

Worldwide Satellite Magazine

April 2010

SatMagazine

New Applications, New Horizons



▼ **PAYLOAD** ▼

BEAM... The New Horizon NASA/Johns Hopkins University Southwest Research Institute	Page 6
BEAM... In My View To Boldly Go — Whoever... by Elliot Pulham, President and CEO, Space Foundation	Page 11
BEAM... In My View Satellites To The Rescue... Haiti + Beyond by Hoyt Davidson, Founder, Near Earth LLC	Page 19
INSIGHT Pay Radio — The European Race Is On by Chris Forrester	Page 26
INSIGHT Strategy: Solaris Mobile by Chris Forrester	Page 31

INSIGHT SatApps Innovation = Industry Growth Euroconsult	Page 37
EVENT SatExpo Europe	Page 42
EVENT CASBAA's India Satellite Industry Forum	Page 48
EVENT SatBouyancy In Maryland @ The Gaylord by Chris Forrester	Page 52
SatBroadcasting™ Drama In Somalila by Bob Hildeman, CEO, Streambox	Page 59

Cover image courtesy of Johns Hopkins
University Applied Physics Laboratory/
Southwest Research Institute (JHUAPL/SwRI)

The New Horizon

by NASA/Johns Hopkins University
Applied Physics Laboratory/Southwest Research Institute

This month's cover reveals an artistic rendition of NASA's New Horizon satellite, rather appropriate given the theme for this issue, New Applications.

What is the *New Horizon* project?

New Horizons is a mission designed to fly by Pluto and its moon Charon and transmit images and data back to Earth.

The satellite will then continue on into the Kuiper Belt where it will fly by a one or more Kuiper Belt Objects and return further data.

The primary objectives are to characterize the global geology and morphology and map the surface composition of Pluto and Charon and characterize the neutral atmosphere of Pluto and its escape rate.

Other objectives include studying the time variability of Pluto's surface and atmosphere, imaging Pluto and Charon in stereo, mapping the terminators and composition of selected areas of Pluto and Charon at high-resolution, characterizing Pluto's

upper atmosphere, ionosphere, energetic particle environment, and solar wind interaction, searching for an atmosphere around Charon and characterizing its energetic particle environment, refining bulk parameters, orbits, and bolometric Bond albedos of Pluto and Charon, searching for additional satellites and rings, and characterizing one or more Kuiper Belt Objects.

New Horizons launched on January 19, 2006, on an *Atlas V 551* booster with a *Star 48B* third stage directly into an interplanetary trajectory. It passed within 101,867 km of main belt asteroid *JF56* on June 13, 2006. It used the encounter as a test of its instruments and tracking and navigation sensors, and returned images of the 2.5 km diameter asteroid, which only shows as a faint dot at that distance.

New Horizons reached Jupiter for a gravity assist on February 28, 2007. The flyby came within about 32 Jovian radii of Jupiter at 21 km/s and was the center of a 4 month intensive Jupiter system observation campaign. The flyby put the spacecraft on a trajectory towards Pluto, about 2.5 degrees out of the plane of the solar system.

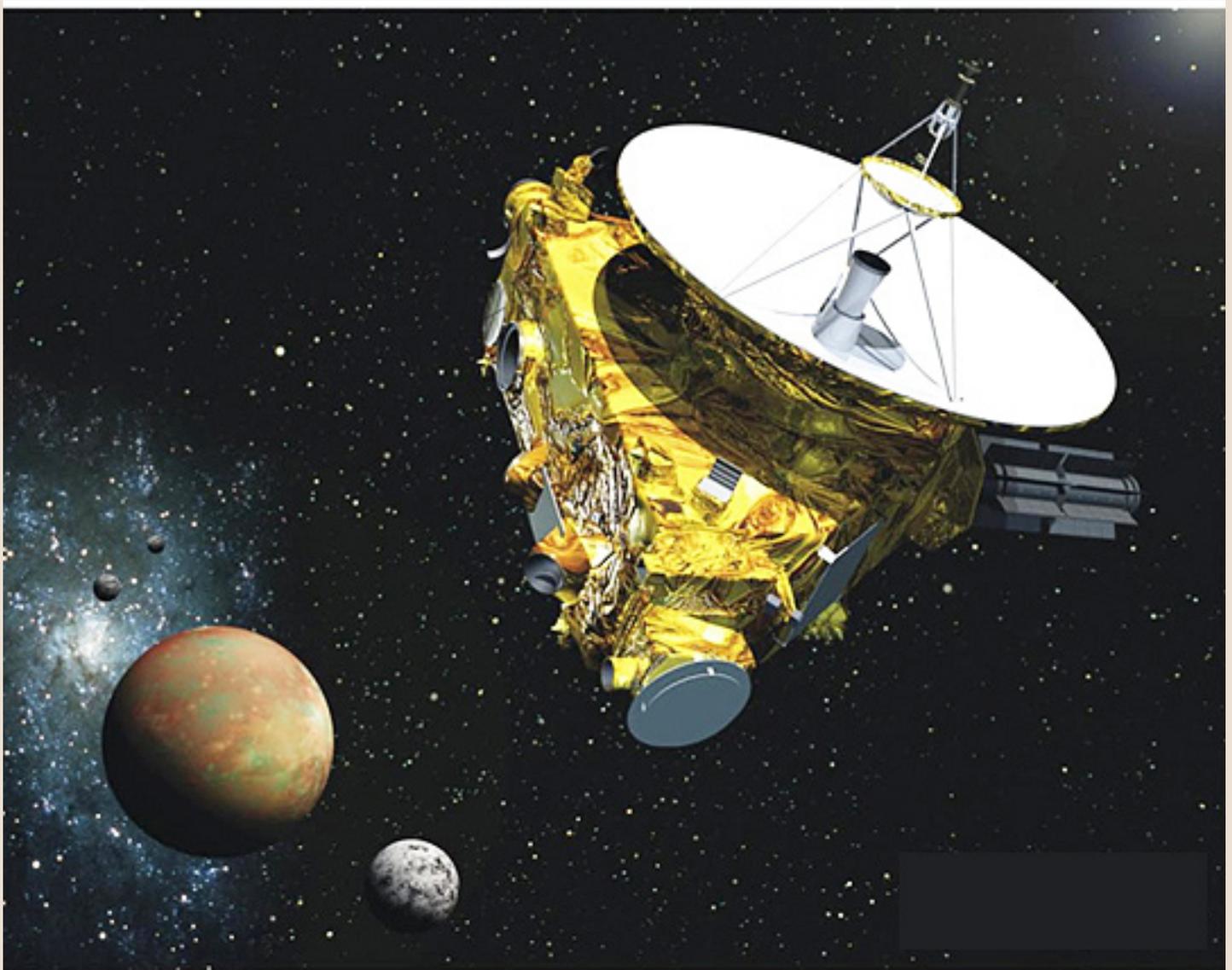
On June 8, 2008, New Horizons crossed the orbit of Saturn. During the cruise to Pluto, New Horizons may

be targeted to fly by a Centaur object (an escaped Kuiper Belt Body) if a suitable target can be identified.

