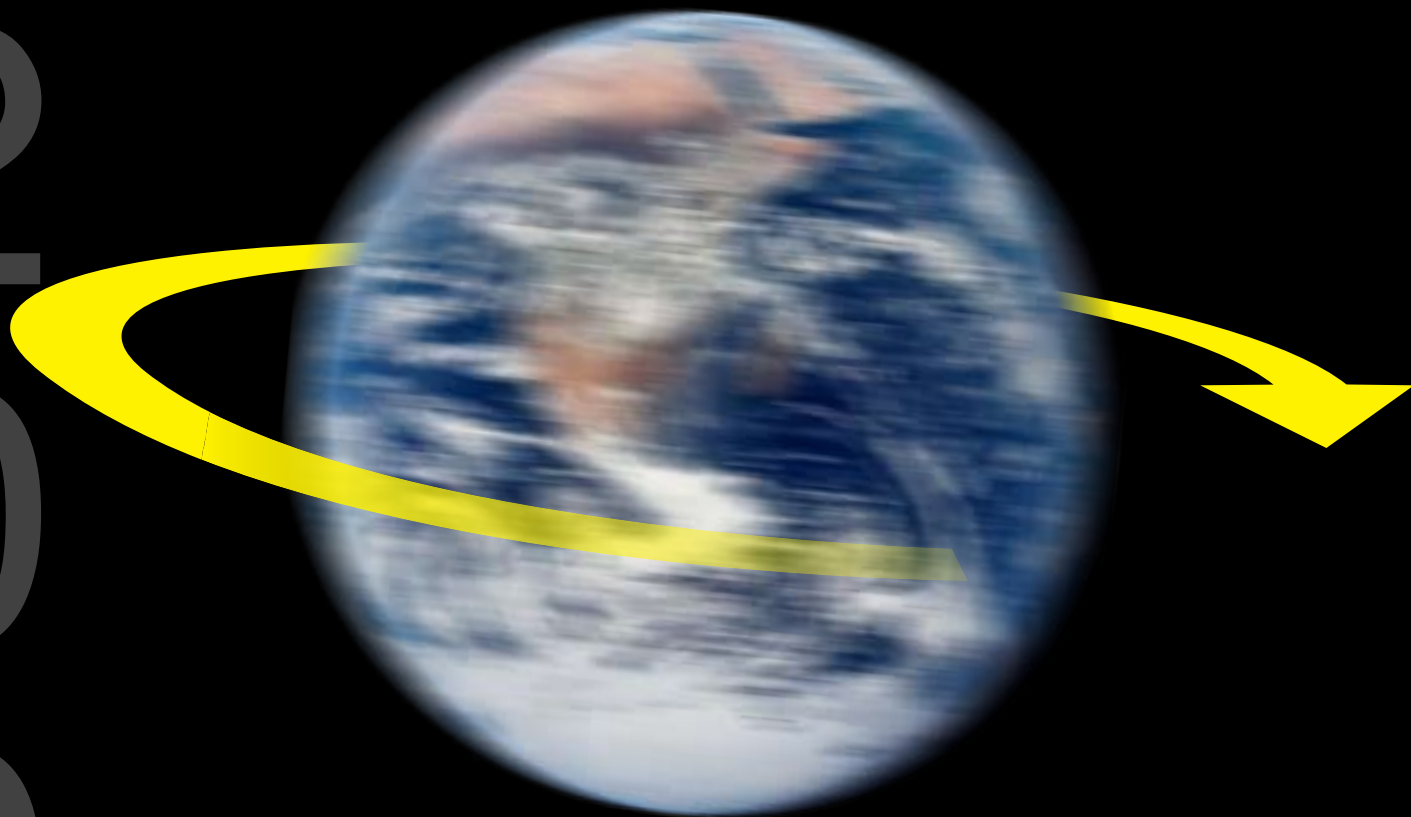





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-  Subject-matter experts examine the past year...
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 - Near Earth LLC
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Reflections + Projections

UPLINK

While this past year generally was a pleasant experience for our industry, next year may find the experience more challenging. Insulation from the economic woes currently stressing governments and citizens alike will be sought. Cocooning will occur, as less and less disposable income is available for extracurricular activities. People will want and demand more and more in the way of home-based entertainment — offerings highly reliant upon satellite delivery. IPTV, DTV, Mobile TV, radio, web — all are big players with satellite connectivity needs. Mix in the variety of support companies involved, from teleports to DVB-S2 technology suppliers to broadcasters to equipment manufacturers, and there is good cause to remain optimistic about business prospects for 2009. The global aspects of our environs are also something to be optimistic about, as leading technologies are implemented in regions of the world heretofore isolated from satellite connectivity. Growth in the African, Asian, Middle Eastern, Pan-Pacific and Latin American markets will continue to forge forward — the need to know and to communicate is driving firms to supply what the customer wants at affordable price points.

This issue provides readers the expertise of those knowledgeable in specific subject matters within a broad range of disciplines and companies. These fine folk have succeeded in our business realms and they review what occurred to their companies during 2008, what they believe will transpire in 2009, and how their companies are fairing as we approach the New Year.

I thank all for their time and efforts in producing their analysis, which, I hope, will realistically encourage readers. These “reports” are offered in alphabetical order so as to not imply any favoritism. Each company has their own presentation wherein they discuss their performance over the past year, what they feel should be noted for 2009, and their product plans. In fact, there are so many companies and subject-matter experts involved, the individual commentaries would not all fit within the publication. We'll offer the first portions of their offerings, which you may then completely read at the **SatMagazine** website via the include article link. If these fine folk sound enthusiastic, why shouldn't they? They are proud of their company's accomplishments and what is hoped will be gained in 2009. Extremely interesting reads, all!

Also in **UPLINK** is an op-ed from **Space Foundation's** President and Chief Executive Officer, *Elliot Pulham*. The op-ed is entitled “**The Top 10 Reasons 2008 Was Great In Space**”, a highly interesting read. Enjoy the magazine, relish the expertise, and for a complete rundown on satcom and milsatcom news every day, I recommend you access **SatNews**. If you have company news or new product info, be certain to send that material directly to me for immediate attention.

As far as 2009 is concerned, worry does little more than adversely affect your health and shorten your life span.. Look for the positive, drink in the sunshine, and don't forget what little known lithographer *Herm Albright* once said in the early 1900's — “A positive attitude may not solve all your problems, but it will annoy enough people to make it worth the effort.”

Hartley Lesser, Editorial Director, SatNews Publishers

by Elliot Pulham, CEO, Space Foundation

If you're like most Americans, you're very happy to see 2008 come to an end.



Pockmarked by the scars of a long presidential campaign and a global economic meltdown, 2008 will be remembered as a long season of unwelcome news, punctuated by a historic moment of hope as Americans elected Senator Barack Obama to be president of the United States. Nonetheless, a series of dramatic events in space were playing out in the background, assuring that 2008 will be remembered as a great year in space.

Top 10 Reasons 2008 was a great year ...

Number 10

Space economy rockets past \$250 billion

According to *The Space Report 2008: The Authoritative Guide to Global Space Activity*, the global space economy zoomed past the \$250 billion mark in 2007.

No longer dominated by government spending, the space economy is now driven by consumer applications of technologies using the U.S. global positioning system (GPS) satellite constellation, direct-to-consumer satellite television and radio broadcasting, and commercialized space imaging satellites that fuel such consumer applications as Google Earth.

Available online at www.TheSpaceReport.org, the Space Foundation's annual report on the industry also revealed that, despite the global economic slowdown, the space economy grew 11 percent in 2007 — largely owing to a mature and growing commercial space economy. While government space spending remains relatively flat, commercial space revenues now account for 71 percent of global space activity, with sectors like GPS equipment manufacturing up 20 percent and direct-to-home broadcasting up 19 percent.

Number 9

Virgin Galactic unveils SpaceShipTwo and begins test program

Sir Richard Branson and his *Virgin Galactic* team selected New York's **Hayden Planetarium** last January to unveil the design for **SpaceShipTwo**, the successor to

Virgin's **X-Prize**-winning **SpaceShipOne**. SpaceShipTwo is an operational version of the two-stage-to-space system that will carry thousands of ordinary citizens from all walks of life into space in the years ahead. With the Virgin Galactic team

already putting future suborbital passengers through centrifuge training and the first SpaceShipTwo carrier aircraft rolling out for tests in August, the age of space travel for everyone moved significantly closer to reality.

Number 8

Japan's success with extra-terrestrial exploration

2008 marked the first time that the Space Foundation's **John L. "Jack" Swigert, Jr., Award for Space Exploration** was presented to a non-U.S. organization. **JAXA**, the **Japan Aerospace Exploration Agency**, was recognized for successful operation of an impressive fleet of robotic exploration spacecraft. The spacecraft — **Suzaku**, **Akari**, **Hinode**, **Hayabusa** and **Kaguya** — have done everything from landing on and drilling into an asteroid to providing the historic first HDTV images of Earth's moon as seen from lunar orbit. The impressive Japanese solar system exploration program is on the leading edge of a growing trend of space firsts by nations other than the traditional space superpowers, signaling a new era in international space exploration.

Number 7

SpaceX achieves successful orbital launch

Undaunted by earlier launch failures, the commercial space transportation company founded by dot-com millionaire and entrepreneur **Elon Musk** succeeded in successfully placing a demonstration spacecraft into

a precise Earth orbit in September. **Space Exploration Technologies**, or **SpaceX**, was founded and funded entirely with private capital with the expressed intent of dramatically reducing the cost of putting payloads into orbit. The SpaceX **Falcon** rocket is the first liquid-propelled launch vehicle to be entirely capitalized and developed with private funding from main engine to nose cone. The accomplishment was all the more impressive because SpaceX pressed ahead despite three previous failed launch attempts – proving that rocket science is still a risky business, but one that can be mastered by commercial companies with resources and resolve.

Number 6 **Shenzhou 7 success**

China's resolve to become a superpower in space was convincingly demonstrated in September when the **China National Space Administration's Shenzhou 7** mission accomplished a number of impressive firsts. The list of firsts includes China's first three-person crew in orbit, China's first space walk, successful depressurization and re-pressurization of a spacecraft in orbit, successful test and demonstration of a Chinese-design spacesuit, and the demonstration of technologies and techniques for orbital rendezvous and docking. At a time when the U.S. space



program is facing a potential hiatus from manned space flight as the venerable space shuttles are retired, China's manned space program is clearly on the rise.

Number 5 **U.S. Air Force EELV program completes another year of launch perfection**

The quiet giant in space launch, America's **Evolved**

Expendable Launch Vehicle program, under the management of the **U.S. Air Force**, posted another perfect year of flawlessly launching critical national security payloads for the U.S. government. With the robust capabilities of the **Boeing Delta** rocket family and the **Lockheed Martin Atlas** rocket family now under the consolidated management of **United Launch Alliance**, the Air Force has now achieved an unprecedented string of more than 60 consecutive successful launches without failure. If anything, **Air Force Space Command** and its launch wings at **Vandenberg** and **Cape Canaveral** Air Force Bases have made this look too easy. This is still rocket science and Space Command deserves its “props” for one of the great accomplishments of the space age.

Number 4 **India's space program shoots for the moon**

Not to be outdone by China and Japan, the **Indian Space Research Organisation (ISRO)** got the space faring world's attention in 2008 with three significant accomplishments. First came the successful launch and recovery of a spacecraft built to demonstrate the capabilities required to re-enter a manned capsule into Earth's atmosphere and recover it. Second came the announcement by India that ISRO's budget would be doubled, with a stated goal of getting to the moon.



Third, and most recent, was the first successful launch of a lunar spacecraft by ISRO. **Chandrayaan-1** was placed in lunar orbit on Nov. 8 to begin a two-year mission of lunar resource map-

ping and imaging.

Number 3 **Space returns to the national debate**

Largely absent from presidential politics for more than a generation, space returned to the national debate in 2008 as candidates *Barack Obama* and *John McCain* worked to position themselves in battleground states with significant space assets and economies. California with its huge Electoral College contingent, Colorado with the nation's second-largest space economy, Florida with its critical space coast assets, Ohio with the **NASA Glenn Research Center**, and Texas with the **NASA**

Johnson Space Center, all figured prominently in the presidential campaign. As a result, both candidates adopted pro-space exploration planks in their platforms. President-elect Barack Obama, in particular, not only developed a significant pro-exploration agenda, but also returned to Congress to support legislation increasing NASA's budget. This campaign focus encouraged many members of Congress to embrace space as an issue, forcing the examination of current plans to retire the space shuttle and rely upon Russia for the transportation of American astronauts to and from orbit.

Number 2 **Water and other prerequisites of life found on Mars**

Only in a year dominated by global economic crises and a U.S. presidential campaign could news of this magnitude get buried on page two of your local newspaper. The **Mars Phoenix Lander** not only discovered water ice beneath the Martian soil, its cameras on board the extra-terrestrial laboratory actually captured images of a Martian snowfall in progress. Combined with geological evidence turned up by the plucky **Spirit** and **Opportunity** rovers (now operating five years beyond their original 90-day mission design), soil analysis performed by Phoenix has confirmed the presence of minerals and nutrients, which, with water, form the basic requirements for life, as we know it. As the secrets of the Red Planet continue to be revealed, fundamental answers to the big questions about life in the universe become ever nearer our grasp. They compel us to mount a manned expedition as soon as humanly possible.

Number 1 **Barack Obama elected President**

Volumes will be written about the election of Senator *Barack Obama* and its historic importance for the United States of America. I'll leave that to the many authors who are no doubt grinding out books on the subject even before the President-elect is sworn in. The importance of this election for America's space programs, however, cannot be understated, even now. Obama as a candidate evolved, over time, one of the most comprehensive and pro-exploration positions on space to have been articulated by a candidate for President since the landslide victory of *Lyndon Baines Johnson* in 1964. President-elect Obama's platform calls for re-establishing a *National Space Council*, better funding

for **NASA**, reinvigoration of our nation's commitment to exploration, a focus on advanced research and development within all the nation's space enterprises, and using this renewed commitment to inspire, enable, and propel a new generation of space explorers. Within days of his election, Obama's space transition team was in place at NASA headquarters – a clear indication that space will be a top priority in this administration.

Like any President-elect, Obama will face the challenges of translating campaign plans and promises into action. He will do so in an environment of record deficits, in a time of sifting through the wreckage of unprecedented financial collapse and urgent requirements to reform national policies and recapitalize the Army, Navy, Air Force, and Marine Corps whose people and equipment are burned up and burned out after 17 years of continuous war fighting. Still, Obama's message has been one of hope and change and the mantra of Obama and his supporters has been "Yes, we can!" If even a fraction of this energy can be harnessed going forward, 2009 could be one of the best years in history as America, 50 years after Sputnik, prepares to launch The Next Space Age.

About the author

Elliot Pulham is president and chief executive officer of the Space Foundation, a non-profit foundation with significant operations in teacher training and student education, research and analysis, and support of the space community worldwide. Celebrating its 25th year, the Space Foundation is the leading nonprofit organization in the space sector, with headquarters in Colorado Springs, Colo., and offices in Washington, D.C., Houston, Texas, and Cape Canaveral, Fla.

A Blisteringly Good Year For Europe

by Chris Forrester

We need to find a new word to describe Europe's satellite progress over the past year. Looking back a year we described 2007 as "spectacular", and in 2006 we said "action-packed", while 2005 had been in our view "exciting". But how do you top 'spectacular'? The answer, as far as 2008's trading is concerned, is that the year has been an amazing one for European satellite operators. They've made profits, added impressively to their fleets, maintained fill rates, and seen their all-important margins improve.

Moreover, the improvements extend to the wider family of operators to include players such as **Arabsat** and **Nilesat**, as well as the usual giants such as **Intelsat**, **SES**, and **Eutelsat**. *Kurt Riegelman*, now responsible as SVP Global Sales for Intelsat, jokes that his frequent-flyer miles to and from Europe are growing rapidly! Intelsat managed more than 25,000 hours of satellite capacity out of Beijing for the Olympic games, in both SD and HD. "A staggering amount," said Riegelman.

Intelsat has also been contracted by the **Major League Baseball Association** to bring baseball into Europe, Latin America, and Asia, including coverage of the American League, the World Series and the World Baseball Classic in 2009. "There's been some talk of MLB launching their own dedicated channel, like the NHL, for example, but our role is simply to help them in distribution," said Riegelman, who also stressed how well Intelsat's partnership with **Telenor** at **One Degree West** works. "From the geographical location point of view it's a fantastic slot. And we could not have a better partner than Telenor. Both PAS and Intelsat have been working with Telenor for years and years, but for us today it fulfils a multi-purpose role, not just for video but with different flavours of video including DTH, including cable and contribution services. We see Intelsat's customers wanting to evolve, and they are asking us how they might get to a particular spot to serve multiple markets. And this is an excellent trend and where [there is] a giant footprint, the sort Telenor offers, is just what we want. We think we have a great project at One Degree West which will help our customers work through DTH, cable and broadcast."

His comments are wholly endorsed by Telenor, which saw the Norwegian operator have an impressive year culminating with the launch of **Thor-5** (**Thor-6** is due for launch in the spring of 2009). Telenor's broadcasting division reported "solid revenue growth" and stable margins helped by the addition of Thor-5. There was an impressive 22 percent growth in revenues on the firm's *Transmission and Encryption* (Conax) divisions. "Based on the Thor 6 programme continuing to progress well, Thales Alenia Space estimates that delivery of the satellite will be within the contracted time frame of the second quarter of 2009. The next key stage will be reached in November, when we look forward to our launch service provider, Arianespace, defining the 30-day window for launch," says Telenor.

Telenor's latest client news reveals that they currently have 420 channels (on IPTV) now being carried throughout the region. Telenor has spent the last six months designing and developing its first IPTV network for **Canal Digital** and **Telenor Telecom Solutions** in the Nordic region.

But while 420 IPTV-based channels are impressive, the fact is that European satellite operators are carrying between them a massive 6,500 channels. The **European Audiovisual Observatory** used the giant **MIPCOM** programming market in Cannes to unveil its latest channel count for greater Europe (including Croatia and Turkey) and says that around 6,500 channels are currently available to EU audiences. Even though some channels are duplicated (**Discovery**, for example, is in most markets and each linguistic version is counted as a separate channel).

The study uses its '**Mavise**' database to monitor numbers and currently identifies 5,068 active channels. The Observatory's survey of local television channels is still ongoing: a further estimated 1,500 small local channels are active in European markets and will be progressively added to the database. Of the 5,068



Thor-5 launch

channels identified in Mavise, 4,663 channels are established in one of the 27 EU countries, or in the two candidate countries (Croatia and Turkey), and 405 originate from third countries.

