

The capabilities of Meteosat are increasing with each generation to meet growing user requirements. The 800-kilogram MOP/MTP has one mission with its three-channel **Meteosat Visible and Infrared Imager** (MVIRI) and a repeat cycle of 30 minutes. The two-ton MSG conducts observation missions with its 12-channel **Spinning Enhanced Visible and Infrared Imager** (SEVERI) with repeat cycles of 15 minutes in nominal mode and five minutes in rapid-scanning mode at extraordinarily high resolution (one kilometer for the High Resolution Channel from geostationary orbit). It also has the **Geostationary Earth Radiation Budget** (GERB) instrument for a dedicated climatology mission.



Unlike the two previous generations of Meteosat spinning satellites, the three-ton MTG will be three-axis stabilized and each satellite will have different payloads for four different observation missions. The first MTG satellite will carry a 16-channel combined imager capable of providing both full disk high spectral resolution imagery and fast imagery and, if approved, a lightening imager. The second MTG will have an infra-red sounder, and a possible chemistry mission using an **Ultra Violet Sounder** is also being coordinated with the European Space Agency for implementation via the **Sentinel 4** satellite operating under the Global Monitoring for Environment and Security program.

CALENDAR OF EVENTS

Visit: http://www.satnews.com/calendar.shtml for additional listings

Date	Event	Location	Contact	Web
December 03-06, 2007	**ITU Telecom Europe**	Sofia, BULGARIA	Fernando Lagrana	http://www.itu.int/EUROPE2007/
December 3-5, 2007	**Satcom Australia 2007**	Sydney, Australia	Vanessa Riley Tel: +61 2 9021 8808 E-mail: vanessa.riley@terrapinn.com	http://www.terrapinn.com/2007/satcom%5Fau/index.stm
December 5-7, 2007	**IPTV World Forum Asia - 3rd Annual**	Suntec, Singapore	Tel +44 (0)117 3116 226 Fax: +44 (0)117 3116 221 Email: markj@junction-group.com	http://www.iptv-asia.net/
January 13-16, 2008	**PTC 2008**	Hilton Hawaiian Village Beach Resort & Spa, Honolulu, Hawaii, USA	Phone: +1.808.941.3789 Tel: +1.808.944.4874 Email: info@ptc.org	http://www.ptc.org/
January 22-25, 2008	**Network Centric Warfare 2008**	Ronald Reagan Building and International Trade Center, Washington, DC	Tel: 1-973-256-0211 Email: info@idga.org	http://www.idga.org/cgi-bin/templates/single.html?topic=329
January 29-30, 2008	**IPTV World Forum Latin America 2008**	Rio de Janeiro, Brazil	Tel +44 (0)117 3116 226 Fax: +44 (0)117 3116 221 Email: markj@junction-group.com	http://www.iptv-latina-merica.com/
January 30-31, 2008	**Mobile & Deployable Communications**	Marriott Prague, Prague, Czech Republic	Nicolas Pianet Tel: +44 (0) 207 7827 6032 Email: npianet@smi-online.co.uk	http://www.smi-online.co.uk/mdc4.asp
February 5-7, 2008	**WEST 2008**	San Diego Convention Center, San Diego, California, USA	Email: westregistration@jspargo.com Tel: (703) 449-6418	http://www.afcea.org/events/West/
February 20-22, 2008	**International Space University's (ISU) 12th Annual Symposium**	ISU Central Campus, Strasbourg, France	Steven Brody E-mail: brody@isu.isunet.edu	http://www.isunet.edu
Feb 26-28, 2008	**Satellite 2008**	Washington DC Convention Center, Washington DC	Tel: 1-301-354-1797	http://www.satellite2008.com/
March 4-6, 2008	**CABSAT**	Dubai International Convention and Exhibition Centre, UAE	CABSAT Team Tel: (+971) 4 308 6077 / 6048 Fax: (+971) 4 318 8607 E-mail: cabsat@dwtc.com	http://www.cabsat.com/
March 12-14, 2008	**IPTV World Forum 08**	Olympia, London, England	Tel +44 (0)117 3116 226Fax: +44 (0)117 3116 221markj@junction-group.com	http://www.iptv-forum.com/
March 27-29, 2008	**Sat Expo**	Fiera di Roma, Italy	+39 0444 543133	http://www.satexpo.it/
April 7-10, 2008	**Satcom World Africa 2008**	The Sandton Convention Centre, Johannesburg, South Africa	Brian Shabangu Tel: +27 11 463 6001 Fax: +27 11 463 6903 E-mail: brian.shabangu@terrapinn.co.za	http://www.terrapinn.com/2008/satcomza/
April 12-17, 2008	**NAB - National Association of Broadcasters**	Las Vegas Convention Center, Las Vegas NV.	Tel: 202-429-5300 Fax: 202-429-4199 E-mail: nab@nab.org	http://www.nab.org/
April 22-25, 2008	**The International Conference on Space Applications (SPACEAPPLI 08)**	Toulouse - France	Carte Blanche Tel: +33 5 63 72 31 00 E-mail: contact@toulousespaceshow.eu	http://www.toulous-espaceshow.eu