The flyby of Pluto will occur nominally on July 14, 2015. The encounter period starts 6 months prior to closest approach. Long range imaging will include 40 km mapping of Pluto and Charon, 3.2 days out. This is half the rotation period of Pluto-Charon and will allow imaging of the side of both bodies which will be facing away from the spacecraft at closest approach.

NEW HORIZONS

The First Mission to Pluto and the Kuiper Belt:
Exploring Frontier Worlds





to Earth at 600 bps over a 9-month period. After passing by Pluto, New Horizons will be headed out to the Kuiper Belt where one to three Kuiper Belt Objects with diameters exceeding 35 km are expected to be targeted for encounter and similar measurements to those made at Pluto. This phase of the mission will last from 5 to 10 years.

The spacecraft has the shape of a thick triangle (0.68 x 2.11 x 2.74 m) with a cylindrical radiothermal generator (RTG) protruding from one vertex in the plane of the triangle and a 2.1 m high-gain radio dish antenna affixed to one flank side.

An aluminum central cylinder supports surrounding honeycomb panels. The central cylinder acts as the payload adapter fitting and houses the propellant tank. The 465 kg launch mass includes 80 kg of propellant. The entire structure is covered in thermal multi-layer insulating blankets and thermal control is further achieved by electrical dissipation and RTG waste heat, thermal louvers, and external shunt plates. Communication from Pluto will be via X-band at a rate of 600 bps through the high gain antenna to a 70-m DSN dish.

New Horizons will fly within 10000 km of Pluto at a relative velocity of 11 km/s at closest approach and will come as close as 27,000 km to Charon. During the flyby the instruments should be able to obtain images with resolution as high as 25 m/pixel, 4-color global dayside maps at 0.7 km/pixel, hyper-spectral near infrared maps at 7 km/pixel globally and 0.6 km/pixel for selected areas, characterization of the atmosphere, and radio science results. Because of the limited power available, the instruments will be duty cycled during encounter. The flyby will take place at a distance of about 33 AU from Earth with a round-trip light time of 9 hours. Encounter data will be transmitted

There are also two low gain antennas for communications within 5 AU and a medium gain antenna with uplink capability to 50 AU. The RTG will provide approximately 228 W at encounter in 2015. Hydrazine monopropellant is used for propulsion via four 4.4 N thrusters and twelve 0.8 N thrusters, a delta-V capability of 290 m/s will be available after launch. The hydrazine is stored in a titanium tank separated from the gaseous nitrogen pressurant by a girth-mounted diaphragm. The spacecraft has both 3-axis stabilized and spin-stabilized modes. Star cameras are mounted on the side of the spacecraft for navigation.

The 31 kg science payload package requires 21 W of power and consists of seven scientific instruments. The *Long Range Reconnaissance Imager (LORRI)* consists of a visible light, high-resolution CCD Imager. The Ralph instrument is composed of two parts, a visible CCD imager (**MVIC**) and a near-infrared imaging spectrometer (**LEISA**). The Alice instrument is an ultraviolet imaging spectrometer. The *plasma and high energy particle spectrometer suite (PAM)* consists of **SWAP**, a toroidal electrostatic analyzer and retarding potential analyzer, and **PEPSSI**, a time-of-flight ion and electron sensor. The *Radio Science Experiment (REX)* will use an ultrastable oscillator to conduct radio science investigations. A *student-built dust counter (SDC)* will make dust measurements in the outer solar system. Total mission cost is planned to be under \$550 million. 

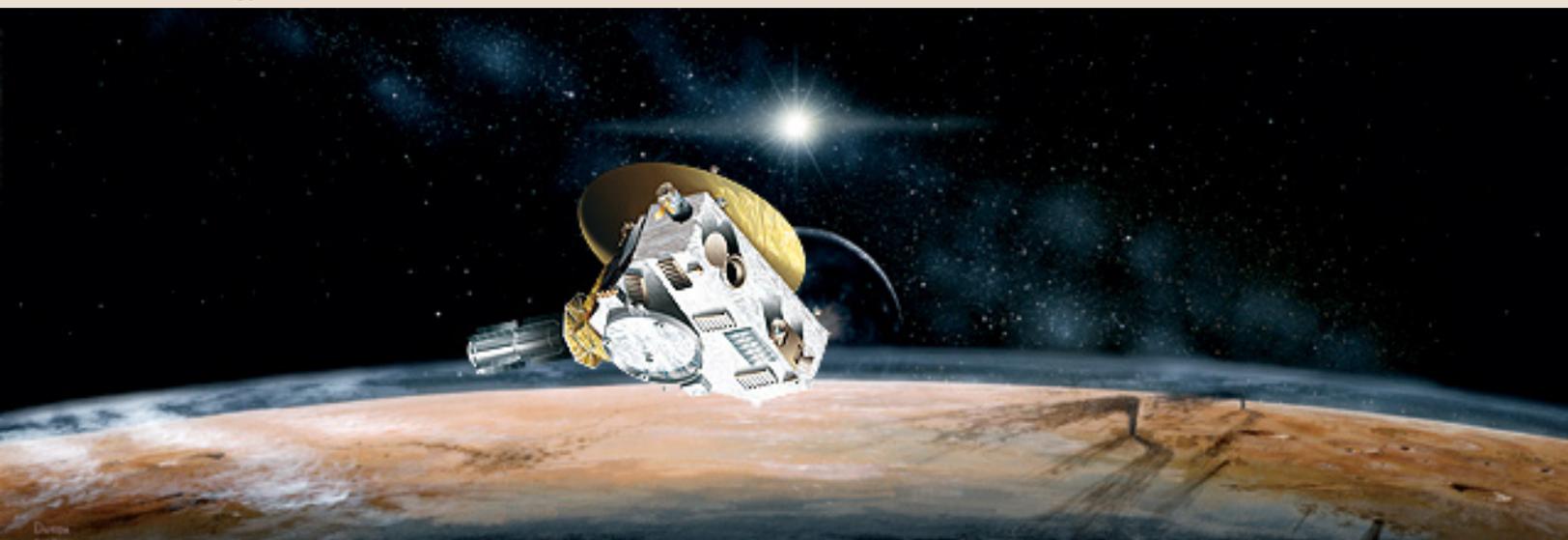
About The Johns Hopkins University Applied Physics Laboratory