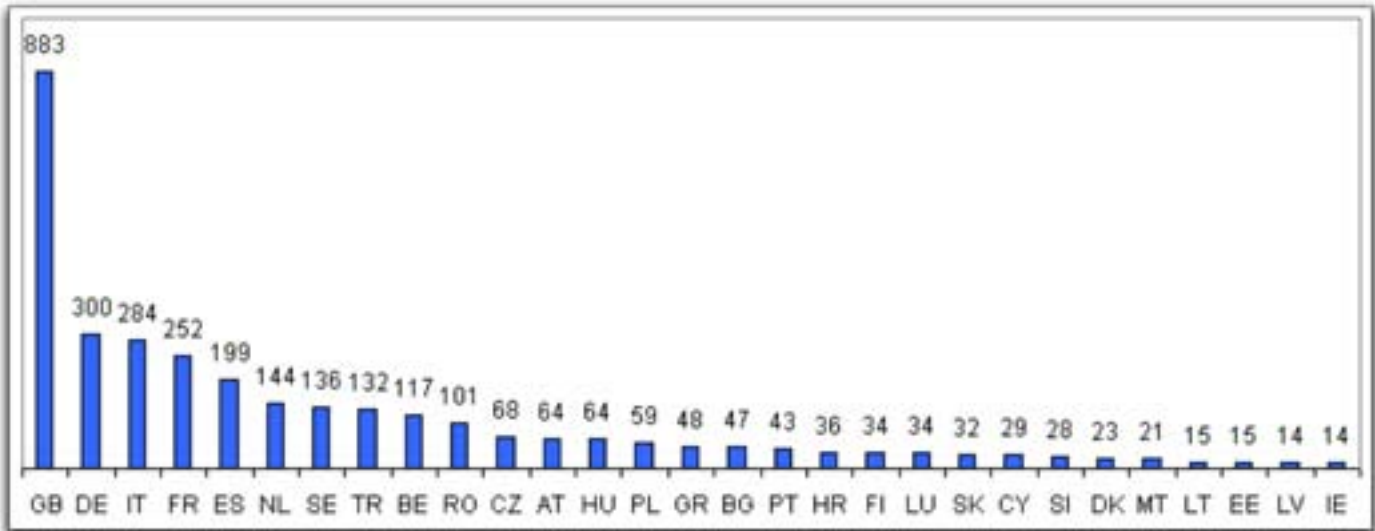
The Observatory's analysis of the breakdown of channels (local channels excluded) according to country of establishment (*Figure 1 on page 10*) shows that the U.K. is by far the country with the highest number of channels: 883 compared with 300 in Germany, 284 in Italy, 252 in France and 199 in Spain. The U.K.'s leading position can be explained not only by the large number of thematic channels intended for the national market but also by the considerable number of channels established in the U.K. and targeting other European countries.

The database diagram (*See Figure 2 on page 10*) also allows a statistical analysis of the range of channels available by genre. Among the channels available in Europe in 2008, generalist channels offering a mixture of different programme genres still represent the largest category: 376 channels of this kind are available. Film channels represent the largest genre of thematic TV channels (333 channels), followed by sports channels (324 channels), entertainment channels (269 channels), and music channels (238 channels). There are also 201 news and business chan-

nels, 189 children's channels, 135 documentary channels, 110 lifestyle channels, 103 home-shopping channels, 69 cultural/educational channels, and 26 travel channels on the market.

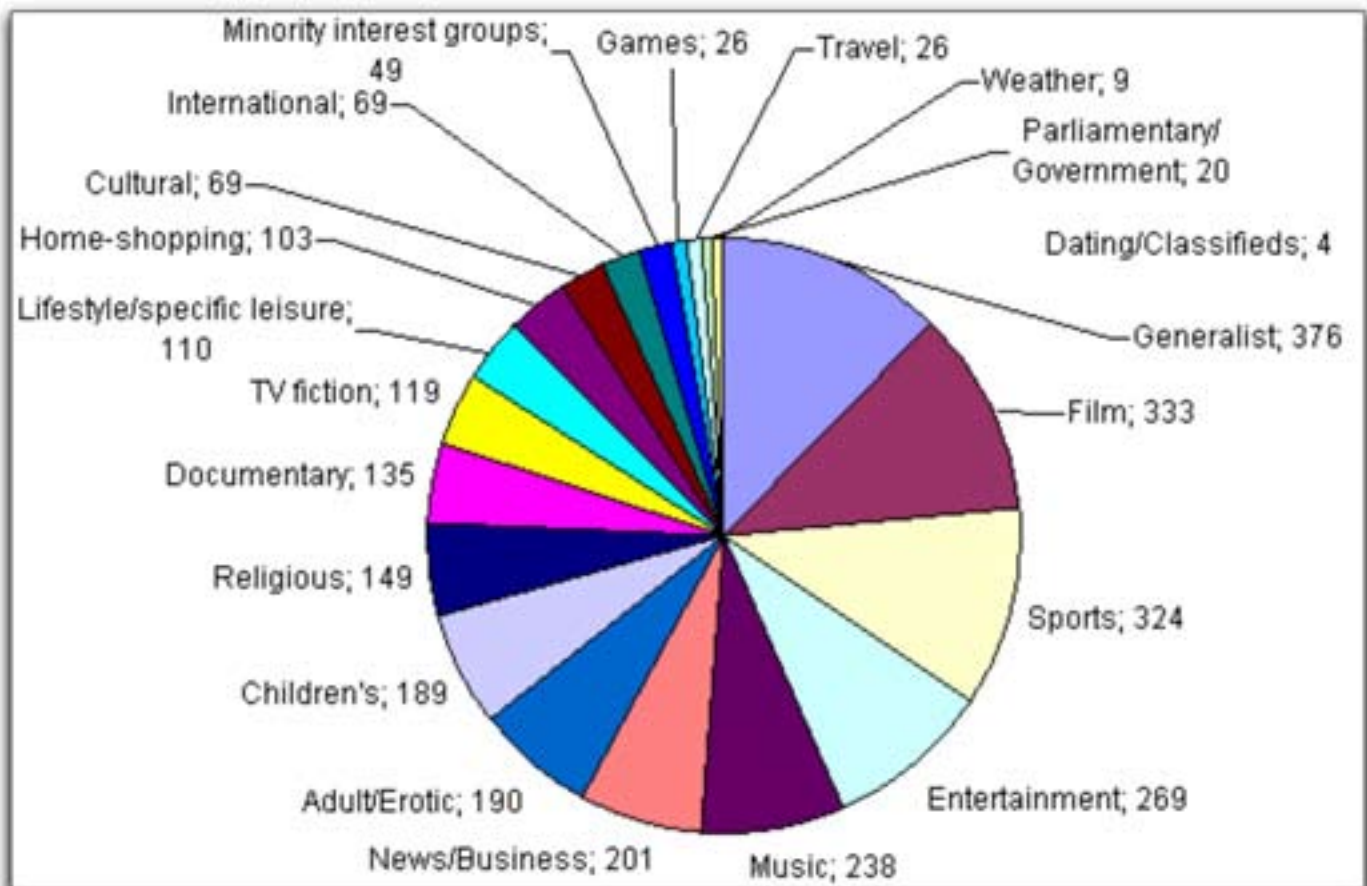
The two main European operators have also had a blisteringly good year. Luxembourg-based **SES** says it is now carrying 55 high-definition channels, and expects to have signed more up by the Christmas holiday.

Number of active TV channels established in EU countries + Croatia and Turkey (excluding local channels)



Data: European Audiovisual Observatory, Oct 2008

Breakdown of TV channels by genre (nationwide TV channels available in EUR 29)



Data: European Audiovisual Observatory



Romain Bausch

Indeed, SES president/CEO *Romain Bausch* delivered positive news at the end of October as far as Germany was concerned, where the analogue switch-off was now anticipated to happen in the 2010-2011 time frame, and where he saw a

considerable uptake of HDTV-based services for Germany kicking in at about the same time.

Bausch also explained that talks were again scheduled with pay-TV broadcaster **Premiere's** new **News Corp.** management team about future use of **SES Astra's 'entavio'** digital TV system, which encourages free to air network broadcasters to encrypt their signals. "The situation is now much clearer at Premiere. We now have a clear interface at Premiere and hope to make progress over the next weeks and months. Importantly there is an increasing [level of] agreements between Germany's public and private broadcasters regarding the switch-over to digital. It is clear that by the end of 2010 or during 2011 there will be the switch-over from analogue to digital, and in particular from the statements made by the public broadcasters there is a commitment to launch HDTV basically at the same time. This is a very good development."

Bausch said that other initiatives were underway. There are now 10 satellites in SES' launch procurement plan (and 11 if you include the planned Ground Spare referred to above). This plan includes **Sirius-5**, a new satellite for launch in 2011 with a total of 56 transponders (of which 36 will be utilised by Astra and 20 by SES subsidiary **New Skies**). As the launch manifest gets underway the net growth will see 293 incremental transponders added to the overall SES fleet, which represents a 28 percent increase over the 1,048 transponders

SES Launch Manifest

active at December 31, 2007.

Indeed, it seems satellite operators can do no wrong as far as HDTV is concerned. Eutelsat has continually unveiled impressive revenue numbers, helped by increased demand for HDTV (it carries over 60 HD channels). The past year has seen a staggering 500+ (up 16.4 percent) new channels join one or other of Eutelsat's growing slices of orbital real estate, and taking Eutelsat's overall total more than 3180 channels (as at September 30).



Giuliano Berretta

HDTV capacity certainly saw significant gains, with CEO Giuliano Berretta saying that Eutelsat had more than doubled the number of HD channels it is now carrying compared to a year ago. Berretta talked about robust growth in a couple of specific regions: "With sustained demand across all our markets, both

in European Union countries and in our 'Second Continent' of Russia, the Middle East and Africa, Eutelsat is confident of meeting its objective of more than €900m of revenue for fiscal year 2008-2009 and an objective of a compound average growth rate of 6percent for the period 2008-2011, accelerating during the period."

Eutelsat was instrumental in breaking a world record for the first ever international demonstration of Japan's 'Super Hi-Vision' ultra-HDTV system in September at the giant IBC broadcasting convention. A few days ahead of IBC had seen Eutelsat awarded EuroConsult's 'Best Satellite Operator of 2008' honour. Eutelsat used its Atlantic Bird 3 satellite as the connection for transmission between a play-out centre in Turin and the huge RAI exhibition centre in Amsterdam. Eutelsat and engineers from Italian pubcaster RAI had compressed the somewhat juicy signal of 24 Gbps to a more manageable 140 Mbps stream which still needed two full transponders using DVB-S2 to handle the bitrate.

Intelsat, SES, Eutelsat and **Telenor** are each important in their coverage, but as far as the Middle East is concerned Arabsat and Nilesat are the dominant

Satellite	Launch date
Sirius 4	Nov 18 2007
AMC-21	Aug 14 2008
Astra 1M	Nov 2008
Astra 3B	Q4-2009
Astra 1N	Q2-2011
Sirius 5	Q3-2011
Ciel-2	Q4 2008

players, and they too have had a spectacular year. Nilesat is chock-full, and has no real capacity of its own available. However, it is partnering with Eutelsat on some frequencies. It also has a new satellite, **Nilesat-201**, a Ku/Ka-band craft on order from **Thales Alenia** and for delivery around May 2010.

The other 12 regional operators broadcasting over the Middle East are also busy with a combined average fill rate of 73 percent, reports **EuroConsult**. The mid-2008 survey proves again that the Middle East is one of the world's most dynamic for broadcasting. Transponder demand is rising at 12 percent per annum, with satellite-lease revenues growing by 17 percent per year on average since 2003, reaching \$752 million in 2007, says Euroconsult.

However, Arabsat has also been writing large cheques, with a pair of RFPs out. Mohammed Youssif, CCO Arabsat, says that Arabsat, over the next three years or so will launch four new satellites, giving it the youngest fleet in the region, and more or less representing \$1bn of investment from Arabsat's telco partners. Youssif says he is buoyed by the sense of well-being in the sector.

"Everyone seems happy. Orders are back up, launch capacity is extremely busy, good demand for bandwidth, so overall and in general I see us enjoying a sellers' market at the moment. In terms of Arabsat

Arabsat Manifest

Satellite	Launched	Position	Options
BADR-6	July 2008	26° E	C and Ku (BSS)
BADR-4	Nov 2006	26° E	Ku (FSS and BSS)
BADR-3	Feb 1999	26° E	Ku (BSS)
BADR-5	2010	26° E	C, Ku and Ka
BADR-5A	2009	26° E	C and Ku
BADR-7	2011	26° E	C and Ku
Arabsat-2B	Nov 1996	30.5° E	C and Ku
Arabsat-4A	Failure		
Arabsat-5A	Q4/2009	30.5° E	C and Ku
Arabsat-5C	2011	20° E	C and Ku?

specifically, we have seen a huge surge in demand and we sense certain trends that are now visible in the region.”

Youssif said the trends revolved around four key areas: Ku-band, C-Band, HDTV and Ka-Band. “One clear trend is that there is plenty of demand for Ku-Band capacity. And this works out as far as we are concerned in a simple ratio where for every three Ku-band transponders sold we sell one C-Band transponder. Like others, we are seeing a great deal of demand for C-Band over Africa, and there’s plenty of talk about Ka-Band including the Middle East although maybe this still has a year or two before it translates into real demand.”

The Middle East is also now beginning to look toward high-definition. The ‘HD Ready’ sets are already in many people’s homes, but content is in short supply. This is seen as likely to change in 2009.

Two other major events are also expected to occur next year. First up is the launch of ‘**Solaris Mobile**’, a joint-venture satellite owned by **Eutelsat** and **SES Astra**. Solaris will launch in Q1/2009 and operate in the S-band, looking for DVB-SH traffic, or satellite pay-radio customers over Europe.

The second event is the launch of **Hylas-1**, the first craft to come from Avanti Communications. Built with the help of European Union cash the satellite will go to a mid-Atlantic position (at **33.5° W**) later next year. Hylas-1 is already picking up very useful contracts especially in governmental broadband work.

2009 will present plenty of challenges for all our mentioned operators. There might even be further consolidation between players. But the thirst for new niche channels seems unquenchable. HDTV is coming on strong, and broadband by satellite — at long last — is making progress. We can anticipate more superlatives this time next year.

About the author

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.



Peering Around The Curtain

by Peggy Slye, Division Director, Futron

What surprises does 2009 hold for the space industry?

A year ago the space industry's near and mid-term future looked extremely bright, with annual industry studies happily validating individual organization's reports of increased revenue, improved sales, strong revenue growth and enhanced profitability, all buoyed by several years of consistently increasing global demand for satellite based services. Through the first half of 2008, strategic financial transactions continued to close, albeit at a somewhat slower pace than in previous years. Globally, government space programs maintained focus on expanding their military and civil projects. By all the signs and leading indicators, the pundits agreed that, although some overdue government policy and commercial sector adjustments were certainly wellwarranted, there was no need to look for clouds on the horizon. And there was certainly no reason to anticipate an interruption in the industry growth trends that had been solidly in place since 2003.

A few months have considerably altered that rosy perception. The key question for the new year used to be "will there be any change in 2009". Now the question is "how much, and what kind of change will 2009 bring"?

The global space industry will most certainly be affected by the deepening worldwide credit crisis and will also react, although probably on a somewhat more delayed basis, to the related decline in consumer spending. In 2009, these dual issues are likely to start constraining the ability of commercial companies to in-

vest in new products and to rejuvenate or expand their fleets. These constraints will take two distinct forms: the reduced availability of commercial credit which may not return to previous levels for many months or, in a worst case scenario, not for several years 2) significant tightening of credit terms.

The second constraint, though less immediately visible, makes it increasingly difficult to construct an attractive business plan for high dollar satellite and network investments that entail some degree of technical risk and which require several years for realization of the projected return on investment.

As global economic concerns continue to spread, consumers withdraw from investing as well as their spending on discretionary items. The strong demand for more and better products and services, which has fueled steady industry-wide growth, will contract and future planning projections will be curtailed accordingly. In previous economic downturns, government, especially military, and commercial space outturns have operated in opposite business cycles, with contractions in one arena being offset or even outstripped by expansions in the other. As a result, although all elements of the global space industry have been subject to challenging market conditions periodically in the past, there have also been attractive new and different opportunities, which emerged in parallel during the same time as some traditional markets were declining. Agile commercial companies and perceptive government agencies have prospered by being very flexible and adapting to these evolving market conditions. Those who adapted most readily to the changing market enjoyed the best eventual positions.

Unfortunately, in 2009, with ongoing requirements for huge, unforeseen investments in the global financial infrastructure taking top priority for most governments, it is highly unlikely that any major new programs or expansion opportunities will develop to offset this projected slowdown for the global space industry. Although industry reports for Q3 and Q4 2008 may remain reasonably strong, reflecting the carry-forward impact of previously robust market conditions, the global economic circumstances will undoubtedly color global industry results beginning in 2009, and, depending on the depth and severity of the contraction,

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possibly for several years beyond. As overall commercial satellite fleet utilization levels are now at historically high levels, especially in the highest demand regions, a delay in operators' fleet replacement and expansion plans will also create potentially difficult operating constraints for customers, particularly for the most sensitive government and military clients.

Just as pressure creates remarkable gems in nature, near term global financial pressures could also produce some important global, industry-wide benefits. The need for increased productivity and the desire for increasing access to significant space-based programs may lead to increased global collaboration and to the creation of more public-private partnerships. The early definition and development of badly needed frameworks for global cooperation, in key areas of space activity such as remote sensing, earth observation, systematic space traffic control, as well as common standards for regulating and ensuring safety in the

emerging fields of human commercial spaceflight and space transportation, also require cooperative agreements rather than solo projects.

In the United States, the transition of leadership to the *Obama* administration will create some unique operational challenges for U.S. space-related agencies and U.S. based space programs. The obvious timing issues associated with selecting, installing, and training new leaders cannot be minimized. Some key space decisions really won't wait! In its list of top issues for the new administration, the GAO named the Shuttle Transition as a key decision requiring attention in the very near term.

In addition, industry leaders and experts are unanimous in their view that the time for reforming the ITAR (International Traffic in Arms Regulations), the U.S. export control regime that has unduly burdened the U.S. space

industry as well as those who would conduct business with U.S. industry partners for years is long overdue. Although this issue is one that has been discussed repeatedly, it is a likely target for actual reform and action next year because it impacts and could improve the health of the U.S. economic and industrial base.

Another likely action that will impact the space industry would be any potential changes to U.S. foreign policy and military presence in Iraq and Afghanistan. An accelerated drawdown of troops in the field, for example, is likely to be accompanied by a related increase in UAV activity in the region to ensure the safety of forces remaining on the ground and to assist the local government with security measures. Implementing this type of transition would increase demand for commercial satellite capacity in that region — capacity already in extremely short supply.

Beyond the change of leadership, the economy, NASA's timing for key program transitions and evolving military strategy, the twin issues of space policy and space governance also offer the potential for driving key changes in 2009. The reports of two key U.S. government committees — the **National Security Space Independent Assessment Panel** (*Allard Commission*) and the **House Intelligence Committee** (*Reyes Report*) — recommend a comprehensive governance overhaul for U.S. government-driven space programs and related agencies. This further indicates a unified decision-making and advisory organization for all U.S. national space matters (such as the previous **National Space Council**) should be established at the highest level of government. If implemented, this entity would provide a forum for developing a unified and updated national Space Policy as well as the related Space Strategy needed for implementing a unified national vision for space effectively. Recommendations such as this, which normally attract significant resistance during prosperous times, are often welcomed as positive potential changes when increased productivity and efficiency are viewed as vital for all government activities.

At the same time, regulatory issues loom large for the satellite industry as well. This year's **ITU** debates and decision on C-band spectrum allocation and use, coupled with the FCC's recent decisions on *White Space* initiatives, reveal a steady and increasingly challeng-

ing global debate over the best application for scarce space resources. Simultaneously, satellite's role in promising new markets may well be challenged by new technologies for fiber and terrestrial wireless systems.

All of these uncertainties raise the obvious question of whether 2009 will see more consolidations, mergers, and acquisitions. At recent industry conferences, financial analysts and leading experts offered opinions on the likelihood of near term investments in the space industry. These opinions ranged from "little or no activity (especially major activity) in the next few months" to the almost dire "there will be almost no activity for the next few years". However, industry experience shows that financial pressures also create impetus for consolidations from a different perspective. With slower growth probable for the next few years, and far more challenging operating conditions expected throughout the industry, companies whose business plans relied heavily on increasing growth and/or improved operating margins will try to seek partnerships, alliances, and consolidations to avoid major business reversals, particularly in market segments that are already overcrowded or tight with intense current competition.

Adverse economic and market conditions also offer important opportunities for growth by improving productivity and enhancing business outcomes for customers and end-users, something that the global space industry knows how to do extremely well. The 'telecom bust' of 2001 found many commercial space industry members exposed to a rapidly collapsing market. The industry discovered multiple ways to become more efficient and to provide services for customers that substituted technology for more costly human effort and improved service and productivity, while reducing costs for end users.