The Applied Physics Laboratory (APL) is a not-for-profit center for engineering, research, and development. Located north of Washington, DC, APL is a division of one of the world's premier research universities, The Johns Hopkins University (JHU). The Laboratory has been a major asset to the nation since it was organized to develop a critical World War II technology in 1942. We recruit and hire the best

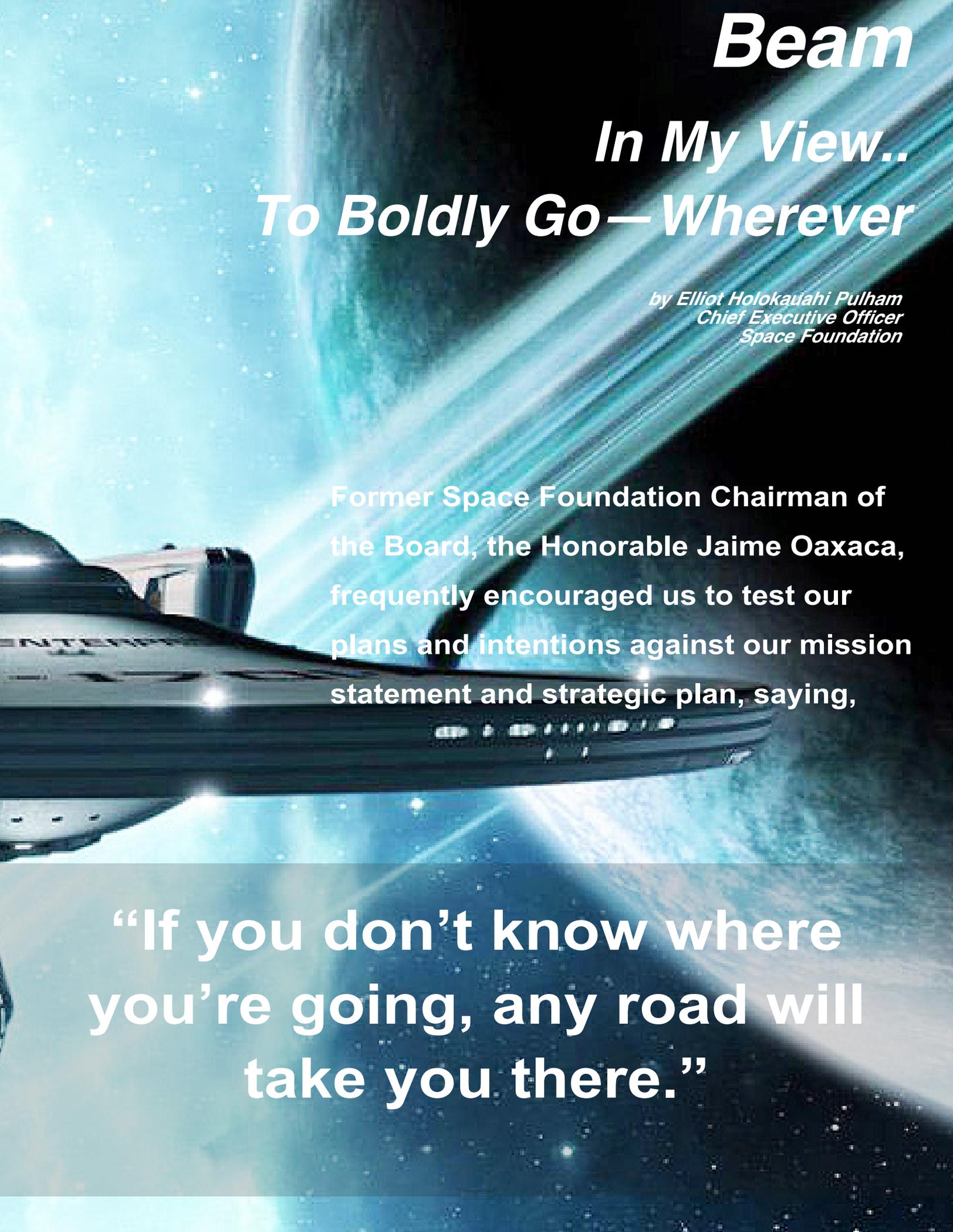
and the brightest from top colleges, and 68% of our recruits are engineers and scientists. We work on more than 600 programs that protect our homeland and advance the nation's vision in research and space science, at an annual funding level of about \$980 million.

APL solves complex research, engineering, and analytical problems that present critical challenges to our nation. That's how we decide what work we will pursue, and it's how we've chosen to benchmark our success. Our sponsors include most of the nation's pivotal government agencies. The expertise we bring includes highly qualified and technically diverse teams with hands-on operational knowledge of the military and security environments. We offer an outstanding and creative staff, augmented by world-class facilities.

*All images presented in this article are courtesy of **NASA/Johns Hopkins University, Applied Physics Laboratory.***





A futuristic space scene with a large blue beam of light and a spacecraft. The background is a dark blue space with a large, bright blue beam of light streaking across it. In the foreground, a white spacecraft is visible, partially obscured by the beam of light. The overall atmosphere is one of exploration and discovery.

Beam

In My View.. To Boldly Go—Wherever

*by Elliot Holokauiahi Pulham
Chief Executive Officer
Space Foundation*

Former Space Foundation Chairman of the Board, the Honorable Jaime Oaxaca, frequently encouraged us to test our plans and intentions against our mission statement and strategic plan, saying,

“If you don’t know where you’re going, any road will take you there.”

Sadly, this seems to be precisely the modus operandi of the Obama White House when it comes to civil space.

I have long maintained that we'd never really know this administration's intent toward NASA until we saw its first budget proposal. In January, that shoe finally dropped, and the news — a dim, lethargic, uninspired view of the future — was not good. The administration proposes to strip NASA of meaningful human exploration goals, and instead turn the agency into a space technology hobby shop with a charter *To Boldly Go Where Ever*.

The “yes, we can” team has told NASA “no, you can’t.”

For those of us who supported *Barack Obama*, the candidate, based on a clear and well-articulated space policy plank in his campaign platform, our disappointment is now complete. During the campaign, we were encouraged and excited about what this Administration could — and would — do for space.

Instead, we are facing arguably the worst presidential decision on space since *Richard Nixon* killed *Apollo*.

On August 2, 2008, Senator *Barack Obama* offered the space community hope with these statements:

“Let me be clear, we cannot cede our leadership in space.”

Yet his budget would do just that. By killing the *Constellation* program, the administration will make NASA entirely dependent upon Russia for launching American astronauts. Human-rated, lunar-capable space systems will remain in development in other countries, but not the United States.

“I’m going to close the gap, ensure our space program doesn’t suffer when the shuttle goes out of service, by speeding the development of the shuttle’s successor.”



A Constellation Earth Departure Stage, docked to the Crew Exploration Vehicle, fires its engine to leave Earth's orbit. Credit: NASA/John Frassanito and Associates

The development of the shuttle's successor, *Orion*, is to be sped to its grave. So the gap has not been closed, but rather reconfigured as a cliff. When the shuttle workforce draws down and skilled aerospace engineers and technicians lose their jobs, people who have dedicated themselves to the advancement of our space programs will suffer more, not less.

“More broadly, we need a real vision for the next stage of space exploration. This is what America is all about; we can do anything when we put our mind to it.”

Our nation’s vision for space exploration — to extend human presence throughout the solar system — is relegated to the historical scrap heap and no real or new vision has been articulated or even hinted at. The nation’s space agency is to become an observer (Earth observation missions), maintainer (International Space Station), procurer (commercial space systems), and tech incubator. But, minus an exploration mission, it is not clear what technology will be developed or why.

It is this tragic flight from human exploration that is the most damaging thing. For all its faults, NASA has played a crucial role over the past 50 years by inspiring

young Americans to dream — and then to dare to follow their dreams. The more active and visible NASA is, the more students enroll in and graduate from advanced science, engineering, computing, and mathematics programs. When we have exciting and visible space programs to leverage, our pace of innovation blossoms, and organizations like the Space Foundation are our most effective in the nation’s schools and classrooms.

As *Mark Mills* wrote recently for **Forbes.com**, “*The Moon program’s effect was profound and far-reaching, inspiring an entire generation of engineers and entrepreneurs. No, they didn’t all get government jobs with NASA or in private-sector companies supporting NASA to build the Saturn V rocket, the space capsule, its electronics or the moon rover and all the other related hardware. Most just found the whole idea — the pursuit itself — inspirational and pursued careers*

in everything from microprocessors and software to nuclear power and photovoltaics.

“The dots are not so hard to connect. The U.S. economy was in liftoff mode for most of the second half of the twentieth century. While there were several contributing factors, at the core the accelerant for growth was techno centric innovation. Not space technology per se but that generation of scientists and engineers who brought an unprecedented intellectual energy and excitement to peacetime pursuits. The inventions and new companies created in the shadow of Apollo were manifold.”

That was just one of many opinions — some insightful, some disturbing — published in reaction to the White House budget proposal. To see *Mills’* full article, enter the following URL into your web browser...

<http://www.forbes.com/2010/02/16/nasa-moon-mars-personal-finance-financial-advisor-network-space-program.html>

To see what others are saying, select this next link...

<http://newsletters.spacefoundation.org/spacewatch/articles/id/416>

When we are designing, building, testing, and flying new space hardware, we keep Americans employed in high-tech jobs that maintain our global technology edge and serve as a critical, and formidable, economic engine. We keep our young people in the **STEM** (*science, technology, engineering, and mathematics*) pipeline.

In this global economy, it’s one hell of a competitive advantage to walk away from.

In fairness, I should note that there are some positive provisions in the current budget proposal. I suppose we should all be grateful that the proposal gives NASA an additional \$6 billion over the next five years — a pittance, but in view of the overall tone of the entire proposal, a big relief. The budget could have been devastated.



Continuing *International Space Station (ISS)* operations until at least 2020, is something the *Space Foundation has advocated strongly.*

Emphasizing science, scientific research, and education are all also good things, especially in an era where the United States’ position as a scientific power is waning. But, how we can truly rebuild our position here is questionable with the direction the rest of our national space program is going?

And, finally, we are pleased to see the requirement and funding for NASA to make greater use of commercial, off-the-shelf space systems. It is not a substitute for having strong, capable national ways and means in space. However, as was the case with the first Air Mail



Artist rendering of SpaceX Dragon spacecraft delivering cargo to the International Space Station. Credit NASA

contracts, it does provide important seed corn from which good things can grow.

But, there is a key difference compared to the Air Mail contracts that spawned commercial aviation: back then, there were already private and commercial aircraft flying and ready to carry the mail. That is not at all the case with commercial space transportation systems, which haven't even begun to fly to orbit.

As of yet, there are no commercial systems that can take crew and cargo to orbit and dock with the ISS. There are, of course, several such systems in development. A **SpaceX Dragon** crew capsule prototype was on display at the **25th National Space Symposium**, and we look forward to seeing what commercial solutions are on exhibit at the upcoming 26th National Space Symposium.

However, financing, testing, regulating, and human-rating such systems will not be easy or inexpensive. Given the scale of investment required, and financial and technical risk that must be assumed, the markets for

these systems need to be global, as they are with the commercial aircraft industry, to enable a reasonable return on investment. Yet we're no closer to **meaningful ITAR** reform that would open those markets.

At the **Space Foundation**, we're completely in favor of stimulating commercial space activities and having the government "buy commercial" whenever possible. Our space transportation infrastructure has changed little over the decades, and revolutionary commercialization likely holds the key to routine, affordable access to space. But this requires more than a few NASA contracts. It requires regulatory reform, technology export reform, financial and tax incentives, loan guarantees, and many other components, including a national security space strategy for using commercial space transportation

as effectively as the Department of Defense uses commercial communication satellites.

Some have said, given the precarious economic situation and record-setting proposed federal deficits, we should sacrifice our civil space programs — at least for the time being. In the epic landscape of the \$3.83 trillion federal budget, this is nonsense. In the latest budget proposal, NASA accounts for just 0.49 percent of federal outlays. We could double the NASA budget and round it up to 1 percent — something the Space Foundation has long argued for — and we, as a nation, could reach for the stars again without creating even a ripple in the federal budget.

In fact, this is the most crucial time to invest wisely in a vigorous NASA human exploration program — to stimulate the economy by the creation of new jobs, new technologies, and entirely new spin-off industries.