The difficult economic cycle and global correction also stimulated the entire space and telecom industry to develop critical new skills. These included...

- *improved cost management techniques*
- *differentiated strategic staffing approaches*
- *better inventory and supply chain practices*
- *a systematic methodology for managing yield and network optimization*
- *more realistic business models*

Applying such business insights and expanded skill sets in the current environment will allow the more agile and perceptive space industry players to create meaningful and sustainable growth, even while the market levels out somewhat in the near term and reorganizes over an extended period of time.

The new year promises to be eventful and exciting for the space industry. Although 2009 shapes up in stark contrast to the year that might have been in earlier projections, the prospect for major industry-wide changes with lasting impacts and eventual benefits has never been greater. The only requirements for success are being open to change as a means for achieving necessary transformation; and flexibility in identifying and mining the best new opportunities! This industry is adventurous and bold and should be well positioned to thrive in this newly challenging global change cycle as well as to provide a leadership example for other industries also facing multiple challenges. The old maxim truly applies to our industry today — whether we believe we can — or we believe we can't — **we will be right!**

About the author

Peggy Slye has more than 24 years experience in the global telecommunications industry, and is currently Director of the Space & Telecommunications Division at Futron Corporation, where she leads a team of engineers, econo-



mists, regulatory / policy specialists and analysts in meeting the needs of a very diverse base of global commercial and government space and telecommunications clients. Prior to Futron, Ms. Slye served in a wide range of management positions at Intelsat, including sales, marketing and customer service.

Annus Horribilis or Annus Mirabilis?

by Hoyt Davidson, Founder, Near Earth LLC

To borrow from Queen Elizabeth II, the year 2008 “is not a year on which I shall look back with undiluted pleasure... it has turned out to be an Annus Horribilis.” Depending on your view of the U.S. Presidential election, you may believe the year had an offsetting “Annus Mirabilis” event or, alternatively, just more Horribilis.

Either way, clearly from a financial point of view, a lot of perceived value evaporated in our heretofore specially protected and recession resistant satellite industry.

In a rush for the door, investors indiscriminately dumped anything and everything that did not look like cash. Satellite companies, which tend to be small to mid cap in terms of trading liquidity, and generally far from investment grade credits, suffered along with most others. In fact, public equity values declined 23 to 95 percent from recent highs, despite the solid operating performance mentioned below and despite wide held beliefs of significant resistance to recessions.

Yields on outstanding satellite company debt also widened significantly. Unless such yields contract again, it will be quite challenging for many companies to raise much needed growth capital or to refinance existing loans as they come due.

When, and to what extent, this value returns (and brings with it renewed investor interest) is a major question for all of us. Just as clearly as financial turmoil and market volatility ruled the day late in 2008, the year also witnessed some important industry accomplishments and progress.

There are also, of course, many challenges facing the industry in 2009 as well as opportunities to consider. Here is a brief summary of how we fondly — but nervously — look back on the year and prepare for the future on a sector by sector basis.

FSS Operational Performance

Satellite industry performance, from an operating point of view, is in large part measured by the health of the important fixed satellite service sector. Most

FSS operators have enjoyed mid single digit revenue growth this year. Intelsat reported record revenues for its first six months of 2008, up 9 percent, and **Eutelsat** reported a 7 percent gain over 2007.

Some firms, such as **SES**, saw much flatter growth this year. In general, FSS companies are enjoying strong cash flows, good multi-year backlogs, and reasonably high credit quality customers who are dispersed over a variety of economic sectors and geographic regions. Furthermore, the telecom and entertainment markets they serve tend to be critical to their customers or at least resistant to recessionary pressures.

Through October 31st, 2008, a total of 628 36 MHz transponder equivalents of capacity have been added. This capacity expansion was largely driven by the continued explosion of video content worldwide. However, other applications such as private data networks, cellular backhaul, and Internet connectivity, were important factors in addition to continued strong demand from government/military users, particularly from the U.S. While the worsening global economy could have a negative impact on near term demand, we do not see any long term trend other than continued massive acceleration in demand for satellite delivered digital bits. Even with continued advancements in compression and modulation efficiencies, demand for transponders should continue, especially for the developing nations of Asia-Pacific and Middle East/Africa markets.

2008 Advances and Accomplishments

Among the most remarkable accomplishments in 2008 was the launch of **ProtoStar**, which we understand is now in full **ITU** compliance. Starting a pan-Asian FSS company without majority Asian ownership is quite impressive.

From a future trend perspective, the other major accomplishment has to be China's entry into the commercial GEO manufacturing business and re-entry into the GEO launch market with the **China Academy of Space Technology** manufacture (**DFH-4** platform) and **Great Wall Industry Corporation** launch (**Long March 3B**) of **Venesat-1** for Venezuela. A new low cost provider of space segment capacity could lead to further national fleet additions and to more nations joining the space age,

while potentially staving off further consolidation by the “big guys”. We note, however, the flexibility, efficiency, dependability, and geographic reach of the larger FSS operators is hard to debate — consolidation is still a manifest destiny in a deregulating flat world.

2009 and Future Prospects

Going forward, leverage at FSS firms such as Intelsat and Telesat could become an issue, at least from the point of view of operational and strategic flexibility, but we do not envision any near term credit driven solvency issues at any of the major FSS operators. More conservatively levered firms like SES and Eutelsat should be able to handily weather the credit crisis and better exploit growth opportunities, although Eutelsat does have €1.3 billion of debt to refinance in November, 2011. What we believe could happen over the course of a prolonged and deep recession is that access for capital to launch new space segment capacity could become more challenging and expensive.

This could have the effect of making it harder for smaller FSS operators to grow or even replace aging capacity without relying on new lower cost systems as mentioned above. Whether this results in an environment conducive to further industry consolidation is hard to predict, but there could be less capital to support such consolidation anyway.

We suspect that the major FSS operators with their large fleets and economies of scale will still be in a preferred competitive position in this challenging economic climate despite any local market subsidization or preferential access.

As for new FSS applications, the one that is perhaps

Symbol	Company	Closing Price-11/7/2008	52-week high	Decline from high
GSAT	Globalstar Inc.	\$0.50	\$10.03	95.0 %
SIRI	Sirius XM Radio	\$0.26	\$3.94	93.4 %
TSTR	T C	\$0.70	\$8.89	92.1 %
ICOG	ICO G C	\$1.38	\$4.83	71.4 %
DISH	Dish Network Corp	\$15.52	\$50.80	69.4 %
SKYT.OB	S T C	\$2.85	\$8.85	67.8 %
HUGH	H C	\$19.61	\$60.61	67.6 %
ORBC	Orbcomm	\$2.81	\$7.87	64.3 %
BSY	B S B	\$26.73	\$53.18	49.7 %
ISAT.L	Inmarsat	£3.95	£5.85	32.5 %
SESG.PA	SES Global S.A.	€ 13.23	€ 18.28	27.6 %
DTV	DirecTV Group Inc.	\$21.94	\$29.10	24.6 %
ETL.PA	Eutelsat	€ 15.79	€ 20.50	23.0 %

Company	Yield as of Jan 1, 2008	Yield as of Oct. 9, 2008	Yield Increase
Intelsat	10.5 %	14.1 %	3.6 %
SES Global S.A.	5.4 %	7.8 %	2.4 %
Eutelsat	7.1 %	8.4 %	1.3 %
Telesat	-	16.5 %	-
DirecTV Group Inc.	6.9 %	10.6 %	3.7 %
Dish Network Corp	7.0 %	12.4 %	5.4 %
Inmarsat	6.6 %	9.8 %	3.2 %
Sirius XM Radio	11.0 %	32.6 %	21.6 %
GeoEye	10.2 %	12.9 %	2.7 %
T C	13.7 %	25.7 %	12.0 %
H C	9.2 %	11.0 %	1.8 %

least understood and most under appreciated is wireless backhaul. According to **ABI Research**, the cellular backhaul market should reach \$23 million by 2012. Over half the world's population, some 3.5 billion people, now carry mobile phones. While subscriber growth is slowing in the developed world it is also shifting to richer bandwidth applications rapidly accelerating digital traffic. In the developing regions, growth is still in the high double digits and in parts of Africa, for instance, in excess of 100 percent. What about the other

3 billion people without cell phones? Tapping this market has not been lost on entrepreneurs like O3b (which even stands for "Other 3 Billion") or its sponsor Google. Many of these next 3 billion customers live in the rural/remote areas of the world. Bringing them mobile connectivity may require substantial new satellite capacity marking a return to the original telecom purpose of satellites.

DBS/DTH

Operational Performance

The other major satellite industry driver is the DBS/DTH sector which dominates the various consumer oriented satellite service businesses in terms of revenue contribution and cash flow generation. The DBS/DTH sector had a good 2008 with continued healthy increases in subscriptions across the world. Even in the fiercely competitive U.S. market, DBS managed to gain a little more market share from cable and telcos although **DISH Network** did suffer a loss of net subscribers driven in some part by the switch of **AT&T** to competitor **DIRECTV**. These industry subscriber gains came despite earlier warnings of an overpowering threat from triple-play offerings. Apparently, providing a premium video experience through massive HDTV offerings and subsidized DVRs was enough to hold off the triple-play onslaught and new fiber/IPTV platforms for another year. Equally impressive were increasing ARPU levels and well managed churn rates. The operating results were achieved even despite materially poorer customer service rankings, a trend DBS really needs to reverse in a hurry if it is going to keep its customers in a recession. For the developing world, DTH is expanding rapidly with new satellite capacity. There are three operators now in India and China is considering launching **SinoSat-4**, its second DTH satellite.

2008 Advances and Accomplishments

The most impressive accomplishment in 2008 has to be the rapid increase in numbers of HDTV channels offered to DBS subscribers and the continued proliferation of DVRs. Building

off of 2007 efforts and continuing throughout 2008, investments by DBS/DTH operators in content and customer premise equipment has fundamentally improved television viewing for tens of millions of households. We believe these gains in picture quality and time shifting flexibility will become the new default standard and eventually spread around the world.

2009 and Future Prospects

Churn appears to be on the rise due to greater home turnover and the economic downturn and ARPU could experience pressure as subscribers look for cost savings in their household budgets. On the positive side, the February 19, 2009 analog-to-digital transition in the U.S. could result in a windfall of new subscribers. Most neutral industry observers expect many of these analog broadcast viewers to be spurred by necessity (or marketing offers) to switch to a multi-channel cable or DBS service. Who will win the lion's share of these

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new subscribers is up for debate, but it seems clear that we are talking about millions of potential new customers for DBS providers. Past 2009, we do believe the continued growth in IPTV supported by capabilities such as **SES Americom's IP-Prime**, further roll-out and penetration of services such as **FiOS** and **U-Verse**, and even improved cable triple-play packages will start to put considerable pressure on the DBS providers, particularly in the non-rural markets. To grow and thrive in that market, DBS will need to finally answer the triple-play bundle and offer its subscribers a competitive broadband and VoIP service.

MSS

Operational Performance

MSS has also seen respectable subscriber and revenue gains this year, mostly off of mature platforms like Inmarsat and Iridium, but many MSS operators face real financial viability issues. The industry requires a massive amount of new capital and yet has not achieved a fraction of the once promised 8-digit subscriber potential. Meanwhile, terrestrial coverage gaps continue to get filled in by more and more capable networks like 3G/3.5G, Wi-Fi and WiMax. Luckily, these terrestrial networks just broaden the addiction to higher and higher bandwidth connectivity to cell phones and vehicles making the need for seamless mobile connectivity more and more evident. Clearly, it's not just about voice and low data rate services anymore. Mobile users, especially enterprise, young adults and affluent consumers, are demanding broadband access everywhere for video, other rich media content, large file transfers and high bandwidth interactivity for faster browsing and even gaming.

The largest market is clearly land-mobile which heretofore has been restrained by inadequate equipment form factors (e.g. brick phones), poor usability and costs too high versus required mass market price points. Years of investment and technology evolution have come a long way to solving many of these user issues (as have restructured balance sheets). The new **Iridium 9555** phone is one example of the tremendous progress made. Demand in aerial and marine applications has also grown materially in 2008. In fact, for much of the aerial/marine MSS market the demand for bandwidth from crew and passengers has become sufficiently large to afford FSS versus MSS solutions.

The same can be said for the *Comms-on-the-Move* market where military demand for such things as imagery and mapping applications forces an FSS solution. We expect to increasingly see this blurring of MSS and FSS as mobile bandwidth requirements increase. For now it is easier to think of MSS as being the L-band, S-band business and FSS being C, Ku and Ka-band.

2008 Advances and Accomplishments

There have been several notable accomplishments this year in the MSS sector. The one with the greatest near term revenue impact was the completion of the Inmarsat-4 fleet and roll-out of the BGAN service for both maritime and land-based customers. **ICO** finally got a bird up which allows it to retain its spectrum license and do some testing. One more launch and they can lay claim to their own ATC spectrum. **ICO** also won a nice settlement from Boeing, but the market appears to be heavily discounting either the amount or timing of this windfall. On the spectrum consolidation front, Harbinger helped push an agreement between L-band competitors **Inmarsat** and **MSV** that should be a win-win for both and hopefully trigger some much needed consolidation in the MSS sector. 2008 was also a big year for **ORBCOMM**, the only surviving Little LEO. They launched 6 satellites on June 19th (5 replacement birds involving new payloads on old Orbital buses and 1 Coast Guard demo satellite) and in May entered into a \$117 million contract with **Sierra Nevada Corp.** for 18 higher functioning satellites. Finally, following the demise of Boeing's ill-fated **Connexion Mobile** internet service to aircraft, **Row 44** stepped into the gap with their own new satellite based internet to aircraft offering, which began trials on Alaska and Southwest Airlines. Competing terrestrial solutions from Live TV, Aircell and others also entered the fray.

2009 and Future Prospects

In 2009 and 2010, new more powerful MSS satellites are expected to enter service from **TerreStar**, **MSV**, **ICO** and others in hopes of satisfying this growing demand for "any content, anywhere, anytime, to anyone". What needs to happen in this time frame is smart industry rationalization. Europe is presently going through its S-band (2 GHz) licensing process with four participants so far. The one thing the world does not

need in this capital constrained economy is a build-out of four or more redundant mobile connectivity infrastructures for any region. Competition is wonderful, but hopeless redundancy makes no sense to investors and ultimately, therefore, to consumers.

The most important MSS spark that has yet to be ignited is serious interest from the terrestrial mobile providers such as the major cellular companies. The dream is that they invest in or acquire MSS providers to offer a seamless hybrid always-on service. Perhaps the past reluctance of cellular providers has been due to an underwhelming MSS market opportunity compared to the gargantuan lower hanging fruit of the rapidly growing terrestrial wireless/cellular markets.

While the relative market opportunity may still be small, a desire to better serve and thus retain the connectivity addicted may prove to be the greater motivating factor going forward. Now that MSS form factors and pricing per bit are improving, especially with the upcoming launches of new MSS satellites, it should only be a matter of time before certain niche mobile users demand hybrid services and force the hands of the cellular players. This is what many MSS investors are betting on. Just as GM's introduction of **XM Radio** in its cars quickly forced a response by Ford, Chrysler and then all other major auto manufacturers, the hope is that the first cellular domino to fall will quickly lead to a global alignment of the terrestrial and space mobile players. But, it does not have to be a strategic alignment with the cellular world. Others, such as **Google**, are looking to get into the business. The FCC, in an attempt to eliminate the "digital divide", is doing some clever repurposing of spectrum to bring about new wireless broadband services. Recently they opened up whitespace spectrum for free unlicensed use and even approved Globalstar's use of its ATC spectrum for a rural WiMax type service. The end game in the wireless world is still far from predictable.

Satellite Radio Operational Performance

Satellite radio is still a relatively small contributor to overall industry revenues. That is not to belittle the now approximately 20 million SDARS subscribers for the newly merged **Sirius XM**, but as SDARS has not proven commercially viable outside the U.S. (and maybe not even in the U.S.), it has yet to reach its full potential. In particular, this year marks the demise of much of **WorldSpace**, the very first SDARS company and developer of many of the key technologies. It is safe to say there would not be an XM Radio and perhaps not even a U.S. SDARS industry were it not for the early visionary work of *Noah Samara* and the Worldspace team. Alas, the pioneers in this industry rarely reap the full fruits of their labors.

2008 Advances and Accomplishments

The biggest accomplishment in 2008 was clearly the FCC approval of the Sirius / XM merger despite heavy Congressional and NAB opposition. Such courage and sanity in an election year is rare indeed, but the increasingly obvious and intense alternative audio competition together with a willingness on Sirius' part to accept various consumer protection provisions were enough to carry the day.

2009 and Future Prospects

In the U.S. market, Sirius XM faces a daunting \$1 billion debt refinancing before it can begin to enjoy its promised merger synergies. This is not the credit market one would want for such a refinancing, especially when your #1 distribution channel is experiencing automotive sales declines of 25 to 40 percent. Our expectation is that there is enough subscriber value to save Sirius XM, but that equity shareholder dilution will be painful if not total. On the bright side, it is encouraging to see OEMs and Delphi opposing the FCC's mandate for integrated HD/Satellite radio receivers as unduly burdensome on consumers from a cost point of view. The automotive OEMs have always preferred satellite radio, and the install fees and revenue participation, to a HD Radio alternative that is not even ubiquitous. Nonetheless, we do expect increasing HD Radio competition as someone will build the receivers. Lastly, we expect sometime in the next three years we might see an SDARS provider emerge in Europe. Europeans are increasingly becoming "united" and pan-European

and want their music options to match. Our bet would be **ONDAS**, but it could be any of the S-band competitors even if only as an adjunct to a mobile video or voice/data offering. We wish them all luck in what has proven to be a very tough business. The key may be not owning the expensive space segment, but focusing instead on the content and listeners.

Satellite Broadband Operating Performance

The surprise subscriber success story this year was the emergence of a vibrant satellite broadband sector led primarily in the U.S. by **Wildblue** and **Hughes (Spaceway)**, but also showing considerable life in other regions. **HughesNet**, for instance, finished its 3rd quarter with 420,700 customers, adding almost 15,000 net subscribers each month. We believe Wildblue may have enjoyed similar monthly subscriber growth. Europe has also joined the satellite broadband party with estimates of as many as 37 million underserved homes in the European and North African regions. **SES's Astra2Connect** launched in mid-2007 saw continued growth in 2008 and **Eutelsat** started its **Too-way** service with plans to add a new Ka-band satellite for 2010. In the U.K., **Avanti Broadband** has a new satellite scheduled for 2009. The once questionable Ka-band has now been broadly accepted as an important new industry resource to be further exploited.

2008 Advances and Accomplishments

The launch of the Spaceway III service was the major highlight of the year and a factor in satellite broadband subscriptions exceeding the one million mark. However, given that the **Yankee Group** in 2004 predicted 12 million subs by 2008, we are still a long way from living up to earlier industry projections and hype.

2009 and Future Prospects. The one thing that seems certain for the future is the eventual construction and launch of massive capacity spot beam Ka-band satellites such as the one proposed by **ViaSat**. The market demand and technological viability of Ka-band satellite broadband was proven this year, but the lingering investor concern is that of the length of the market window to enjoy an adequate return on the capital employed. The key to keeping that market window open against other gap filling alternatives like wireless broadband, DSL, cable and fiber is to substantially

lower the cost per bit so satellite broadband users can enjoy increasingly more bandwidth per subscription dollar. For that to hold, we will need 10x and eventually 100x gains in capacity per dollar.

The Stage Is Set For 2009

In conclusion, 2008 was another year of significant achievements by the satellite industry. Regrettably, these achievements have largely been lost and overwhelmed by larger global economic considerations. We are, however, optimistic about the future, as history has taught us well that while value is not always recognized when created, if true and lasting it is eventually rewarded. Or, as Rene Anselmo used to say, "truth and technology will triumph....." Speaking of which....way to go **Elon Musk** and **SpaceX** team!