Much of the reaction to the Obama proposal bemoans the manner in which this budget throws away the fruits

of billions of dollars already invested in Constellation systems. Hardware has been built, engines have been fired, lunar excursion vehicle prototypes are in field test, and the **Ares 1-X** demonstration launch vehicle has had a successful first test flight. **Orion** is taking shape, a Constellation systems launch pad has been built, and, across the country, systems are being integrated.

But, for NASA, this is business as usual. NASA is no stranger to promising programs being cancelled (think *Venture Star*) or sent back to the drawing boards (think *ISS*). These perturbations are costly and wasteful, but industry is tragically familiar with the seeming capriciousness of its government customers, and will flex as it must. As usual, it will be the rank-and-file workers who will be left asking themselves why, in this environment, the administration would take unilateral action that puts thousands of Americans out of work.

If there is a silver lining in all this, it is that Congressional approval is required, and many space champions on both sides of the aisle are grievously concerned. This creates a golden opportunity for industry to set aside its normal competitive differences, and work together toward a consensus exploration agenda for the nation that can be embraced, and funded, by Congress for the long term.

Perhaps a sleeping giant has been awakened. A space exploration program with enduring bipartisan support, one that can weather changes in administration and remain on course, would be a worthy legacy for generations of Americans.

In my view, our esteemed former chairman of the board was correct: ***If you don't know where you're going, any road will take you there.***

Adopting that paradigm for NASA is unacceptable. Too much is at stake.

The NASA budget proposal will be covered at the upcoming **26th National Space Symposium**: On Tuesday morning, April 13, we'll have a panel discussion, NASA — The Budget and The Way Ahead, that features:

- » ***Deputy NASA Administrator Lori Garver***
- » ***FAA Associate Administrator for Commercial Space Transportation, Dr. George Nield***
- » ***George Washington University Space Policy Institute Director Dr. Scott Pace***
- » ***Commercial Spaceflight Federation President/ NASA Advisory Council Commercial Space Committee Chair Bretton Alexander***

Then, on the closing day, April 15, NASA Administrator **Charles Bolden** will be a featured speaker.

Let us know what you think! Your comments are always welcome at our [Facebook fan page](#), on [LinkedIn](#), or via [Twitter](#). 

Image: The LightWorks





Beam

In My View Satellites To The Rescue... Haiti + Beyond

*by Hoyt Davidson, founder and
Managing Partner of Near Earth LLC*

By now you have all probably seen heart breaking, high resolution satellite imagery of the destruction in Haiti. The speed with which *GeoEye* and *DigitalGlobe* disseminated these images around the world was truly amazing. With extensive databases of recent imagery, these companies were even able to provide side by side pictures of before and after.

Google is also putting images from multiple sources into **Google Earth** together with maps, including earthquake epicenters, so that anyone with an Internet connection can freely access up to date imagery and related geographic information.

These satellite based capabilities are fundamentally changing the world's ability to respond to disasters and, no doubt, played a major role in accelerating and energizing not only the relief efforts of many governments but also the charitable contributions of millions of people. On the ground these images continue to provide rescue and relief operations

with critical intelligence information. Because of this capability hundreds of millions of dollars will move more expeditiously and be deployed more efficiently; yet it is almost for free. What is this capability worth to an ever more fragile and dangerous world?

As usual, satellites have also been crucial in providing the communication networks necessary to support rescue and relief efforts. The earthquake took out much of the landline and wireless infrastructure and even severed the submarine cable linking the island to the global network, but within literally hours, satellite firms were setting up emergency networks and in many

cases even donating satellite capacity and equipment to governments, media and telecom companies and humanitarian organizations. This has been true of past disaster incidents as well, but this time the speed and magnitude of the support is quite breath taking.

I understand that **Intelsat S.A.** had a dedicated team and a fly-away system in Port-au-Prince airport almost immediately, providing on-site coordination and transmission services. They quickly established two communication networks — one in C-band and one in Ku-band, including Intelsat's **GlobalConnex Network Broadband** service, using capacity on **Intelsat 907** and **Horizons 2** satellites.

Not to be out done, **SES World Skies** donated satellite capacity on five of its satellites (**AMC-1**, **AMC-6**, **AMC-21**, **NSS-7** and **NSS-806**) plus access to teleport facilities. **CapRock Government Services** provided full end-to-end satellite communications support and connectivity to the **U.S. Marines Corps**.

Iridium had already pre-positioned its satellite handsets with a variety of services and organizations for their use in such emergencies, including local telephone companies and to **Spirit Airlines**, which has resumed flights in and out of Haiti. Inmarsat provided its *Broadband Global Area Network* (**BGAN**) terminals to **Telecom without Borders** and DBSD is making available to the U.S. government its S-band satellite capacity for two-way mobile communications or broadcast video services throughout Puerto Rico.

Stratos is providing Inmarsat, Iridium, and VSAT satellite equipment and services to several agencies and **Spacenet** is offering help through its existing services to Haiti. **Globecomm** has joined in, as has **SkyTerra** and **SkyPort**. **PSSI** is even donating its satellite trucks for a Haiti fund raising concert in the U.S.

Beam



Dwellings on steep ridges south-west of Port-au-Prince, in the Bolosse area. © GeoEye — Images viewable in Google Earth.

Perhaps with practice, the satellite industry and relief agencies are just getting better at disaster response or perhaps it is just the greater power, usability and availability of today's satellite technology. Either way, there seems to have been vital lessons learned from previous disasters, not that we are now anywhere close to perfection. However, the importance of restoring communications quickly and broadly is now widely recognized as step one and the satellite industry has responded accordingly.

I am proud of the satellite industry for its progress and its generous contributions, but the scary part is that even today most of these communication efforts are being done on a somewhat ad hoc and uncoordinated basis. With an international effort involving many countries and dozens of agencies, who is in charge?

Setting up communications involves emergency requests by a vast array of first responders and service providers for satellite capacity, equipment and services going out to a large number of satellite telecommunications companies. On top of that is a need to integrate the unsolicited donations of satellite capacity, equipment and services. Who decides which agency should get which satellite assets? Who sets the priorities for utilization of scarce bandwidth?

If robust and quick satellite communications is critical to saving lives and efficiently using disaster recovery resources, is

patching together a multitude of solutions in real time the right strategy?

With electrical power we have learned our lesson from costly brown outs and black outs. Today, the electric grid is designed to have excess capacity to handle unusual peak loads (*e.g.*, extremely hot summer days).

That peak capacity mostly sits idle and is therefore very expensive per kilowatt-hour of usage, but when needed its existence is critical to sustaining our lives and economy. Shouldn't we also have peak capacity for satellite communications; capacity that is dedicated and ready at a moment's notice for disasters and with agencies and users trained to use it? What, if like Haiti, a once in 200 year earthquake hit Los Angeles? Or, New York was attacked by a weapon of mass destruction and you had 10 million people at risk and without communications? How forgiving would the citizens be that their government did not plan for such a scenario? Just as with hurricane Katrina, there would be headlines that such a need was foreseeable and the politicians did nothing. After all, some Black Swans are really just Grey Swans. We know a "Big One" will hit one day and we know the terrorists want to hit us hard.

There is no technological excuse. The technology to establish emergency satellite connectivity is well in hand. With high throughput satellites and steerable spot beams, we now have the ability to launch what would basically be a nationwide or even regional insurance policy; guaranteeing the availability of dedicated fast 2-way bandwidth targetable to an impacted area in the event of a mega-disaster. A robust capability could also be built over time by adding one or more steerable beams to each new FSS satellite that is placed into GEO. With excess MSS capacity (**Iridium**, **Globalstar**, **SkyTerra**, **TerreStar** and **ICO**), we also have the ability to lock up significant capacity for emergency mobile communications.

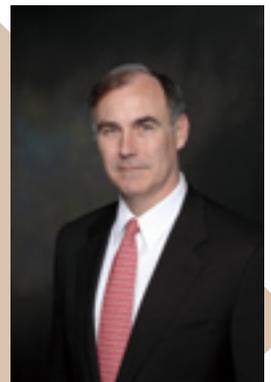
The conceptual leap that has to be made is that, like peak electrical generating capacity that mostly sits idle, this emergency satellite capacity is just as vital to our livelihoods. Its cost should, therefore, not be compared to normal marginal usage, but to the value delivered when needed. If we are truly serious about homeland defense, whether against manmade or natural disasters, shouldn't significant dedicated satellite capacity be part of the planning?

Having the government as an anchor tenant for an appreciable amount of stand-by capacity would also enhance the ability of satellite companies, particularly the MSS and satellite broadband providers, to finance, launch and maintain their businesses and thereby offer consumers and corporations affordable 21st century satellite services. To hold the cost down, any standby capacity acquired by the government could be made available for resale by the satellite operators on a preemptable basis. There are many other potential public/private models that might work. The key point is that like the U.S. government's support of Iridium, GeoEye and DigitalGlobe, wise investments of taxpayer dollars have generated substantial and global benefits. Let's remember that the next time we view a satellite image on the front page of our morning newspaper or hear about a doctor in Haiti using an Iridium phone to order medical supplies.

When it comes to disaster relief and recovery, isn't it time to get serious and plan for tomorrow's needs? The technology is here; we just need the political will.

About the author

Hoyt Davidson is the founder and Managing Partner of Near Earth LLC, a New York based investment bank and advisory firm focused on the satellite industry, wireless telecom and the aerospace industry. At Near Earth, Mr. Davidson focuses on providing strategic and financial advisory services to the satellite and aerospace industries, including: (1) buy and sell side M&A; (2) private equity financings; and (3) valuation and due diligence support for leading private equity and hedge funds as well as major strategic investors. Mr. Davidson has a S.M. degree (MBA) MIT's Sloan School of Management and a B.S. degree in Physics from MIT.



Pay Radio — The European Race Is On...

by Chris Forrester



The past few weeks have seen some major progress in terms of an international roll out for pay-radio. *SatMagazine* has faithfully followed the news from Ondas Media and its plans for a European pay-radio roll out by satellite.

The Company has been busy showcasing its new developments at Barcelona's giant Mobile World Congress exhibition. They are super-sexy.

However, we also now know that **Liberty Media**, through a wholly-owned subsidiary, has its own plans to mop up the **WorldSpace, Inc.** assets out of Chapter 11 bankruptcy. Liberty's 40 percent relationship with **Sirius-XM** is also important in this mix. There's also the question of **Sky Terra** to consider.

Liberty Media CEO *Greg Maffei* confirmed that WorldSpace, which Liberty is in the process of acquiring from bankruptcy, will go global. Mr *Maffei* told analysts during Liberty's results conference that WorldSpace has L-band spectrum access worldwide [*not quite true/Ed*] and that Liberty was looking to develop the now somewhat lapsed WorldSpace assets.

Mr. *Maffei's* comments must be read in close conjunction with those of Sirius-XM, in which Liberty holds a 40 percent stake.

At almost exactly the same time, Sirius-XM said: "We have entered into a letter of intent with a Mexican company, ACIR DARS Mexico, S. de R.L. de C.V., to pursue a license to offer satellite radio in Mexico. ACIR DARS Mexico has filed an application for a license to offer satellite radio with the Mexican government. The letter of intent contemplates us receiving a royalty from ACIR DARS Mexico as well as an option to acquire an equity interest in such Mexican business."

The 'not quite true' statement concerns the UK, where **Qualcomm** has the L-band (1467-1492 MHz) terrestrial frequency rights.

An **SEC** 'annual report' 10-K filing made February 25 by Sirius-XM also talks of Sirius-XM's long-held relationship with WorldSpace, in particular a *Technology Licensing Agreement* dated January 1, 1998 (and amended six months later). A key — but telling — phrase bluntly says, "Other regions. We are in discussions with various parties regarding possible joint ventures in other countries."

It is also worth remembering how all-embracing Sirius-XM is in North America, and how these vehicle brands are just as well known outside its current operating region. "We have agreements with every major automaker — Acura/Honda, Aston Martin, Audi, Lamborghini, Bentley, BMW, Chrysler, Dodge, Ferrari, Ford, General Motors, Honda, Hyundai, Infiniti/Nissan, Jaguar, Jeep, Kia, Land Rover, Lincoln, Lexus, Toyota, Scion, Subaru, Maybach, Mazda, Mercedes-Benz, Mercury, Mini, Mitsubishi, Porsche, Rolls-Royce, Volvo and Volkswagen — to offer either Sirius or XM satellite radios as factory or dealer-installed equipment in their vehicles. As of December 31, 2009, satellite radios were available as a factory or dealer-installed option in substantially all vehicle models sold in the United States," stated the SEC filing made by Sirius-XM.

There's another global satellite system that so far has made little impact on Europe. **SkyTerra Communications** wants to rollout a global satellite operation, starting later this year with the launch of



Circa 1924 — The RCA-GE Radiola Super-VIII, a six tube, catacomb-type, superheterodyne chassis with built-in antenna and built-in horn speaker.