About the author

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 Legal and Regulatory View

by J. Steven Rich, Attorney,
Paul, Hastings, Janofsky & Walker LLP

The year 2008 has been a time of change in many respects. Continuing turmoil in world-wide markets, for example, has created challenges for numerous companies in virtually every sector of the economy and the satellite industry has not been immune. Regulators around the world have faced challenges of their own this year, and while their actions may have sometimes been overshadowed by world events, they have nevertheless kept themselves busy addressing numerous satellite-related matters in 2008. The issues addressed this year have varied as much as the countries addressing them, and range from significant mergers to content regulation to market access. Here are some of the highlights from 2008...

North America

In the United States, by far the highest-profile regulatory action in 2008 involving satellite operators was the **Federal Communications Commission's** ("FCC") long-delayed and controversial approval on a 3-2 vote of the merger between satellite radio broadcasters **XM Satellite Radio Holdings Inc.** and **Sirius Satellite Radio Inc.**

XM and Sirius received their FCC licenses in April 1997 pursuant to FCC

rules that expressly prohibited either entity from ever acquiring the other. However, neither entity had ever turned a profit as a standalone business. The two had posted cumulative, combined losses in the billions of dollars prior to their merger.

While the FCC expressed skepticism about the operational efficiencies to be gained by the merger, as well

as certain other benefits the parties claimed would result from the merger, the FCC found the merger was, nevertheless, in the public interest based largely upon a number of conditions to which the parties agreed. For example, XM and Sirius agreed to make à la carte programming options available for the first time. The parties also agreed that the combined company would set aside eight percent of its channels for public interest and minority programming at no charge to the programmers. In addition, the parties agreed not to raise the cost of their basic programming packages for three years, and the FCC imposed the additional requirement that the combined company not reduce the number of channels contained in its current packages or new packages for three years. Finally, XM and Sirius agreed to specific timeframes to comply with preexisting FCC rules requiring that interoperable receivers be offered to consumers.

While the XM-Sirius merger attracted the most news coverage, the FCC also has spent time this year reviewing other significant transactions in the satellite sector. For example, in February the FCC approved the spin-off of **DIRECTV** from **News Corp.** to **Liberty Media**. The FCC is continuing to review the proposed acquisition by **Inmarsat plc** of **Stratos Global Corporation**.

Europe

The **U.K. Department for Culture, Media and Sport** commenced a rulemaking proceeding in July in which the U.K. government seeks to implement the **EU Audiovisual Media Services ("AVMS") Directive**. The AVMS Directive, which came into effect on December 19, 2007, establishes rules for determining the jurisdiction for satellite broadcasters located outside the EU whose broadcasts are received by consumers residing in the EU. Under the AVMS Directive, jurisdiction over such broadcasters is assigned to either **(1) the EU Member State whose satellite capacity is used to broadcast the channel into the EU, or (2) if the channel is not using any satellite capacity belonging to a EU Member State, the Member State, if any, from which the channel is uplinked to the satellite**. The U.K. government has tentatively concluded that it should include non-EU channels within its current regulatory framework and ensure that its rules can be applied to non-EU broadcasters. At the EU level, the **European Parliament** and the **Council of Ministers** enacted regulations in July that pave the way

for the implementation of the **Galileo** satellite navigation system. The regulations include authorization for a budget of €3.4 billion, to be funded by European taxpayers, and also impose security requirements and procurement rules that will apply to the Galileo system. According to the timetable contained in the rules, the first satellites are to be launched and the first ground-based infrastructure is to be installed by 2010.

Middle East and Africa

In March, the **Nigerian Communications Commission ("NCC")** took a significant step in promoting the availability of telecommunications services, including Internet access, in rural and underserved areas, by awarding a 10-year telecommunications services license to **Nigeria Communications Satellite ("NIGCOMSAT")**. Under the terms of its license, NIGCOMSAT is authorized to provide **International Data Access ("IDA")** connectivity for voice, data, or other services directly to customers, and also may interconnect with the PSTN. *(ED—Since the writing of this article, the satellite **Nig-ComSat-1** has been declared a total loss.)*

As described in the November issue of **SatMagazine**, the **Arab League** adopted a controversial set of guidelines this year entitled **"Arab Satellite Broadcasting Charter: Principles for Regulating Satellite Transmission in the Arab World."** Under the charter, a satellite broadcaster may not broadcast content that would jeopardize *"social peace, national unity, public order and general propriety."*

The charter further provides that satellite broadcasters must act in a way that protects *"the supreme interests of Arab countries and the Arab world."* Satellite broadcasters also must, among other things, *"eliminate from satellite broadcasting any material that would promote smoking and/or alcohol drinking, but rather highlight their dangers."*

Asia

The Chinese government took measured, but noteworthy, steps in 2008 to allow the expansion of satellite television broadcasting within China. In March, the **State Administration of Radio, Film, and Television ("SARFT")** announced it would allow 33 foreign television channels to be broadcast selectively within China. Under this new policy, SARFT now allows channels

such as **CNN**, **HBO**, **BBC World**, **Cinemax**, and **Discovery Channel** to be broadcast to three-star and above hotels and expatriate apartments in China.

Additionally, SARFT announced in June that it planned to loosen restrictions on satellite television use by individuals after the **Chinasat-9** satellite is launched. According to SARFT, direct-to-home satellite services will initially be offered at no charge to users located in remote and underdeveloped users in China.

The View For 2009

In reviewing the significant legal and regulatory milestones of 2008, it is natural to speculate about what 2009 may hold, even though prognostication is always risky in an industry as dynamic as the satellite sector. However, it does not require a tremendous leap of faith to conclude that regulators will continue to face many of the same challenges in 2009 as they have faced in 2008.

For example, it is likely regulators in many parts of the world will continue to struggle with the issue of content regulation, an issue made much more complex by the inherently cross-border nature of the satellite industry. Regulators also will continue to face difficult public interest issues in the context of mergers and acquisitions involving satellite companies, particularly in light of the challenging economic circumstances faced by many companies, which may make business combinations a necessity for some.

About the author

J. Steven Rich is an attorney in the Washington, DC office of Paul, Hastings, Janofsky & Walker LLP and specializes in corporate and regulatory matters involving communications, media, information, and satellite technology companies. For further information, [select this direct link](#) for their informative website regarding their services.

The Maritime Market: VSAT Rules

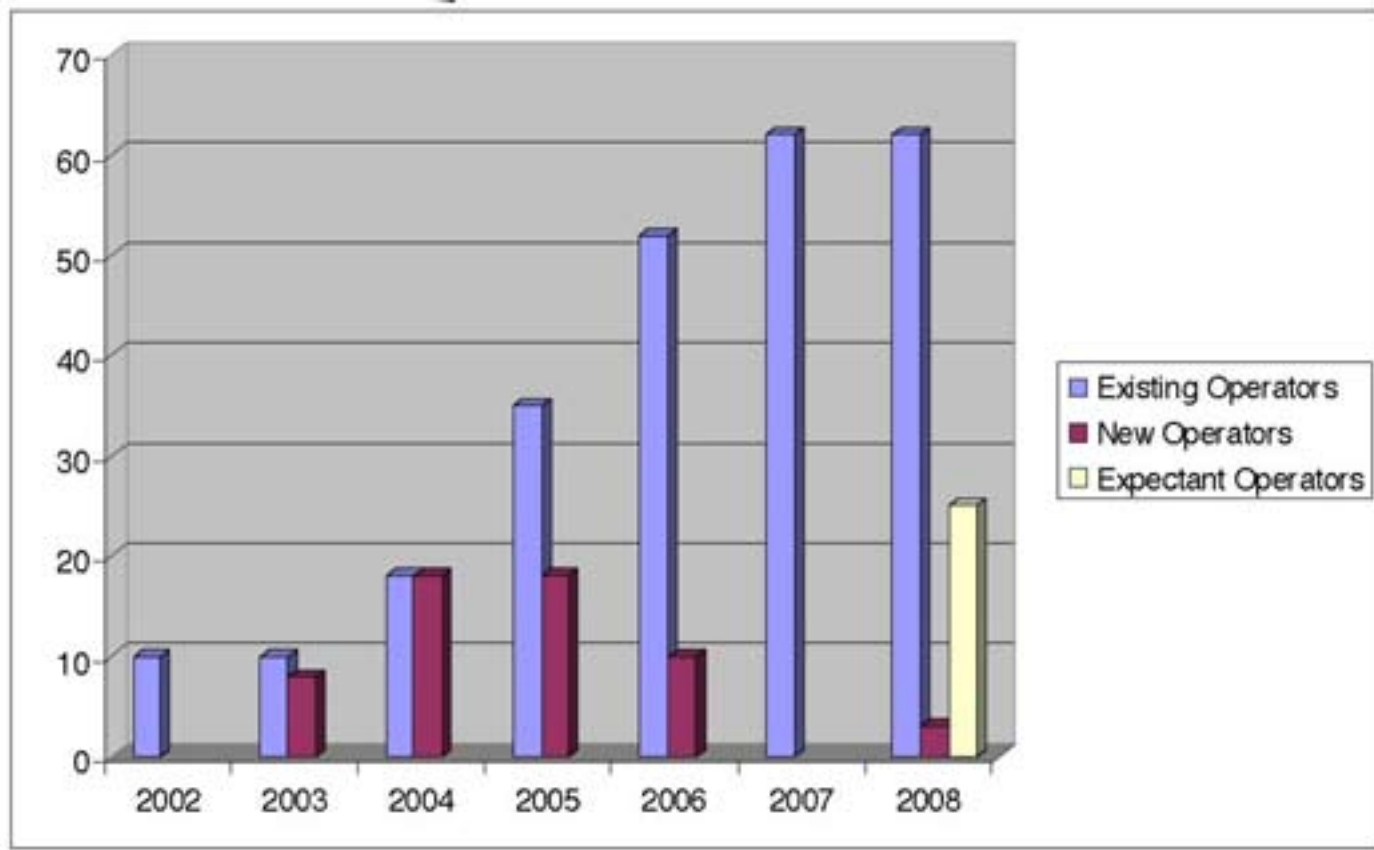
by James Dell, Co-Founder, Parallel

The Market

There are a number of segments within the maritime niche that have been well targeted by satellite vendors and these segments are now effectively saturated. These include cruise lines, oil & gas supply, and ferries. These sub segments are small in volume — less than 1,000 ships in total — but high in value. The related market in the oil & gas business includes supply vessels, drill ships, seismic vessels, and dive support services, so you can see why such should be included in the maritime market segment. CapRock, Stratos, and Schlumberger (the latter two companies are both Parallel customers) all have sizeable customer bases in this area.

to more than 90 service providers located across the globe. All are interested in providing some form of VSAT service to the maritime industry. The past four years have seen major penetrations into the next levels of the market. These are comprised of several sub-segments, regional and international in scope. There has been a fundamental change in the wider commercial market as they start to recognize broadband at sea as an essential requirement.

Most stabilized antenna VSAT services have experienced long term revenue growth at rates of between 15-20 per cent per year over the past five years. Underlying this, the customer base has considerably broadened. Average prices or margins are not as high today as they were in the late 1990s and early 2000s.



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However, recent changes in the demand for broadband at sea has increased the number of operators deploying stabilized antenna systems. These operators range from a handful of specialized companies

Of the top 12 revenue earners in this segment, six have businesses primarily focused on the oil & gas industry. With the increasing saturation of this segment, many major players have progressively moved towards

the broader maritime industry in their search for growth in vertical markets they know and within which they have developed substantial expertise.

Despite the reduction in average pricing, revenues from stabilized VSAT services (which include bundled hardware) grew to more than \$600 million in 2007. Vessels in service increased to more than 5,000 in number.

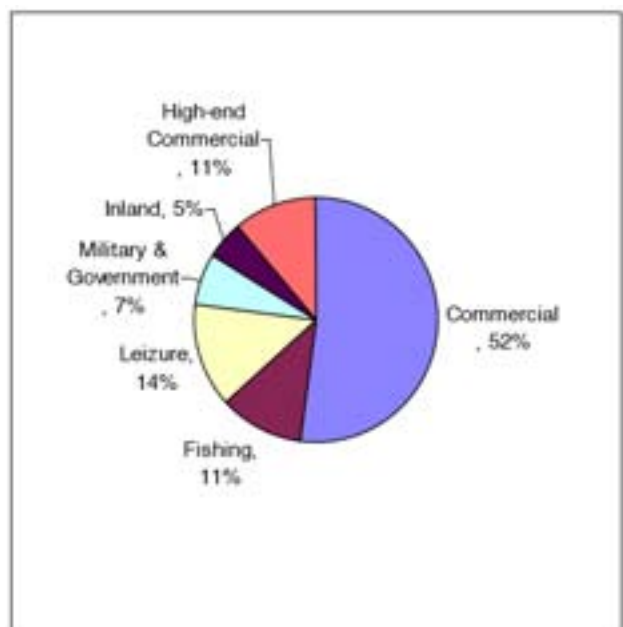
The **COMSYS Maritime VSAT Report** analyses the total available maritime market based on their own primary research, publicly available data, specific data points from industry contacts, and specifically commissioned research by maritime industry consultants. The report reveals there are almost 150,000 vessels of all types. More than 20 per cent of these vessels are potential customers for VSAT. The segmentation of these vessels can be seen in the pie chart on **Page 32**.

For many years, communication at sea has been expensive and generally considered a luxury. Use of service has, as a consequence, been carefully monitored and controlled. Today, flat-rate broadband connectivity is becoming a necessity in order to recruit and retain crew. This has quickly strengthened the case for VSAT as an alternative to the established maritime satellite services that have dominated to date.

The Strategy

To become successful in the Maritime industry, a satellite communications strategy was required that offered key differentiations from the other companies in, or aiming at, this market segment. For **Parallel**, a Maritime specific module with demonstrable ROI was built and added to the company's **SatManage** product. The aim was to achieve a 40 percent market share by the close of FY2010.

The key module of SatManage is *Location Tracker*. A customer can easily determine where the mobile terminals have been located, where they are heading, as well as obtain a graphic view of each terminal's current status (red/green up/down). The latter data is equally useful for static assets.



Pop-up panels (**screen shown below**) reveal the location and heading of terminals at regular time intervals. Information pop-ups include all-important live and historical indicators, including lat/long data, RF and IP performance. The module's built-in database tracks out-of-transmission coastal areas or embargo areas. When a mobile VSAT terminal enters one of these areas, SatManage can raise a variety of alerts. Available in 2D and 3D interactive versions, SatManage allows

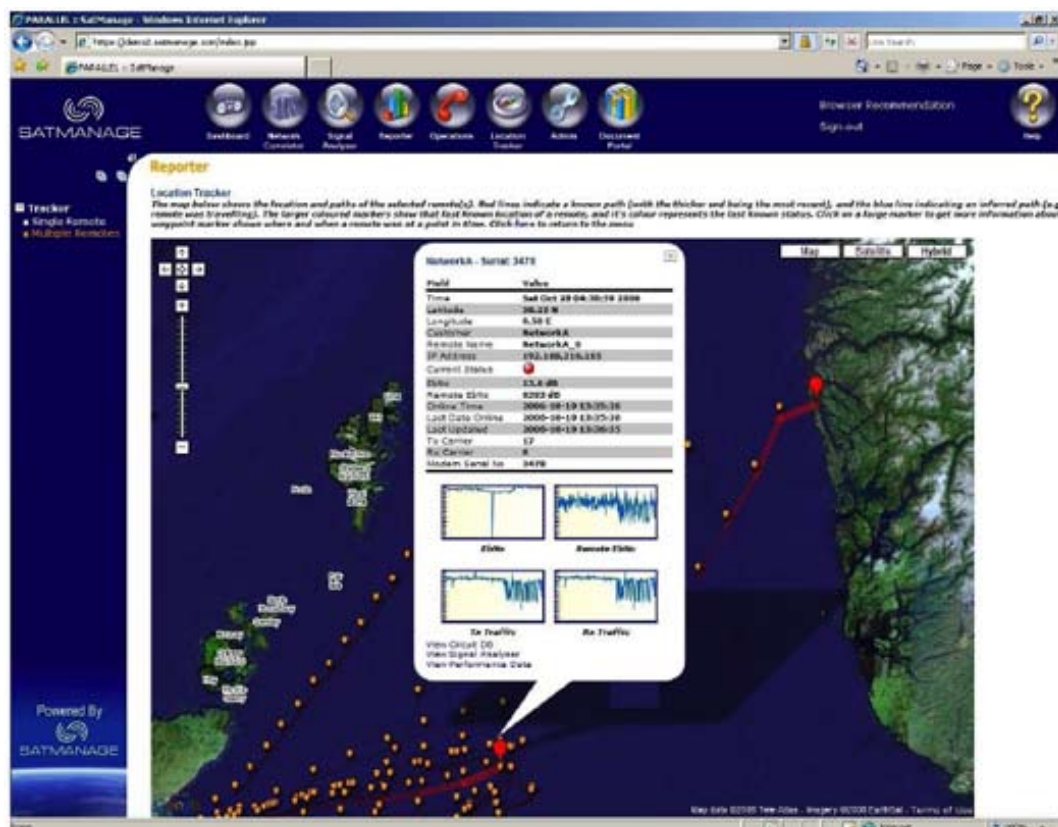
for the real time overlay of external data sources including weather, radar, roadmap, satellite footprint, embargo areas, and imagery or custom overlays.

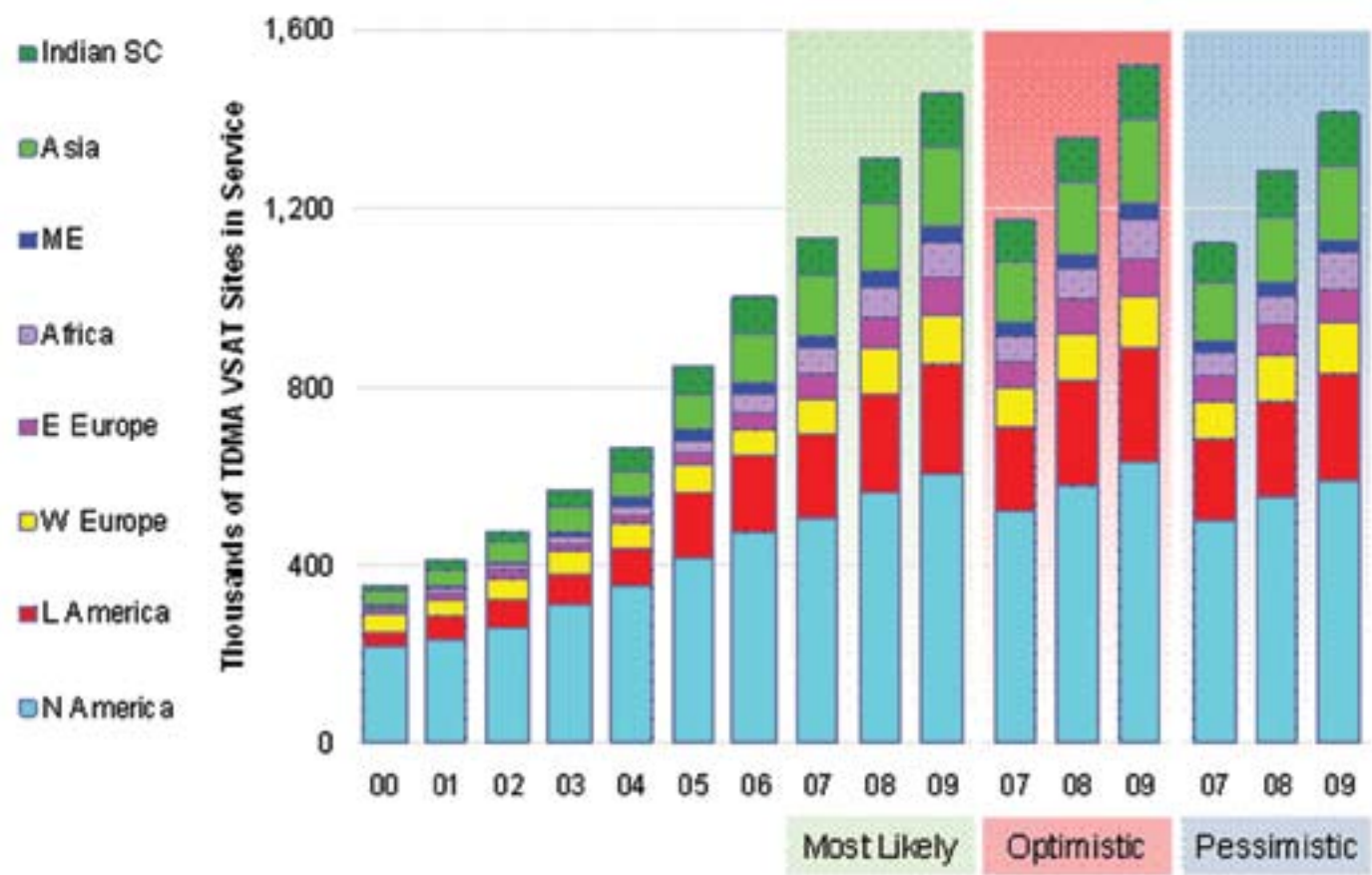
Many Maritime Operators will require the services of several satellite providers, an added complication when compared to static sites. Crossing satellite boundaries from one provider to another must be carefully managed — connectivity must be maintained. SatManage allows Operators to monitor the vessel's heading and to instantly determine when it would be sensible to transition to another provider.