SkyTerra 1 from the Baikonur Cosmodrome. The trouble is that the Sky Terra operation might just run out of cash.

First, a little background: SkyTerra started out life as **Mobile Satellite Ventures** (MSV) with **TerreStar** as a shareholder. TerreStar was earlier known as **Motient**, and Motient was one of the founders of **XM Satellite Radio**. In other words, SkyTerra isn't just about mobile phones, fascinating as that is, but also has an eye on the global radio entertainment space, which is now beginning to have some interest for us in Europe.

The current position is that Europeans have at least two players committed to providing satellite radio to cars and handheld devices in the shape of **Ondas Media** and **Liberty/WorldSpace**. Ondas Media is still putting its plans together but has signed up some major car names for an introduction next year, although test transmissions might begin sooner. **Liberty** now effectively owns the WorldSpace satellites and also controls 40 percent of US pay-radio operator Sirius-XM — Sirius-XM and Liberty both having confirmed that they are committed to rolling out an international pay-radio service. It could be that Europe would have two rival systems an offer which is perhaps good for competition, although not necessarily offering minimum confusion for potential subscribers.

Back to SkyTerra... Sky Terra has as its major investor in the shape of **Harbinger Capital Partners**. Harbinger is also a major investor in London-based **Inmarsat**. And Inmarsat has absolute access to a large slice of L-band frequencies over Europe (these are similar to the L-band frequencies in use by **Solaris Mobile**, a 50/50 joint venture of **SES Astra** and **Eutelsat** and likely to be used by Ondas Media — More on Solaris Mobile in the follow-up feature...).

On March 1, SkyTerra confirmed it has paid \$31.5m to Inmarsat in cash to maintain L-band spectrum rights that were agreed to by the two businesses back in December of 2007. Paying the money gives SkyTerra

until September 2011 to decide how it wants to use the Inmarsat L-band spectrum, when it must then cough up several hundred millions to actually access the spectrum. It sounds like a lot of cash but it is actually much less expensive than launching a fleet of satellites!

Key to this admittedly complicated story of inter-relationships is the use of ground-based frequencies, called *Ancillary Terrestrial Components* (**ATC**), which the Americans have granted to satellite operators and which ensure that signals get through to users even in the deep content canyons of Manhattan as well as in the open countryside. Similar terrestrial repeaters will be used in Europe to boost satellite reception of video and audio signals to cars and cell-phones.

In other words, all of SkyTerra's ducks are lining up in a row, ready to be used for a global satellite operation beaming services (which could include broadband, as well as video and audio) to vehicles and smart-phones in the USA as well as potentially over Europe. But there are now major questions over how much cash it has left in its bank to fund this ambitious programme.

SkyTerra has already paid \$491m to **Boeing** to build its first two satellites, but more is due. The company says it has to find another \$211m in the first nine months of this year. To help meet a probable funding gap measured in the tens of millions, it has already had to "suspend" certain major payments totally \$155m. And it said March 1st that it expects to have \$155.4m in cash at the end of October, which some say is much too tight a position to be in if it wants to roll out services this coming winter.

Should Sky Terra restructure itself to guarantee a wider presence outside of North America, then it is quite possible that there will be three competing satellite pay-radio systems over Europe. They are:

- » **Solaris Media, probably with Ondas Media using its S-band frequencies**
- » **Liberty Satellite Radio, using Sirius-XM's skill set and WorldSpace L-band assets**
- » **SkyTerra, supplying L-band frequencies leased from Inmarsat**

Does The Market Exist?

It is true that satellite-delivered mobile TV (and audio) has had a somewhat lacklustre performance to date. A new study states that the satellite mobile TV market will soon be worth an impressive \$11bn a year.

Despite the limited audience and coverage of services, the market for mobile television is expected to witness rapid growth, providing potential opportunities for content providers, mobile operators and handset manufacturers. Increase in mobile device penetration rate as well as rising popularity of TV services is expected to boost the popularity of mobile TV services among consumers. Success is determined by factors such as availability of compatible cellular phones, support for wide picture quality and high rates of data transfer. Mobile handsets equipped with standards of analogue broadcast, **DVB-H** (*Digital Video Broadcasting for Handhelds*) and **CMMB** (*China Mobile Multimedia Broadcasting*) are expected to witness significant growth. The developing countries of Brazil, China, and India are expected to foster growth in the market for mobile TV services, says **Global Industry Analysts Inc.**, in a new study.

"Growth is driven by the transition of terrestrial TV signals to digital airwaves from analogue as well as free wireless TV technologies such as MediaFLO and DVB-H. Satellite-based services are forecast to foster growth by offering affordable solutions for reliable and high-quality delivery of mobile TV services in Europe. The development of interoperable standards and availability of free spectrum space is expected to

encourage the development of high-quality content for mobile television. Developing countries of Brazil, China, and India are expected to foster growth in the market for mobile TV services.

"The Asia-Pacific region offers vast growth opportunities for the mobile television market, and is expected to witness large-scale expansion in the subscriber base as well as service revenues. Rapid growth is attributed to factors such as increasing penetration of mobile handsets and availability of services on a free-to-air basis. Affordable subscriptions and unlimited packages hold high significance for mobile TV services in Asia-Pacific countries. Japan and South Korea represent the leading markets for mobile TV services in Asia-Pacific region, while China and India offer the enormous growth opportunities for market participants," adds **GIA**.

That's all very well. But most critics of 'mobile TV' (and radio) suggest that as far as Europe is concerned, the region is *VERY* different to the USA. Europe has a well-developed terrestrial TV and radio business, while the urban areas enjoy ample 3G telephony. Moreover, the dozens of different languages and complex licensing requirements create additional headaches.

Nevertheless, **Ondas Media** is pressing ahead, and we can see that the combined might of Liberty+Sirius would create be a formidable marketing entity with skills and cash a-plenty to create a buzz in some key European markets. The position of Sky Terra is more questionable, at least until its own future is more secure. Either way, the future looks extremely interesting.

And speaking of Solaris Mobile... next page for Chris' continuing Insight...



strategy: Solaris Mobile

by Chris Forrester

Ofcom “does not understand the market”

Solaris Mobile is the 50/50 joint venture between Eutelsat and SES Astra, designed to bring pay-TV services to phones, other handhelds, as well as in-car video and audio entertainment, by satellite. The Company has been busy showcasing its new developments at Barcelona’s giant Mobile World Congress exhibition. They are super-sexy.