Another complication of having moving assets (especially for sea going vessels) is the requirement for the

services of several Hubs and, with that, several **Network Management System (NMS)**. Running a simple report for a vessel can require the Service provider to extract data from the various NMS' of the various Hub Operators. This results in many hours of work to produce what should have been the simplest of reports.

SatManage integrates with all NMS' and stores the data in a central database. This allows reports to be instantly generated on any needed basis (i.e., per vessel, group of vessels, etc.)





TDMA Sites in Service 2000-2009

In addition, the Operator no longer needs to know which provider's NMS is required for system configuration, commissioning, and so on. SatManage seamlessly launches the right tool for the project by selecting the appropriate application. All of these actions are handled from within a secure web portal.

One of the primary factors driving shipping companies towards VSAT services as a more economical alternative to satellite phones is crew welfare. The SatManage **INTRA** probe can be setup for reporting on a per service level. This means the services that improve crew welfare can be carefully managed on a per service basis. The probe works at a low level and provides data on all IP information, including VLAN traffic. The crew's ability to access the Internet and remain in touch with family on shore plays a major role in staff retention. With Location Tracker, families can be authorized for read only access — they'll be able to see where their loved ones are located and know when to prepare for their return home.

A Case In Point

Ship Equip is one of the fastest growing **iDirect** users in the shipping industry and has become the second largest maritime satellite communications operator (in terms of the number of vessels under contract) in less than four years after entering the business. They provide services on the iDirect platform as a *Virtual Network Operator (VNO)* and offer full, global coverage via several hubs, including **Argiva** (U.K.) and **Intelsat**.

Ship Equip recognized that to fulfill their growing business, they required increased resources. They searched for a solution to minimize resource requirements without impeding contract fulfillment and revenue growth. SatManage assisted with this need, by acting as a manager of managers, integrating all existing tools and vendors across the entire Network Operations Centre into one fully automated 'umbrella system', or portal. This significantly reduced operating manhours and added desirable features.

One of the key issues facing Ship Equip was their use of services on multiple satellites, each with its own **iDirect NMS**. Preparing a report to view the number of active iDirect sites meant manually collating data from each NMS — this could necessitate two days of work. SatManage works with iDirect systems directly out of the box and makes all reports instantly, available all of the time, no matter how many NMS' are in use or what the versions mix. This is extremely important to companies such as Ship Equip, who use the services of several bandwidth providers with a number of mixed iDirect NMS versions.

SatManage provides a consolidated, agnostic view of the entire global network infrastructure. These capabilities help Ship Equip achieve their growth strategy with greatly reduced human resource requirements.

Morten Qvigstad, CTO, Ship Equip AS, says:

"SatManage will enable Ship Equip to reduce internal running costs through the advanced automation that it provides. Our customers can expect to see an improvement on what is already a class leading quality of service. We are the best in the industry and SatManage will enable us to extend that lead".



About the author

James Dell founded Parallel with partner Tim Moore in 1997. Growing from its network management roots, Parallel is today a specialist in NOC automation and integration for hybrid networks which have satellite components and diverse system platforms. James is a father of three girls and has varied interests including Paragliding, Weight training, Squash, wining and dining, cinema and local youth work. He can be reached at...

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The Age of Uncertainty

by Robert Bell, Executive Director,
World Teleport Association

Collapsing investment and retail banks. Plummeting stock markets. Rising unemployment.

Aside from that unattractive news, how was 2008 for you? More importantly, what do you expect from 2009?

SatMagazine is hardly alone in asking these questions – but the answers it offers may be different from what you read in the rest of the press.

Based on 25 years in business, the one thing I do not expect is that this will be a one-size-fits-all recession.

While we're on the “**R**” word, let's repeat it again. “**Recession**.” Not “*depression*,” as in “*a recession, maybe a depression*”, or, “*the greatest financial crisis since the Great Depression*.” How many times have you heard those phrases from radio and TV journalists in the past 90 days? Hundreds? Thousands? It's little wonder, then, that consumer confidence tanked!

Tell people often enough that another Great Depression is around the corner and they start to believe you. However, it's nonsense. The Great Depression was the product of terrible government policy – tightening credit in a downturn and launching an international trade war – that turned a stock market crash into a years-long nightmare. The private sector may be mighty, but only governments retain the power to thoroughly mess things up. Whatever is ahead, the central banks, the treasury and us officials of the industrial nations know why the Great Depression happened and what not to do next. Let's please put the word “*depression*” back in the box where it belongs.

Now that I have that off my chest, back to our story...

Market indexes, unemployment levels, consumer confidence, and corporate revenue numbers are signaling we are in for a bad patch. When I say that one size will not fit all, however, I am remembering the recession of 2000-2002. That was the “telecom recession,” when massive overbuilding of fiber networks led to overcapacity, bankruptcies, and broken contracts throughout the terrestrial and satellite communications sector. That one was an arrow aimed straight at

the heart of the satellite industry. The price of fiber capacity plummeted and all those transponder and uplink contracts to carry IP traffic dissolved in the face of the truth: that demand for Internet bandwidth was not growing at 100 percent per year, as was then the common wisdom. None of us wants a replay of those particular years.

This is not the telecom recession. It is a financial services downturn, a housing downturn, an automotive downturn, a surge in the cost of credit, and a downturn for the industries that make the durable goods that go into new homes. About 35,000 financial service employees in New York City, where our office is located, have lost their jobs. The city is forecasting the ripple effect could ultimately cost 165,000 local jobs. The Mayor is recommending serious budget cuts and predicting that he will be back in a few months to ask for more. That's going to be very tough for New York. A U.S. unemployment rate that reached 6 percent in October and could go as high as 8 percent in 2009 will be tough for many Americans.

What will the employment figures look like for the satellite business? It's far from clear.

As of this writing, companies in the sector are reporting “steady as she goes” numbers and forecasts. On October 27, **SES** reported continued strong results for its first nine months and the expectation that growth would continue, based on 10 new or replacement satellites in the pipeline. Intelsat, probably the company most challenged by the end of the era of cheap debt, reported record quarterly revenues in August and a record backlog of \$8.5 billion. In April, admittedly a long time ago, **Eutelsat** forecast compound annual growth averaging 6 percent through 2011, based on adding seven new satellites to a fleet serving the most capacity-constrained region on the planet.

The small number of publicly-owned ground segment operators are also issuing decidedly non-recessionary results. On October 30, **RRsat** of Israel reported 34 percent growth in its third quarter revenues to \$20 million and a record \$178 million backlog. **Globe-comm Systems** reported record revenues of \$196 million for the year ended June 30, up 30 percent from the prior year. Its first quarter revenues, reported in

November, were flat from the prior year, but included a 21 percent increase in recurring services income.

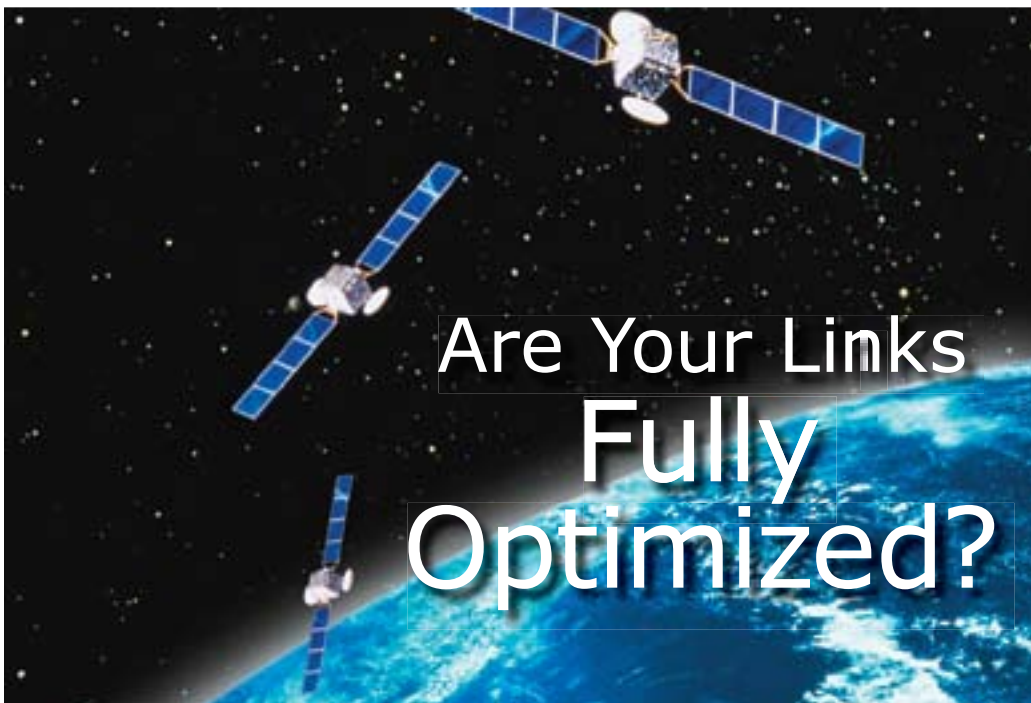
Raymond James analyst *Chris Quilty*, in a November 7 research note, maintained the firm's "strong buy" rating on the stock of Hughes, despite the expectation of higher customer churn in the next three quarters, due to a low price-earnings ratio and forecast EBITDA growth of 30 percent in 2009 and 46 percent in 2010.

Can it all go south? Yes, and in a hurry, as we have seen in the global financial markets. Is the communications business just enjoying a respite before the ripples of recession to reach us next year? Possibly so. However, communications, whether one-to-many broadcast or vast peer-to-peer networks, have become so essential to every aspect of economic and personal life that hard economic times may actually increase demand. People watch more television in bad times. Businesses defer travel and, increasingly, may opt for video as a far-less-costly alternative. Distance learning, remote monitoring, and other applications that substi-

tute digital bits for the movement of people or materials, will all get a boost.

Cisco Systems reported on November 6 that its October revenue fell 9 percent compared to the prior year and forecast a 5-10 sales decline for the quarter. It's almost certain the people responsible for marketing Cisco's revolutionary Telepresence videoconferencing system are upping their sales forecasts. And while television advertising revenue is sure to take a hit, with its knock-on impact on the broadcast networks, the satellite industry, as a whole, is far less dependent than it was even eight years ago on free-to-air TV spending.

WTA's 2008 research (*New Markets, New Services, New Competition*), published in October, revealed that, for teleport operators, only 35 percent of the sector's revenues come from media and entertainment, while enterprise, government, and carrier markets together now contribute 47 percent.



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Do you have satellite modems that have been operational for several years? While the units are functional, you may not be taking advantage of the latest methods to optimize your satellite links. The advanced technologies available in Comtech's industry-leading modems can help you minimize operating costs and maximize transponder utilization. With the monthly savings you can achieve, the new equipment purchase can be easily justified.

Which modems and technologies are right for your network? Use our Bandwidth Optimization Tool to run link configurations to determine which products could best serve your needs. Access this free tool via the link below, or give us a call and we will assist you in the product selection process.

Certainly 2008, despite its surprises, has been a good year for our business. Looking forward toward 2009, optimism may not be justified — but neither is the world crashing down around our ears. Mostly, we will have to wait and see – and get used to living in an age of uncertainty.

About the author

Robert Bell is Executive Director of World Teleport Association (www.worldteleport.org). WTA is headquartered in New York City and has members – teleport operators, satellite carriers, fiber carriers, and technology suppliers and integrators – in more than 20 nations. Robert welcomes your comments at rbell@worldteleport.org.

Teleport photo courtesy of atrexx, Germany

Year in Review: 2008 + Year in Preview: 2009

As stated in the **UPLINK** magazine opener, we were able to avail ourselves of industry-leading expertise from company executives who delve into last year's performances and offer prognostications for next year. The following pages (39 to 56) provide you with the expertise of those knowledgeable in specific subject matters within a broad range of disciplines and companies.

These fine folk have succeeded in various business realms and they review what occurred within their companies last year, what they believe may transpire in 2009, and how their companies are fairing as we approach the New Year.

The general concensus? 2008 was a good, to outstanding, year depending upon the sector, while 2009 holds a cautionary note. As has been indicated, the global economy is subject to various and sundry vagueries every day, and to accurately foretell occurrences next year is simply not a current feature built into the human genome, no matter the experts' position within a company. However, as we talk to numerous industry analysts, leaders and professionals, the observation we can make through these contacts is one of guarded optimism — what is now occurring is a *recession*, not a *depression*, as Robert Bell of the **WTA** so aptly stated.

With the need for the citizenry of our globe's various countries to conserve their funds, many opt to remain at home for their various entertainments. Communication will always be a crucial component of spending, and as such is also the vehicle by which digital broadcasting is delivered — satcom rules.

Within the military, government agency, and NGO environs, priorities shift, but the basic spending programs remain in tact — government "oversight" could alter some existing pathways, but in order to negate one service, another, perhaps even better program is initiated. Increased demand for surveillance, intelligence, Earth observation, first responder tools and more ensure miltascom will continue to garner business for our industries — *Hartley Lesser*

Asia Broadcast Satellite

by Thomas Choi, CEO



2008: During the past year, **Asia Broadcast Satellite (ABS)** witnessed unprecedented business growth in several areas. Satellite use increased from 50 to 95 percent and satellite coverage on **ABS-1** satellite increased to more than 100 channels. This resulted in ABS becoming one of the top satellite distribution platforms for CATV

distribution in the Indian Ocean Region. ABS invested more than \$5M in teleport facilities for video and data distribution services, as well as in MCPC platforms to access the ABS-1 satellite from Germany and Hong Kong, employing MPEG-2/DVB-S as well as MPEG-4/DVB-S2 for standard definition (SD) and high definition (HD) video distribution for customers. From the orbital position at 75° E, four-fifths of the world's population can access this service, which brings significant value to ABS customers.

2009: There can be little question the satellite market in Asia will continue to be a fiercely competitive landscape, especially with the emergence of new domestic operators as well as other regional operators entering the market. The days of paying premium for one or two satellite positions for a pan-Asian distribution will diminish over time. As the capacity on ABS-1 remains extremely tight, the Company will be leasing capacity from other satellite operators (until the launch of ABS-2) with whom they have good business relationships, in order to offer value added services in a few key Asian countries. The years of 2009 and 2010 will be all about growth of value added services.

ASC Signal Corporation



2008: Back in January of 2008, the former **Andrew Satellite Communications Group** became **ASC Signal Corporation**, with the financial support and other corporate resources of **Resilience Capital Partners**. ASC Signal Corporation manufactures antennas and RF electronics for enterprise and consumer satellite communication applications. The Company's product line of antennas range from 45 cm to 9.4 meters and feature solutions for the VSAT and Earth Station Antenna markets. ASC Signal signed on a master distributor for all of their products in the Middle East and North African (MENA) markets. That distributor is **MenaNets**, based in Dubai and in Beirut.

In November, the Company relocated their **Earth Station Antenna (ESA)** engineering, customer support and product line management staff to a new facility in Plano, Texas. The new building features office and laboratory space that will be used for the company's development of antennas, feed systems, antenna controllers, and earth station systems. In addition, at a nearby location, ASC Signal has a high performance antenna test and range facility that supports the testing and measurement of antennas from sub-meter to 10 meters in diameter, at frequencies from S- to Ka-band.

2009: Facing next year, with the Company already offering a presence in Chile, Perú, Colombia and Venezuela, they plan to extend their market coverage to Mexico and the Caribbean. Plus, expectations are high for their services in the Middle East and North African region, which is poised for dynamic growth next year due to an increasingly active market with a diverse economy.

GATR Technologies

by Dean Hudson, Marketing Manager



2008: Who would have thought anyone would take a big round “beach ball” satellite antenna seriously — but that is exactly what’s happening!

In 2008, more and more interest was generated by GATR Technologies’ inflatable satellite antenna, which is a unique piece of high-technology engineering that performs “like a champ” against rigid dish antennas of its size and class. The difference is that this 2.4 meter inflatable antenna system can be packed into two airline-checkable cases, easily transported (even in a small car), quickly setup by a single person, and on-satellite in less than an hour. Similarly, the system (known as the GATR) can be deflated, packed, and ready to go in as little as 15 minutes. During 2008, GATR’s target satellite communications markets (Military, Broadcast, and Humanitarian Assistance) grew significantly. This was the result of GATR possessing the ability to deploy a large aperture antenna quickly and almost anywhere, as opposed to procuring a special-purpose satellite truck, transporting a truckload of large, heavy cases, or having to tow an antenna behind a vehicle.

2009: GATR believes the remote communications industry will remain strong, considering the wide variety of events and situations that have demanded remote, high-bandwidth, high-gain communications during the past year. GATR finds new uses for all or part of its systems and is looking forward to several international deployments worthy of an “Industry First” accolade for deployable SNG systems.

Global Protocols

by Nick Yuran



2008: Global Protocols enjoyed record growth and profits again in 2008. This was due in very large part to the U.S. military’s contin-

ued commitment to the *Space Communications Protocol Standards (SCPS)* the standard in tactical satellite programs. As a vendor of a standardized technology, the Company has always been at the mercy of our customers’ willingness to adhere to the standard.

The **SkipWare** line of SCPS acceleration products entered the market more than six years ago and Global Protocols gambled that the DoD would adopt and adhere to this standard and that it would become an integral component in large tactical satellite programs for years to come. Fortunately, the gamble paid off. Today, SCPS continues to thrive as a requirement across most DoD satellite systems. It is specified for programs that extend well into 2012 and beyond.

2009: The award of key military programs, coupled with SkipWare’s continued presence in the DoD’s primary satellite services facilities, led to unprecedented growth for the Company in 2008 and has positioned Global Protocols extremely well for continued opportunities in 2009 and beyond. There are several new partnerships and licensees currently under negotiation that should come to fruition in early 2009. The Company intends to ride the momentum of 2008 into 2009, as more products are introduced within the SkipWare line. Global Protocols will move into new and previously untouched satellite markets as well as debut new, expanded rosters of SkipWare licensees.

Globecast Worldwide

by Christian Pinon, Chairman & CEO



2008: Despite the current economic climate, GlobeCast has managed to grow by more than 5 percent pro forma this year. This is a significant achievement in a period when everybody in the industry is aware that signs of downturn could have a negative impact. Additions to our fiber and satellite network and this summer's Beijing Olympics have

contributed to significant growth in both our distribution and contribution activities.

On a regional level, Asia has seen the most dramatic growth, with a 25 percent rise in revenue resulting from both the Olympics and the general dynamism and growth that is continuing in that part of the world. Growth in regions where we are more established, including the U.S., has been more moderate compared with the fast-growing Asian market. This represents a significant success for GlobeCast considering its current market position and the growth we have seen in these regions over the last few years. This success derives from our increased global presence, our network agnostic offering and our ability to add more value to the traditional offer of content distribution.

2009: TV, specifically TV distribution, will be the only driver for market growth. Innovations (Ka, mobile) will materialize, technically speaking, but this technological push will not trigger significant additional growth. Historical trends will be confirmed, meaning that the GEO satellite industry will be increasingly dependant on the television market, where growth will remain strongly correlated to the global economic growth.

Hughes Network Systems

by Dr. Arunas Slekyas, V.P.



2008: This was a year of change. In the political realm, the enormous power of the individual to effect change has been confirmed yet again. Economically speaking, the painful, and most unwelcome, global financial meltdown may yet prove to be a catalyst for positive change in how we do business, how we govern ourselves, and underlying it all, how we communicate better on this tightly coupled planet we call home.

At Hughes, our mission has always been to innovate and create positive change. Since inventing VSATs over 20 years ago, we've maintained market leadership as the world's largest provider of broadband satellite networks and services, with more than 1.5 million systems shipped to consumer, small business, enterprise and government customers in more than 100 countries. And, this past April we initiated commercial service on **SPACEWAY® 3**, turning Hughes overnight into a fully integrated satellite service provider.

Closer to home, Hughes has partnered with Florida-based America's Emergency Network (AEN) to deliver a satellite-based emergency communications' system powered by the nationwide **HughesNet** service, which has been successfully streaming real-time news briefings from numerous state and local operations centers since the onset of the hurricane season. AEN's service provides residents with access to news, preparedness, and recovery advisories issued by the governor and other state officials by streaming live, storm-related briefings from Florida's Division of Emergency Management in Tallahassee and the Village of Islamorada, and from operations centers in various counties,

iDirect

by David Bettinger, Chief Technology Officer



role to drive communications advances in numerous vertical industries. Our customers have eagerly turned to our advanced DVB-S2 product line in order to expand their businesses. We have also extended our vertical reach, supporting crucial technological advancements in the cellular backhaul, maritime, mobility, and government industries. For iDirect, 2008 was a year to continue strengthening the core technology of our platform. One of our biggest accomplishments in this regard was the launch of our next-generation DVB-S2 product line — Evolution. Built on DVB-S2 with Adaptive Coding and Modulation, Evolution gives service providers an affordable solution that's easy to implement and maintain.

2009: We will continue to expand the addressable market for VSAT in enterprise and government markets, creating new op-

portunities for our partners around the world. We will work closely with industry leaders like Ericsson and Panasonic to develop integrated solutions that meet specific market challenges. We remain committed to the advancement of our platform and will continue to develop new technology, introducing new features that will expand our focus in vertical markets, and support business applications that require high-speed connectivity.

Integral Systems, Inc.

by John Higginbotham, CEO and Director



2008: It's important to take a look forward to the opportunities and technologies for 2009 for both the company and, even more importantly, our industries. Taking the macro-view, the space in-

ket perspective, the current economic environment will push customers to seek to increase efficiencies in their existing assets, both platforms and bandwidth. The business model of this industry will — and must — change. The companies that will excel in this environment are those, like Integral systems, that are able to combine strong systems engineering skills with commercial best practices to drive new levels of productivity and capability to the customer.

dustry has gone through several waves of growth. The first wave began in the mid-1940s, lasted through the 1960s, and established the fundamental industry architecture. The 1970s ushered in the second stage of growth with the development and deployment of technologies such as satellite telecommunications, geolocation (GPS), and remote sensing.

Today, we stand on the edge of a third wave. We are entering a period where we will see mature commercial business models integrated with the advanced capabilities of the industry. The result? Customers across all markets and in virtually every developed economic sector will see new levels of usability and efficiency in their operations.

2009: From a technical perspective, we see the convergence of SATCOM with telecom systems, the rise of intelligent networks, and the advent of converged media. While from a mar-

Intelsat General Corp.

by Kay Sears, President



2008: One of the most important accomplishments has been broadening our thinking from a “bandwidth only” perspective to much more of a solutions-oriented mindset. We started to look more deeply at the government’s mission, and to more fully align our capabilities and expertise to meet those challenges, and to develop a best-solutions approach to those challenges. We

went a long way in 2008 to build a trusted relationship with our partners and customers, which will carry us in 2009 toward the fulfillment of more complex service offerings, such as customized network solutions and hosted payloads. We are very much intertwined with our customers’ successes. I was able to see across the different departments, not just in sales and marketing, but in engineering, program management, satellite design and execution. It confirmed my belief that a trusted relationship with the DoD and our commercial partners is required to support the warfighter and critical end users.

2009: We have a three-pronged vision: First, we want to be a trusted partner with the U.S. government. Such a relationship allows us to invest in core infrastructure like satellites, teleports, and ground systems in an effort to serve them in the future. Secondly, we want to be solutions-driven, and will focus on aligning our capabilities and expertise to meet the Government’s mission and commercial customer’s requirements. The third component is to provide hosted payloads, which leverage our build and launch cycles, and gives the DoD and the U.S. government the ability to add new on-orbit capability with every satellite we launch.

Iridium

by Matt Desch, chairman + CEO



2008: This has been a banner year for Iridium, marked by strong market demand, growth in revenues and subscribers, and the launch of several innovative products and services. A number of new strategic partnerships as well as recent certifications and regulatory approvals are opening new market opportunities. Iridium also announced a financial transaction that will help

to secure its long-term path forward. Our company’s status as the only provider of truly global voice and data communications continues to be a differentiating factor when it comes to growth in the mobile satellite services (MSS) market. This year, we benefited from strong usage in our key vertical markets as well as increased demand from enterprise organizations that depend on Iridium for global communications. Our usage really grew in 2008 as well, and we haven’t seen a falloff in recent months. In the first half for example, voice traffic in Asia was up 82 percent, in North America 50 percent, and in Europe it was up 45 percent.

2009: In August, we selected two companies, Lockheed Martin and Thales Alenia Space, to participate in the final phase of the procurement process for Iridium NEXT, our next generation satellite constellation. The final phase will last approximately nine months and we expect to award a full-scale development contract for Iridium NEXT with one prime contractor by the middle of 2009. Through Iridium NEXT, we will offer a flexible array of new services in addition to continuing our current scope and high-level of service. Iridium NEXT will maintain the company’s unique and advanced cross-linked satellite architecture.

ISODE

by Will Sheppard, V.P., Marketing



iside

2008: Core to Iside's business are directory and messaging server sales to a number of key verticals, including aviation, government and military. The past year has seen us consolidate our position as the primary supplier of X.400 messaging server products to the aviation ground-to-ground messaging market with a vast majority of countries that have adopted the new ICAO stan-

dard for messaging (AMHS) choosing to deploy systems from Iside partners. By leveraging and expanding on our expertise in the field of X.400 messaging we've been able to secure a number of key, though currently confidential, contracts in the military messaging sector. Our directory server product **M-Vault** (an LDAP/X.500 directory) is often deployed in support of messaging systems as well as independently. Features added during the course of 2008, including support for security policies, have meant that M-Vault continues to be in high demand in industries where security and reliability are essential.

2009: There are a number of key market drivers which we expect to continue to make their influence felt over the next 12 months. With NATO expansion, we're implementing messaging and military directory systems based on NATO messaging and directory standards. Coalition operations spreading the demand for NATO-compliant systems to countries in geographical areas well outside of NATO's traditional areas of operation. An increase in the demand for messaging system integration and constant availability, regardless of the environment, as part of better situational awareness being demanded by deployed force commanders.

Newtec

by Serge Van Herck, CEO



Newtec
SHAPING THE FUTURE OF SATELLITE COMMUNICATIONS

2008: The impressive growth of HDTV and IP traffic is further boosting customer's demand for satellite capacity around the world. The satellite capacity supply is growing as well but much slower than the demand; scarcity is therefore increasing transponder costs. Satellite service providers, broadcasters, telecom operators and ISPs struggle to find adequate satellite capacity

and struggle to grow the profitability of their business. 2008 has been an unprecedented growth year for Newtec and was the year of the breakthrough for broadband consumer access in Europe. **SES Astra** has successfully introduced their consumer broadband **AS-TRA2Connect** service using Newtec's award winning **Sat3Play™** technology.

2009: The recent commercial launch of our **Elevation FlexACM** product is creating new business opportunities for our teleport customers around the world. By at least doubling the available throughput on existing transmission equipment and more importantly also by providing an up to now never achieved 100 percent link availability, this new technology is key for improving the business case of many customers. The implementation of higher return speeds through a new modulation and coding scheme in our broadband IP access Sat3Play® product line, will enable our customers to extend their offering from consumer applications to professional applications as well. The transition towards the tapeless news production environment is changing the SNG video world. Satellite contribution links are migrating towards IP and need an easy to implement bidirectional link. Newtec's **Azimuth** products are doing the job.

ONDAS Media

by Dave Krueger, CEO



2008: This was really a landmark year for **ONDAS Media** in which we restructured the company and reoriented its strategy in almost every aspect that included. Our refocus on OEMs led to two car deals (**Nissan** and **BMW**). We also refocused the Company's regulatory strategy and formed partnerships that will carry us forward. Market research was used to redefine our content

strategy and to form lasting partnerships with industry leaders. all the while leveraging this progress to engage a major investment bank to address the fund raising aspects of the business. Significant progress for ONDAS including signed OEM contracts with an enterprise value in excess of 1B euros. We witnessed factory installed radios in autos for more than five million drivers. There was significant technological progress as we now have teams of 20 to 30 people working in Germany and Japan to integrate radios into every type of vehicle sold in Europe, from sub-compacts to the most elite luxury car.

2009: Looking forward, ONDAS intends to satellite broadcast to its Pan-European service area 24x7. ONDAS plans to offer more channels, greater diversity and a broader reach of programming than currently exists in each market in Europe. There will certainly be more car deals, the launch of services on the Internet and terrestrially, the use of satellite transmissions for OEM testing and the fund raising necessary to pay for these enterprises. The Company aims to take advantage of the significant signal processing gains and compression coding advances developed by the music, video and internet industries over the past five years to deliver its content offering.

Operationally Responsive Space Office

by Dr. Peter Wegner, Director



2008: Since May 1 when I became the Director of the Operationally Responsive Space Office, a DoD level office, the ORS has delivered and come closer to its main objective of "Assured Space Power Focused on Timely Satisfaction of Joint Force Commanders' (JFC) Needs." Specifically, ORS has two main goals: **1)** to satisfy the needs of the JFC, and **2)** to develop the enablers to allow for rapid development, deployment

and operation of space assets to support Joint Force Commanders' needs. The ORS Office has proposed concepts for three JFC needs to date that involve; commercially hosted payloads for UHF Satcom; use of existing assets for *Space Situational Awareness*; and rapid development of a new system for *Intelligence, Surveillance, and Reconnaissance*. Each of these solutions will bring us closer to the goal of delivering a space capability to the warfighter in six days.

2009: Our next big event is the launch of **Tacsat-3** at the end of January, a hyperspectral imager managed by the **Air Force Research Laboratory**. We also awarded several contracts through a Broad Agency Announcements that will be evaluated for follow-on efforts. As JFC needs are presented to the ORS office, new opportunities for support will be announced for industry participation. We also look forward to continued industry support in the **Open Systems Standards Consortium**.



MITEQ

by Howard Hausman, President



2008: Segments of the market have been changing as users switch to L-band modems and less expensive block converters. MITEQ supports this change and supports the technology with a

line of high quality block con-

verters as well as a diverse offering in synthesized converters. As we have done in the past, we support our customers with converters in the standard frequency bands, which are very competitive, and the less popular frequency bands, still at a reasonable cost. This diversity of product, quality of product, and customer support, is key to our healthy performance.

MCL, MITEQ's High Power Amplifier Company, also had a successful year targeting higher power **Traveling Wave Tube Amplifiers (TWTA)** in single and multi-band applications.

2009: HDTV and the Internet continue to be the requirements that are pushing the satellite communications industry. Both these applications demand more bandwidth and, unlike fiber connectivity, satellite communications have limited available spectrum.

After optimizing the available spectrum in C- and Ku-band, the industry is pushing into Ka-band as it opens a considerable amount of available spectrum. Operating in this spectrum is not free of problems, however. Some examples of these are higher components cost, lower available HPA power, large weather related atmospheric losses, and more.

Orbit Technology Group

by Yossi Levy, Senior V.P., Sales



2008: Though the global economic downturn has impacted everyone, **Orbit** has been able to continue building, developing, and solidifying its offerings and services. This year, we continue to build on the success of the **OrSat** antenna system that has now established itself as the leading 1.15-m Ku-band *Stabilized Antenna System*. In fact, in the past two years, OrSat established a unique status for an antenna of its size, gaining **Eutelsat**, **IntelSat**, and **Anatel** approvals. OrSat is now ready for

use as a *Global-Ku SatCom* system which makes it the only antenna system in the world of its size that has been both fully tested on the global route as well as type approved by all satellite companies that cover this route. In addition to our main thrust of activity, **Marine SatCom**, Orbit continues to develop its other two Satcom product lines for Airborne applications and for Trains, proudly positioning itself as a one-stop-shop for all Satcom Solutions.

2009: Orbit will unveil a new, small maritime stabilized antenna system, a 60-cm Ku-band antenna ready for Global-Ku coverage and intended specifically for small platforms. Later in the year, we plan to unveil our new **Stabilized Mobile Satcom Antenna** that is specifically designed for trains. This is a real breakthrough in the field with no matching competitive alternatives on the market. The new system has already been successfully tested and approved by a leading European rail service provider. We take great pride in being the first company to offer this exciting product that was conceived from its inception specifically for use on trains.

Paradise Datacom

by Tony Radford, V.P. Sales + Marketing



2008: We have experienced consistent year over year growth and 2008 has been no exception. Since our product portfolio includes a broad offering of both RF amplifiers and modems, we are able to address a wide range of markets. We have seen a steady increase in demand in both the commercial and government sectors. Our commercial business, which covers a wide spectrum of applications from IP gateways to

cellular backhaul links, has seen considerable growth in Asia and Africa, prompting us to expand our infrastructure in that part of the world. We've also experienced a surge in our government business both in U.S. and in Europe. Our X-band **SSPAs** received **DISA** certification late last year resulting in major orders from satcom system integrators, so much so that we had to expand that part of our production facility to keep up with demand. With the placing of the **Wideband Gap-filler** satellites into service, we expect to see a lot of opportunity for X and Ka-band products going forward. Our biggest challenge is being able to meet customer demand while providing the level of pre and post sales support necessary to sustain the business.

2009: Market forecasts speak well for industry health in general. Predictions of growth for DTV services in Asia and the Middle East give us confidence that we made the right call to make an aggressive move into the DVB-S2 market with our launch of **VISION**. **Quantum** will help steer operators of networks based on legacy technologies towards the new world of DVB-S2 + IBS/IDR + PCMA and **Evolution** will continue to entice the market with unique and innovative features.



PBLSat

by Paul Claydon, General Manager



2008: This has been an exciting year for us. In our second year of operation, we've worked hard to establish our position as Europe's leading specialist in Occasional Service broadcast solutions. 2008 saw our fleet of SNG's deliver a range of events such as **Euro 2008**, the **Champions League** final from Moscow and an entire season of **Formula One** from various European locations.

The proliferation of HD has meant that more satellite capacity has been required for each transmission. Events that would have occupied 9mhz capacity in 2007 are now demanding 18 or 27mhz. This can only be a good thing for the consumer, but of course it can sometimes mean that satellite capacity can be hard to come by.

In anticipation of this, **PBLSat** has leased contiguous capacity giving our clients access to a wide bandwidths for each HD transmission. The Company also acquired key satellite capacity on **Eutelsat-W1**. This is prestigious capacity and compliments our other capacity on **Eutelsat-W2** and **Atlantic Bird-1**.

We also joined forces with partners in the U.S. to offer a complete SNG service for the U.S. elections. Other partnership agreements have been achieved with other global suppliers allowing us to provide our customers with SNG's anywhere in the world.

2009: In general, I think the industry will face even greater demands for satellite capacity at key times and only those suppliers that invest in the Occasional Use capacity will meet the demands of the 2009 marketplace.'

PPM

by Colin Morris, Business Development Manager



2008: **PPM** is a U.K. company specialising in fibre optic converters for the communications industry and have been supplying fibre optic links to many of the world major Satellite companies for a number of years. The company's **ViaLite®** product is well known in the communications in-

dustry and is helping many satellite equipment manufacturers, network engineers, network installers and systems integrators to realise the next generation future proof transmission fabric. As 2008 draws to a close and we look back on the challenges that were faced by the industry our attention is drawn to the growth in services such as DTH and the demand for more high definition (HD) services and an increased demand on bandwidth. PPM and the ViaLite® platform is instrumental in helping network engineers design systems that can cope with this increased demand. Throughout 2008, enquiries in both the satcom and broadcast markets has been steady and overall the order level for standard ViaLite equipment was up by almost 15 percent on that of 2007. That said, some of the traditional markets serviced by PPM's ViaLite, such as large Satcom projects, have slowed somewhat only to be replaced by an uptake in broadcast based projects such as fibre optic backhaul for wireless camera systems.

2009: During the coming year, will continue to develop the ViaLite product range, embracing new technology and techniques to cope with the ever increasing demands of the industry. With the turmoil in the world economy, PPM is positioned to cope with the turbulent times ahead by being active in several market sectors. 2008 has been a great year for RRsat with two major acquisitions, Launch of an HD playout center and new additional satellite platforms.

Proactive Communications

by Marc LeGare, CEO



2008: The satellite communication industry has taken great strides during 2008 to connect people throughout the world via an expanding array of mediums. In one of our specialty markets, **Iraq Reconstruction**, we were proud to facilitate the transition of our satcom network from the **Coalition Forces** to the Iraqi government. The fully meshed secure voice network provides the **Iraqi**

Ministry of the Interior with more than 250 nodes, latency at 650ms and toll quality voice connections for voice, e-mail and Internet.

PCI has engineered a vehicle that allows for secure satellite communications on the move. PCI's **Satellite Platform and Remote Tactical Access Network (SPaRTAN™)** allows military and emergency personnel to communicate and provide real-time information updates over Internet Protocol (IP). Communications such as **Ku On the Move/Halt**, Internet access, **Voice over IP (VoIP)**, **video teleconferencing (VTC)**, **tactical conference bridge (TCB)** and real-time video with an unmanned surveillance camera are aggregated at the vehicle/node and transported over commercial satellite/IP to the designated communications center.

2009: Due to the lessons learned from intense security requirements, crucial reliability measures and the critical nature of communications in a military setting, some of the most advanced satellite communications services are now being developed for commercial business use. Satcom providers such as PCI are taking what they have learned from wartime environments and applying those best practices in a corporate setting.

RRsat

by David Rivel - Founder and CEO



2008: This has been a great year for **RRsat** with two major acquisitions, launch of an **HD Payout Center** and new additional satellite platforms. **RRsat Global Communications Network Ltd.** is a comprehensive global satellite and fiber distribution service provider providing Production, Payout, Uplink, Down-link, Turn-around services and end-to-end transmission for television, Radio and Data channels. In 2008, RRsat announced two major acquisitions: **"Hawley Teleport"**

located in Pike County, Pennsylvania, USA, which was acquired from Loral **SkyNet Satellite Corporation**, and the satellite business of **Bezeq Sat** in Israel and the **Emeq Ha'ela Teleport**. The latter has operated as one of the premier communications facilities in Israel for more than 30 years and is currently one of the most interconnected Fiber network hubs in the country. The facility was designed to support video, radio and data content, and will allow to significantly increasing the capacity and redundancy of RRsat's infrastructure.

2009: RRsat intends to be the leading independent network for the global TV market. RRsat persistently expands the range of innovative, value added services and adapts service offerings to new technologies. RRsat, through its new additional Pennsylvania USA-based teleport intends to build a strong local presence in the U.S. and South America. The strategy to attain this goal includes providing additional services to existing customers and joining new customers who are seeking for content management and global distribution services.

Emeq Ha'ela Teleport

RUAG Aerospace

by Peter Scherrer, Executive V.P., Space



RUAG
Aerospace Defence Technology

2008: In general, the market situation was very intense this past year. We see a continued good order intake and we work on a number of new prospects with good probability like **Kopernikus (GMES)** and the procurement of a full **Galileo** constellation. We also see a good inflow of commercial contracts. Space was declared as a priority area in **RUAG's Strategy 2010**. By purchasing **Saab Space** and **Aus-**

trian Aerospace, RUAG is strengthening its position in the space business. The aim is to combine the three companies' strengths and expertise to form one strong business unit for Space within **RUAG Aerospace**. The acquisition also meets the expectations of our owner, the **Swiss Confederation**.

2009: The merger of **SAAB Space**, **Austrian Aerospace** and **RUAG Space** will enable RUAG to complement its own space portfolio with new technologies and products and to establish itself as a leading European equipment provider in the worldwide space market. We will be able to offer our customers more efficient solutions and we will stay an independent, highly qualified equipment supplier.

On the European institutional market, politics do have an important impact. By merging our companies across the three countries Austria, Switzerland, and Sweden, we are strengthening our position vis-à-vis **ESA (European Space Agency)**. This will lead to more interesting, larger projects. Together, our three countries account for more than 7 percent of ESA's total budget. The merger also makes good sense on the commercial market.



SAT-GE

by Andrew Jordan



SAT-GE 

2008; This has been a buoyant year in the Pacific with demand for Ku- and C-band capacity growing steadily. **SAT-GE** has been able to benefit from this demand, having a unique satellite positioned directly over the region with multiple spot beams giving almost complete coverage in C- and Ku-band. Typical applications include GSM backhaul, aeronautical, maritime, military and just added cable head-end video distribution. A

growing proportion of usage also includes data and Internet trunking for remote islands who, in order to keep up with the rest of the world, have begun to deliver greater bandwidths for Internet access to their communities. Operationally, SAT-GE has tightened-up its control of **GE-23**, having its inauguration in May 2007, the Company now has more than a full year under its belt and understands its assets, its customers, and its markets to a level of detail that makes it responsive and accurate, able to deliver with speed and at the highest quality. During this period, SAT-GE implemented state-of-the-art systems to model loading and usage on the complex GE-23 payload which will enable us to optimize utilization.

2009: We see next year continuing its growth pattern, despite the financial troubles in other sectors. Although there will be a downturn globally, the industries that we support have longer term funding models which we believe will weather the current financial and consumer spending oriented storms. Having said that, the financial crisis will mean inevitably that some new services will be unable to launch due to lack of funding, but satellite companies work typically on 15 year business plans.

SkyTerra (formerly MSV— Mobile Satellite Ventures)



by Alex Good, Chairman, CEO + President
and Jim Corry, V.P., Government Solutions —
Jennifer Manner, V.P., Regulatory Affairs —
Chris Gates, V.P., Strategy

2008: SkyTerra (the former MSV) performed well throughout 2008, enjoying solid revenue from both equipment sales and satellite services. At the same time, the company also made significant progress on the development of its next-generation satellite-terrestrial network. In October 2008, SkyTerra completed its **Satellite Mutual Aid Radio Talkgroup (SMART™)** program, a nationwide network of nine-regionally managed talkgroups enables reliable, interoperable communications among federal, state, local and tribal law enforcement and public safety organizations across the country.

2009: SkyTerra intends to expand its program of nationwide SMART talkgroups to include international cross-border interoperability. National security is extremely important and border control plays a key role in keeping Americans safe. SkyTerra is also looking forward to the launch of their next generation satellite network as it will provide countless broadband opportunities and better geographic coverage for consumers and emergency responders alike.

Space Florida

by Steve Kohler, President, Space Florida



2008: Space Florida worked with the U.S. Air Force to announce a significant achievement – the turnover and official lease of **Launch Complex 36** at **Cape Canaveral Air Force Station** to the State of Florida. While the lease itself for commercial build out may not seem like big news, the timeframe in which it was conducted was telling. In an

environment where traditional launch processes typically require years of review and assessment, this request was accomplished within the course of several months. This achievement demonstrated the increasing willingness by the Air Force to embrace the future of commercial space at Cape Canaveral, a site that has, in recent years, been focused on civil and military launch. The Air Force even went so far as to stand up a commercial launch office at the Cape and is now working with Space Florida to initiate the **C.A.S.P.E.R. Program** (Customer Assistance Service Program for the Eastern Range), providing no-fee assistance to commercial customers to quickly and efficiently get through the launch preparation process.

2009: Space Florida sees Launch Complex 36 as a foundation for a **Commercial Launch Zone (CLZ)**, which would encompass several launch sites at Cape Canaveral, Space Florida's **Space Life Sciences Laboratory** and other locally-based payload manufacturing sites. This zone would reach vertically into LEO, GEO and beyond, enabling the benefits of a Free Trade Zone to commercial payload customers, such as those in the satellite industry. The designation of a CLZ in this area would give Florida a competitive advantage for commercial payload and launch customers without the traditional bureaucratic requirements.



Space Foundation

by Elliot G. Pulham, President & CEO



2008: Despite the downturn in the general economy, the global space industry grew 11 percent to more than \$251 billion in revenues in 2007, according to the **Space Foundation's annual *The Space Report 2008: The Authoritative Guide to Global Space Activity***. While general financial markets faced great upheaval during 2008, forward momentum

continued in the space industry and the Space Foundation's operations reflected this momentum throughout the calendar year. The Space Foundation's signature event, the **National Space Symposium**, continued its 24-year pattern of unabated growth as the premier annual space industry event in the world. Importantly, the Foundation's education enterprise, which is tackling the daunting challenges of reforming and revolutionizing education while preparing a technically savvy workforce of the future, launched numerous new programs and experienced significant growth during the year.

The Space Foundation brand continues to gain recognition as the preeminent nonprofit brand in the space industry as this hybrid operating foundation continues to apply new resources to meet the challenges in service to industry, education, research and analysis, public information and outreach, public policy, technology transfer, and more.

2009: This small but powerful "can do" organization is poised for continued growth next year and is already teaming with space industry partners from around the world to help take the space community to ever higher heights in the year to come.



Spacenet Inc.

by Glenn Katz, President and COO



2008: This was a strong year for **Spacenet** and we experienced our best performance ever since the company's inception 27 years ago. We deployed thousands of VSATs across our core markets, launched multiple new product and technology introductions, and formed new strategic programs and alliances with leading companies in the industry.

Spacenet enhanced its infrastructure in support of PCI DSS compliance across both its satellite and wireline network services product lines in order to provide customers with the utmost level of confidence in the safety and integrity of their networks. Spacenet also launched a digital media alliance program with strategic partners and international VSAT services.

2009: Digital media is one market that we anticipate growth in for satellite communications. The market is still in its early stages and satellite offers numerous advantages in support of digital content distribution. Through our Digital Media Alliance, Spacenet plans to help customers, including retail, healthcare and financial organizations, leverage the full benefits that digital media applications offer. We also see the government market as a key growth opportunity. Federal agencies as well as civilian agencies, like the **USPS®**, a current Spacenet customer with 5000+ sites, benefit from using satellite as a primary network for remote locations, backup network for Continuity of Operations, and as a transportable solution for emergency response. In 2008, Spacenet expanded coverage of its satellite services to numerous government agencies in support of emergency communications networks. We will bring the advantages of satellite communications to even more industries and markets in 2009 and beyond.

Space Systems/Loral

by Arnold Friedman, Sr. V.P., Marketing & Sales



SPACE SYSTEMS
LORAL

2008: This has been an exceptional year for us. To date this year we have signed seven contracts to design and build high power commercial satellites. We are very pleased to add **SES** and **Hispasat** to our family of Blue Chip customers. In addition to the contracts with these European companies, we also won awards for new satellites for **ViaSat**, **EchoStar**, and **Intel-**

sat. In anticipation of this growth, over the past year, we expanded and updated our satellite manufacturing facilities and increased in-house RF component manufacturing. Now we can easily accommodate our industry leading backlog with 20 satellites in progress. Our backlog includes some of the world's most advanced satellites for MSS, Broadband, DTH, DARS and FSS. We are pleased with the successful delivery and launch of five **Space Systems/Loral**-built satellites to date in 2008. These include the world's largest and most complex satellite for delivering mobile services, and a 20-kW satellite that now enables extensive high definition television programming.

2009: We expect a record year for the number of SS/L-built satellites launched into space. When **TerreStar-1** is launched, we will break our own record for the largest satellite ever delivered into space. It will have an 18-meter unfurlable antenna reflector, the largest ever built for a comsat. This year we noted an increased interest, from civil and military organizations, in the schedule and cost advantages of using comsats. Governments around the world are already among the largest users of FSS transponders and they are increasingly looking at using hosted payloads.

STM Group Inc.

by Emil Youssefzadeh, CEO



2008: STM's performance during the past year was in line with our targets. Our product and standards based VSATs were selected for the largest public education based network, awarded with over 5,000 schools in Turkey. We also delivered over one thousand terminals for a civil defense network in Europe, and through a UK-based service partner, our product was selected for rural

broadband services in Scotland for over 800 sites. On top of that, our numerous current customers using our **SatLink™** and **Solante™** system platforms expanded their networks, with deployment of several thousand more VSATs and more hub capacity. We also made significant in-roads expanding our recurring service business. Capacity and traffic in **STM's** SatLink teleports in Florida and California for our marine-based services were expanded and new customers were brought online at our Spanish teleport. We also brought into service a new teleport in Brazil and expanded the capacity on our other teleport serving Latin America. We introduced our DVB-RCS compliant SatLink mesh networking VSATs and a wide-band burst demodulator for our SatLink hubs capable of concurrent processing of up to 32 TDMA carriers in a single 1U chassis.

2009: Next year will be a mix of challenges and opportunities. We will continue investing in new products and technologies to help us grow our business in new markets. This includes continued focus on our GSM base station, mesh VSAT, and Ka band initiatives, plus some new related initiatives now underway. The financial crisis is slowing this expansion for a while, but it is inevitable modern high-speed communications will reach one or two billion more people in the next five to ten years.

Thuraya

by Reham Barakat, Media Relations Officer



2008: Thuraya has developed into new, lucrative, satcom sectors such as satellite broadband and maritime during this year. The Company launched its third geosynchronous satellite (**Thuraya-3**) early in 2008, allowing it to strategically expand its system coverage toward the Asia-Pacific market. The move doubled the population under the **Thuraya** system from 2.5 to more than

4 billion people. Such created a huge potential for Thuraya to serve a large maritime sector that extends from Iceland to Australia. Thuraya introduced two innovative products, **ThurayaIP** and **ThurayaMarine**, catering to the broadband and maritime sectors respectively. The Company has partnered with several application developers to augment its new broadband solution ThurayaIP to develop Thuraya's position in the broadband sector. New services such as the location-based service, **ThurayaLocate**, and access to a WAP enabled portal debuted. The introduction of a competitive broadband solution by Thuraya will enhance the Company's standing in the sector, as well as in the MSS industry.

2009: Thuraya will continue to work on developing products and services throughout 2009, establishing itself as one of the world's leading satellite communications provider that is dynamic, innovative and an ideal partner for communication needs especially in areas where there are no terrestrial networks or coverage. Thuraya at present provides superior technology that caters to a plethora of sectors that are dependent on MSS services and will continue penetrating new core corporate segments to ensure that its services are available to even more customers.

UltiSat

by Moe Abutaleb, President and CEO

by Michael Pollack, V.P., Sales and Marketing



2008: Space-segment shortages over the past year demonstrate that demand for satellite services and networks is still strong and certain regions ap-

pear to show no sign of decline despite the current economic climate. In 2008, **UltiSat** continued to build on the previous success, which included a large multi-regional contract for an international nongovernmental organization (NGO), the provision of numerous transportable and flyaway terminals, and the selection to participate on several government contract vehicles including the GSA SATCOM-II contract. UltiSat designed and deployed a significant worldwide VSAT network — we took less than 12 months to complete the migration of a global network that spanned all continents and included locations ranging from densely populated urban areas to remote islands.

2009: Clearly the current economic crisis presents many challenges for everyone and the effect that it will have on our industry has yet to be measured. Demand for higher speed networking and video-based applications will continue to contribute to capacity shortages, but additional capacity is imminent in the form of newer technologies and new satellite launches in various bands (such as X-band and Ka-band). Hybrid systems will continue to increase as customers recognize that the coverage of satellite combined with the cost-effectiveness of fiber offer a great ROI for certain applications.



ViaSat

by Mark Dankberg, Chairman and CEO



2008: We are proud of our record of sustained growth. Our record revenues, earnings, and bookings during the past year reflect solid competitive positions in key areas – both commercial and government. We believe it's indicative of a potential for comparable growth for our next five years and beyond. Our government businesses in tactical data links, information assurance, and satellite communications continue to

show strong earnings, with revenue growth, gains in market share, and attractive prospects for the future. Demand for satellite Ka-band broadband service was far stronger than expected – with both **WildBlue Communications** and **Telesat Canada** selling out their available capacity in large portions of the U.S. and Canada. We scaled the business quickly, more than doubling shipments over prior years. Finally, we invested significantly in new areas, including our recently acquired AcceleNet® WAN acceleration product, which is gaining market awareness and earned some very exciting OEM distribution agreements.

2009: We're optimistic about our prospects across our diverse product and market base. Ultimately we want to play a key role in delivering high speeds and volumes of bandwidth to hard-to-reach fixed and mobile platforms and locations. For our government customers we must take into account their unique needs for rugged, reliable equipment; integration into complex government specific networks and applications; and robustness to interference and electronic attacks; along with high levels of information assurance and protection.



VIZADA

by Erik Ceuppens, CEO



2008: The European mobile satellite services (MSS) sector experienced significant growth during the first half of 2008 and this is set to continue into 2009. We can say this specifically for on-demand MSS services in the three key market segments, which are maritime, land, and aeronautical. This is the first time that we are seeing growth on all three, which is very positive. At **Vizada**, we

partner with multiple *satellite network operators (SNOs)* to offer customers in each of these segments with more choice in terms of MSS services. In the maritime market, growth is spurred by the increase in trade and maritime transport as well as the number of new-builds. These new-builds require communications systems, which is where we come in.

We're seeing an increasing need for data connectivity from services such as **Inmarsat FleetBroadband** or the upcoming **Iridium OpenPort**, as well as for crew calling solutions. And crew no longer wants to be able to just make phone calls, they also want to stay in contact via email and Internet. Vizada's **Universal Card** provides voice and data communications in one prepaid card that can be used on over both Inmarsat and Iridium terminals. On the land segment, growth has been strong and even higher than industry forecasts, and driven more by data than voice. In the aeronautical market, demand is being driven by two main elements: an increasing need for data connectivity and passenger communications. Vizada has some of the best networking experts in the industry with the ability to seamlessly integrate MSS services and solutions into our customers' network.

by Gary Carter, V.P. and CTO,
International Datacasting Corporation

It seems not that long ago the great advances in audio coding technology and lower cost satellite equipment made it feasible for many radio networks around the world to distribute their programming by satellite. Many of these radio networks uplinked directly from the radio station studios to feed AM / FM / MW / SW and cable systems directly in order to by-pass major shared hub operators. The economics were first driven APT-X and later by MPEG Layer II audio coding and compression technologies implemented on relatively low cost equipment.

Today, many of these distribution networks are still in operation with 10 to 15 year old equipment that has withstood the test of time. However, the manufacture and supply of this old generation equipment has generally stopped long ago and even repair of this old equipment is becoming more of a problem. The age and the lack of support for the equipment answers the "Why should I replace the distribution system" question for most station engineers. The more difficult questions in front of many station engineers to-day are "How and when to replace their satellite distribution systems." and "What should the new satellite distribution system architecture be to carry me through the next 10 years?"

A survey of a number of radio engineers yielded a diverse wish list for the new network infrastructure.

- *Allow for a flexible number of channels and bandwidth*
- *Decrease distribution costs per channel and improve quality*
- *Allow broadcaster to better implement localization*

- Increase availability by eliminating sun and rain outages
- Permit advertisement and commercial insertion
- Integrate better with new terrestrial IP systems
- Easier integration with my broadcast automation system, the internet, DVB-T, DVB-H, DMB, web servers, telephone systems and HD radio
- Be capable of multichannel sound
- Re-use existing RF equipment as much as possible

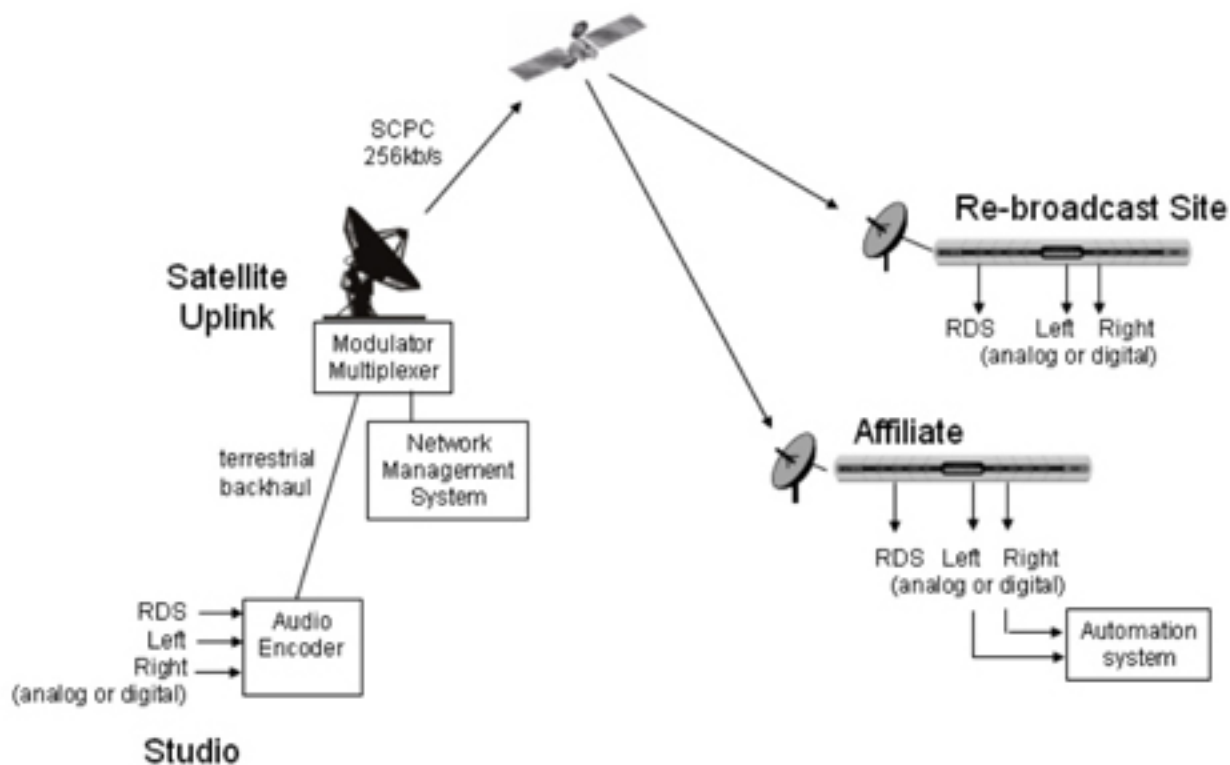
This list highlights how the demands on a radio network have evolved over the past years. The list also suggests that radio will continue to evolve at a great pace. Thus any next generation system must be flexible and adaptable enough to deal with the unknown demands of the future.

and Compression, (2) **Transmission Architecture including Modulation and Forward Error Correction** as well as (3) **IP Networking** to understand their impact on the implementation of a new generation radio distribution system with respect to the desires of network engineers as expressed above.

(1) Advances in Audio Codecs and Compression

Audio encoding technologies have evolved over the past 15 years from MPEG Layer 2, Layer 2.5 and Layer 3 (MP3) into a wide variety of customized codecs from **Real, Microsoft, Dolby** and others to open source codecs like Vorbis, to a new generation of MPEG standards based codecs known as **Advanced Audio Codecs**.

Typical Satellite Radio Distribution System



Developments in three areas of technology are driving developments in the area of satellite radio network distribution. So let's begin by looking at the major technological advances in (1) **Audio Codecs**

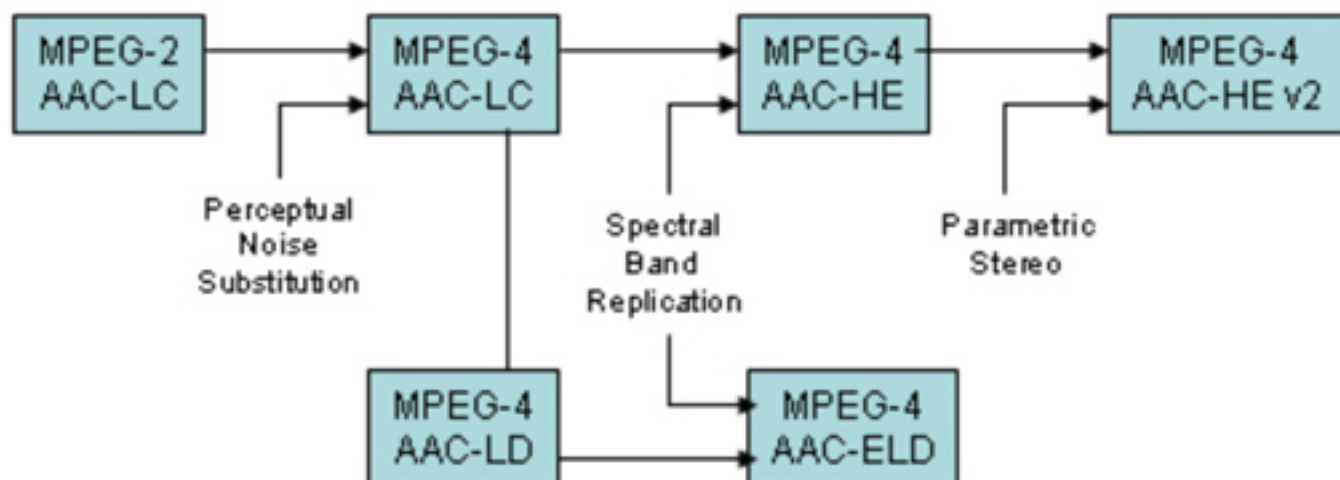
The MPEG-4 specification now includes **MPEG-4 AAC**, **MPEG-4 High Efficiency AAC (HE-AAC)**, **MPEG-4 AAC Low Delay** and **HE-AAC v2**. New variants are being developed and implemented to deal with speech systems

requiring low delay and loss-less codecs are being implemented for those driven by quality.

Modern satellite distribution systems implement MPEG4-LC, MPEG4-LD and MPEG-4 HE-AAC for radio network applications. The figure below shows the evolution of **MPEG4 AAC** codecs.

their current capacity, a quality improvement and a savings of 50 percent when they operate a stereo pair at 128kb/s using MPEG4. Conversely, stations can transmit 2 services in the capacity of one previous service doubling their capacity. Lastly, many codecs can support the common configurations of 5.1 and 7.1 leading the way to the future.

AAC Codec Evolution



One of the major issues with early generation satellite radio distribution systems was the “pops and squeaks” introduced into the audio channel by errors in the data caused primarily by rain fades and sun outages. In the MPEG-4 AAC family, significant error concealment and error masking techniques have been introduced which virtually eliminates these issues.

The benefit of all these codec improvements are that a good stereo radio service can be transmitted in the range of 80 to 96kb/s, significantly reducing the space segment cost to distribute a radio channel. Audio transparency quality is generally agreed to occur at 128kb/s for a stereo pair; audio purists may choose to operate with speeds higher than 128kb/s.

As such, operators with APT-X and MPEG-2 systems operating at 256kb/s can achieve transparency with

The last word on codecs is that users should choose products which incorporate software decoders and codecs. This allows for the implementation of future improvements to existing codecs or the implementation of new generation codecs over the lifetime of the equipment.

This analysis certainly seems to show that MPEG-4 AAC codecs perform a vital role in addressing the requirements of operators to decrease the cost per channel and improve audio quality while paving the way to the future.

As a recommendation, engineers should understand the benefits of the various new codecs and select a codec that meets their needs. The newest isn't always the best choice.

Make certain that the satellite receiver allows the choice of several codecs and that the receiver can be updated/changed over the satellite to allow the next generation codec to be implemented if necessary. As such, a software implementation of MPEG-4 HE-AAC probably fits most people's needs.

(2) Advances in Transmission Architecture including Modulation and Forward Error Correction

In early generation SCPC radio distribution systems, proprietary **BPSK** and **QPSK** modulation and energy dispersal was used with convolutional 1/2 rate forward error correction encoding. These systems were great at the time and the low cost implementations contributed significantly to the success of early SCPC radio distribution systems.

However, DVB for satellite was standardized in 1994 and has subsequently been adopted for use in many satellite radio network distribution systems. The adoption of first generation DVB for satellite (DVB-S) contributed significantly to the improvement in performance of radio distribution systems as well as the virtual elimination of proprietary SCPC transmission systems for radio distribution.

To this day, DVB-S is used almost exclusively for radio distribution systems. The leverage provided by large DBS systems has created a wide variety of components and equipment that has been steadily being improved in performance and reduced in price to the benefit of all users.

Most companies have focused their development and product efforts around DVB-S to make it a great transmission system but now 13 years after it was standardized, even DVB-S is being overtaken by new technologies.

Over this 13 year period, significant advances have been made in the capabilities of analog and digital integrated circuit technologies which permit the implementation of circuits that could not previously be done cost effectively. These advances have led to the release of the new DVB-S2 standard in 2005.

At the transmission layer, the DVB-S commonly used QPSK modulation has been supplanted in DVB-S2 with QPSK, 8PSK and 16QAM modulation.

Additionally, the traditional concatenated Reed-Solomon and convolutional FEC coding has been replaced by the more effective combination of **BCH** (Bose-Chaudhuri-Hocquengham) and **LDPC** (Low Density Parity Check). Furthermore, DVB-S2 supports better filtering which permits a narrower carrier as can be seen in the more aggressive carrier shaping factor which has been reduced to 0.2 from 0.35. The occupied bandwidth for a carrier of a given symbol rate can be calculated from the symbol rate. In DVB-S2, a 30 ms/s carrier occupies 36MHz.

The combination of, better FEC with less overhead and narrower carrier implementation has yielded an improvement in the data throughput of approximately 40 percent. The improvement in the coding gain by about

DVB-S	DVB-S2		
QPSK	QPSK	8PSK	16APSK
1/2	1/4	3/5	2/3
2/3	1/3	2/3	3/4
3/4	2/5	3/4	4/5
5/6	1/2	5/6	5/6
7/8	3/5	8/9	8/9
& RS	2/3	9/10	9/10
	3/4		
	4/5		
	5/6		
	8/9		
	9/10		

1.5dB allows for larger rain fade margins, or the use of smaller antennas or the use of 8PSK modulation into existing antennas.

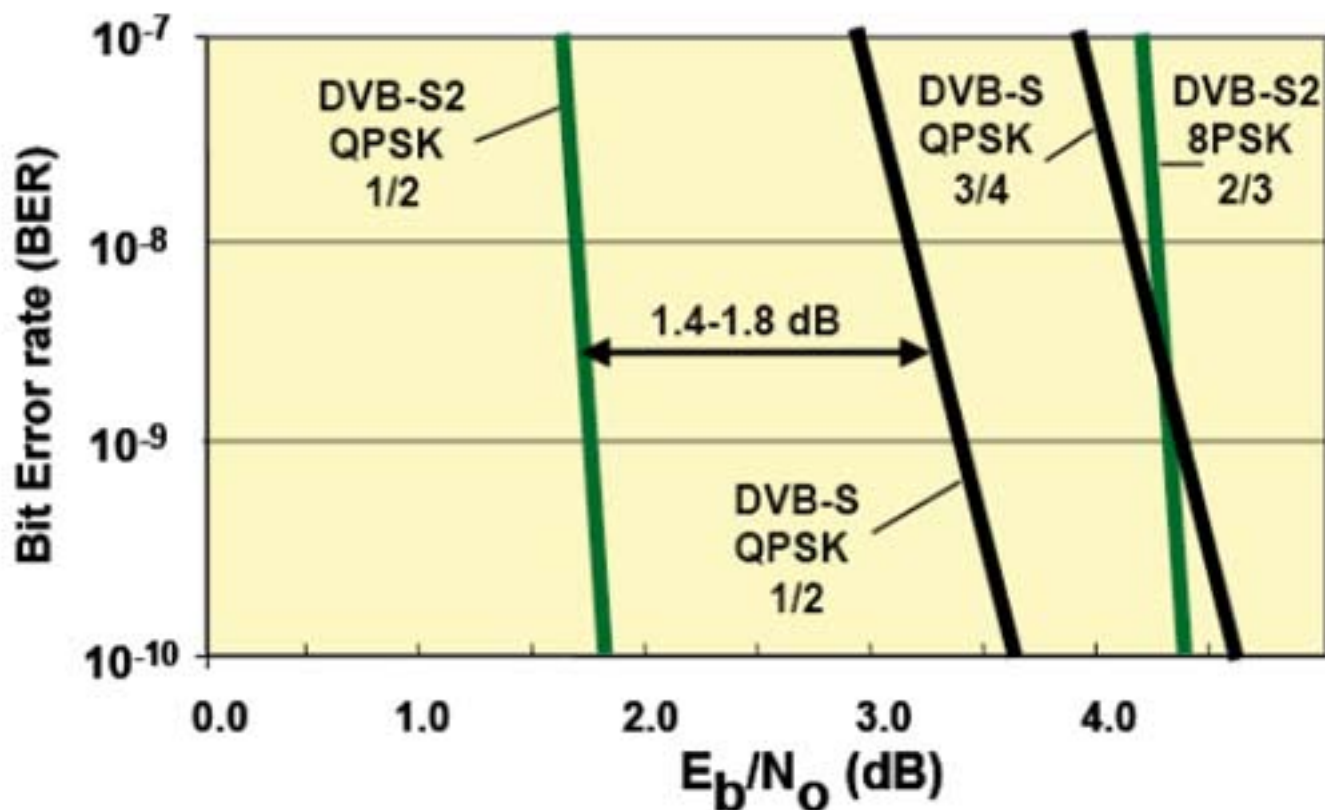
DVB systems are inherently RF bandwidth agile and can contain a variable number of audio channels referred to as PIDs. Typically, the maximum RF symbol rate is 30ms/s which will fill up a 36 MHz transponder and the maximum number of PIDs is 8192, which allows for considerable expansion of the audio channel capacity.

How a new system benefits from these innovations in modulation, carrier shaping and FEC needs to be part of system design to determine the optimal choice for the system. **The table in column 2 on Page 60** shows the most common choices of modulation and the FEC rates available for DVB-S and DVB-S2. Be careful here, not all FEC rates are available in all products on the market.

The figure on **Page 62** shows two interesting items.

Firstly, the reduction in E_b/N_0 between DVB-S and DVB-S2 implementations with QPSK at 1/2 rate FEC shows between 1.4 and 1.8 dB. Secondly, the figure shows the intersection of DVB-S at QPSK rate 3/4 with DVB-S2 at 8PSK at rate 2/3 implying that users could switch to 8PSK and realize a higher throughput

It can be concluded that DVB-S2 is a better transmission solution generally that offers many advantages over DVB-S and traditional SCPC systems. DVB-S however may be a better choice for some however given its maturity and the existing preponderance of existing DVB-S systems.



It seems clear however that DVB-S & DVB-S2 both address the desire for a flexible number of channels and flexible audio bandwidth in addition to contributing to a greater rain fade margin while re-using existing RF uplink and downlink equipment.

Advances in IP Networking

No discussion about future networks would be possible without including a discussion on the internet and computers to look at how IP networking and computer technology will impact the operation of the next generation radio distribution platform. We all know that the internet has developed over the past decade to the point that IP based audio systems play a big roll in radio today. Whether it is an IP codec that is used for contribution or remotes, linear IP networked audio inside studios, terrestrial or satellite IP distribution to transmitters or interfacing with our web based audio servers, 3G phone systems or DVB-H, IP is here to stay in the radio industry and offers many advantages. Consequently, a new generation radio distribution system must be IP friendly and interconnect transparently with the existing IP infrastructure of a radio station

at several levels. IP connectivity can be used for many cost saving applications.

- *IP connection of remotes to studio*
- *IP networking inside the studio of linear audio*
- *IP networking of multicast audio over the satellite*
- *IP monitoring of remotes performance*
- *IP networking to provide back up in case of satellite link loss*
- *For rain/sun fades*
- *For damaged antennas & LNBS*
- *IP connectivity to web servers*

The diagram on **Page 64** shows an all All Digital, IP Enabled, DVB-S/S2 radio distribution system similar to several being installed currently.

In this system linear digital audio is delivered from the playout system to the Audio Encoder over IP over Ethernet. This eliminates the need to run balanced audio coaxial cable which can degrade the audio. This also eliminates the need to do an A/D conversion in the audio encoder which serves to protect the quality of the audio. This project uses MPEG-4 AAC-HE audio compression

which is multicast over a terrestrial network to the satellite uplink where the IP packets are encapsulated inside DVB transport packets for transmission.

The Network Management System (NMS) authorizes the receivers and forwards ad/commercial/program files to the HDDs of the receivers. The NMS system also schedules or triggers the ad/commercial/program insertions.

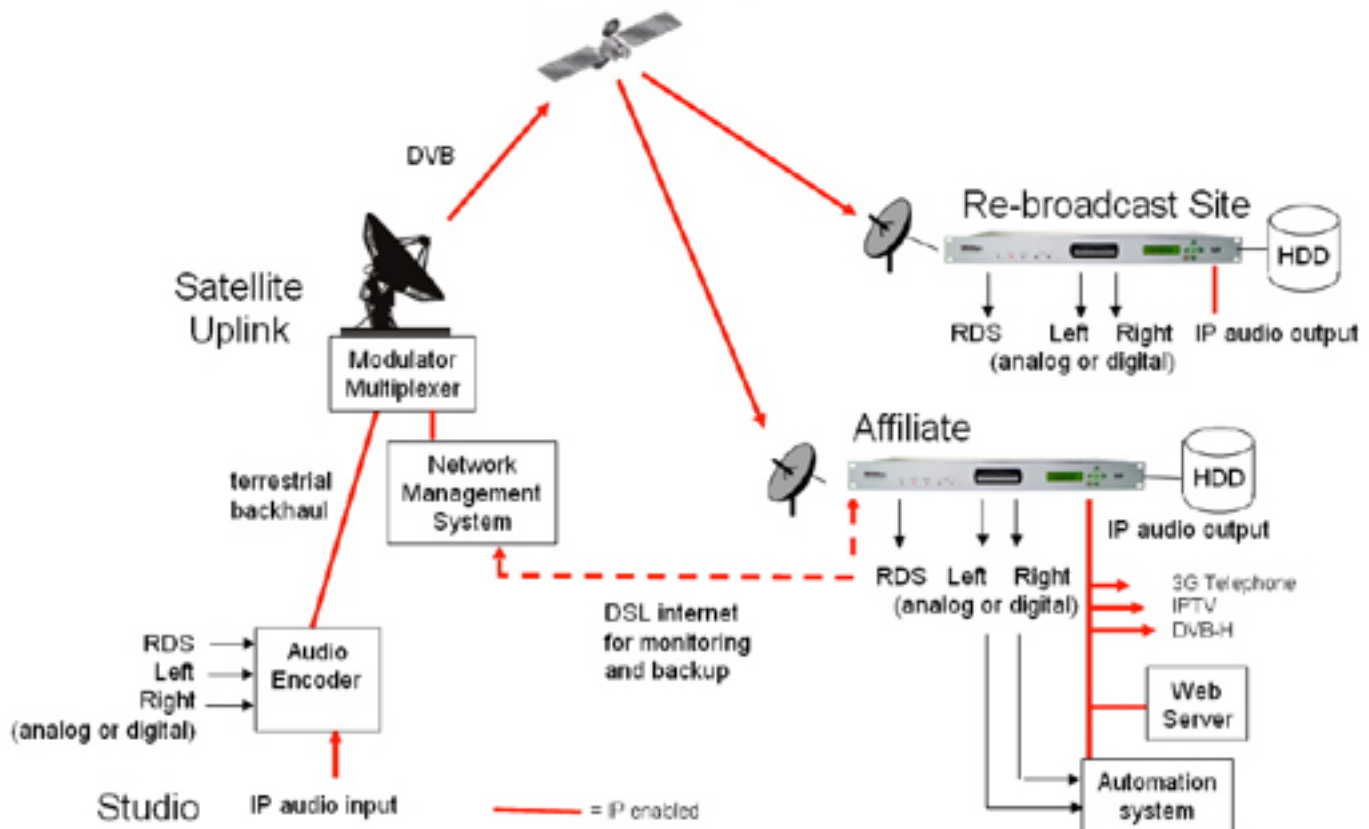
The DVB transmission in this case is transmitting the audio IP packets inside DVB transport packets at 128ks/s. The carrier can be expanded up to a full transponder should the need arise to add more audio, video or data services.

On the downlink, KU-band antennas equipped with LNBS are used to receive the signal which is cabled to the satellite receiver at the affiliate. The satellite receiver removed the DVB transport layer and reconstructs the IP multicast packets.

The IP packets are usually decoded to linear PCM audio and output over IP on Ethernet or converted to analog and output on balanced connectors. Additionally, the compressed audio can be output directly for use by systems requiring compressed audio for subsequent distribution as is the case with web servers, IPTV, 3G/3.5G phone, and DVB-H systems.

Internal to the satellite receiver is a large HDD which is used to store advertisements or programs which could be alternate language or even complete shows. New to this IP implementation is the ability for the satellite receiver to connect via the internet or other IP capability back to the hub and take the program through the terrestrial network as might be the case during a rain fade, sun outage or otherwise when the satellite link may not be available because of a mis-pointed antenna or defective LNB.

All Digital - IP Enabled – DVB-S/S2 Satellite Radio Distribution System with Ad Insertion



Remote sites are monitored via the terrestrial network using conventional SNMP/IP monitor and alarm system.

As such, the implementation of a flexible satellite architecture with the ability to implement multiple program services while reducing costs and improving quality has been shown to be completely capable of transmitting monaural, stereo and multichannel sound. The addition of the IP network layer and satellite receivers with internal HDDs can add the desired interconnectivity with internal station LANs as well as the internet.

As such, local program, ad and commercial insertion is made possible as is connectivity to secondary IP enabled distribution systems such as web servers, DVB-H, IPTV and even 3/3.5G telephone systems.

It is evident that the implementation of modern MPEG-4 audio codecs & compression combined with the benefits of DVB-S and DVB-S2 go a long way to addressing the future requirements of station engineers for these new networks as identified earlier on in this article. Add into the mix, IP networking, and the resulting network solution will address all of the aforementioned requirements of station engineers.

About the author

Gary Carter is Vice President and Chief Technology Officer of International Datacasting Corporation and has over 25 years of experience in the satellite communications industry directly addressing the needs of broadcasters.

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