The word from **Solaris** is that there’s a good chance of services rolling out this year. “There’s an even better chance of us entering into a revenue-bearing relationship with someone this year,” says CEO *Steve Maine*.

First up is a test vehicle at Barcelona fitted with a rugged **Quantum** set-top box (STB). Signals come in from **Solaris Mobile’s** satellite, as well as terrestrial repeaters, and the single

box is capable of receiving multiple channels and audio services. Mom or Dad can listen to satellite-delivered audio in the front seats, while two kids in the back of the car can each have their own channels, either to pre-fitted seat-back TV monitors or re-broadcast to their iPhones.

Second development at Barcelona is the Solaris Mobile pocket WiFi **Gateway** device, developed into a prototype for Solaris by **Elekrobit**

Insight

(a spin-off from **Nokia**). It was Elektrobit which developed the S-band cell-phone for Terrestar's US service. Solaris says that the development of S-band equipped phones will also be important to them.

from the terrestrial repeaters is also good. Maine says one of the key questions they have been asking themselves was how they might get to the stage where the market had available to it a large number of S-band

The Solaris Mobile Pocket Gateway is a pocket sized S-band receiver which decodes DVB-SH TV, radio and data streams and relays them over WiFi via a mini web server built into the device. This technology allows any compatible smart phone with WiFi and a web browser to access mobile TV and radio over Solaris Mobile's hybrid network without modification.



devices. "Handsets, PDAs, laptops, dongles, whatever. It is easy to imagine us helping get a large number of S-band dongles into the market. They're cheap, easy to produce.... But what if we could develop a device that had an S-band

The **Quantum** box is very clever. It picks up the incoming S-band signals from the satellite and automatically converts it to DVB-SH. Live satellite broadcasted TV, Video on Demand from the local storage on the microSD and added-value services through data casting, are the three main applications that the Quantum box can deliver simultaneously and independently to multiple users in any vehicle like private cars, public transportations, buses and trains as well as yachts for maritime applications.

These same DVB-SH services can be received by suitable handheld cell-phones, of course, but fitting units to buses or trains, and allowing users to pick their own channel could be a powerful marketing device for future Solaris customers.

Steve Maine said the experiments (in Paris, Berlin, Barcelona and elsewhere) show that indoor penetration

receiver in it, and perhaps even an S-band transmitter in the future? So this was our starting point: creating an S-band device that could easily communicate with existing terminal devices — like handsets, laptops, PDAs, and using very well-established standards and protocols like WiFi and Bluetooth."



Solaris Mobile's Quantum box

Maine suggests that S-band could — over time — get itself established and inserted into laptops and other devices, but meantime it would be good to have a gateway system that tapped into the zillions of existing devices. The prototypes are today about the size of a PDA, but production models will be half that size.

Solaris was giving away boxes of mints at Barcelona in the anticipated size of the new gateway devices! “They can be in your pocket, or briefcase, or the dashboard of a car, and will pick up a signal and create a WiFi hot-spot, that’s easy to log onto. Imagine you are at home, in the office, or on a train or a bus, and yet do not have a full S-band receiver, well this dongle will be your portal to our S-band network. We think it could be significant in getting us traction.”

He added that this is just the start of Solaris Mobile’s program, which will roll out throughout 2010, “Even using our damaged satellite,” he stressed, referring to the S-band antenna problems on Eutelsat’s W2A satellite. “We’ll roll-out new kinds of consumer equipment, and we are using Barcelona to talk to some very important potential customers and service providers.”

One rumor has it that Solaris Mobile might get close to would-be pay-radio operator Ondas Media. “Not so,” says *Maine*. “This is not to rule out that downstream we might engage

in the provision of services to end users, but this is not where we are today. It is all down to priorities and we do not yet have our core services up and running. And they need more investment.”

Maine says that Solaris Mobile will be concentrating on fulfilling its Europe-wide reception obligations, as

defined by its EU-wide license. “We have found that we more than meet the EU requirements and can fulfill service to more than 85 percent of the European

strong possibility is that we will sign up a major **TMP** [*Traffic Management Product*] supplier in France.”

“We do need another satellite, there’s no doubt about that”

land-mass,” he said. “But we cannot run the complete number of services [because of the antenna problem]. We do need another satellite, there’s no doubt about that. But meantime we can meet all our Stage One objectives, and the EU has accepted that.”

As to a replacement craft it seems that **Eutelsat** and **SES Astra** are each relaxed about making a further investment in the S-band project. **Solaris 2** faces three possible outcomes: (a) the project continues but without further orbiting investment; (b) another piggy-back solution is engineered, similar to the W2A scheme; (c) a stand-alone satellite is procured.

Solaris 2, says *Maine*, is being fast-tracked as far as project evaluation is concerned, but Solaris Mobile’s partners have yet to come to a final view, but *Maine* suggests that there’s a degree of optimism about the process, and option (a) is not being considered. Last week, for example, *Romain Bausch*, CEO at **SES**, suggested that mid-year would probably see a firm decision. *Maine* says the decision is on his near-term agenda.

The immediate plan is for Solaris Mobile to continue its high-profile demonstrations to potential clients and service providers, and showcasing what the service is capable of. “Some are interested in pan-European services like Ondas Media, other potential clients just want national services. We are, however, certain that hybrid solutions are going to be attractive and one

Maine said that France was very high on his agenda, as were the German, Italian, UK and Spanish major markets. “The position taken by OFCOM and its proposals for fees for S-band services into the UK will not make the UK the most attractive market to enter!” *Maine* said that Ofcom had gone through two lengthy consultation processes, “and pretty much ignored everything we said”. *Maine* said, “Ofcom is proposing to charge about £400,000 per annum, per MHz-paired. Brussels has, of course, given us a pan-European authorisation to operate, but that the successful applicants would still need nationally-issued licenses to operate. As was envisioned, we have obtained national licenses, but some people, like Ofcom, have come to the conclusion that there should be punitive fees associated with our scheme.”

Maine says that he has a bar chart which covers the whole of Europe for national administrations and their license costs. “Ofcom is way, way out of line. It makes the UK the least-attractive market in Europe to launch our S-band services,” he says. “Ofcom seems to think this is another 3G gold mine. But remember 3G came along when there was already a mature mobile communications’ market. The guys who were bidding for 3G licenses already had profitable businesses. And most of them subsequently considered they had significantly overpaid for their 3G spectrum. We are not 3G.

“Ofcom has taken a very Mickey Mouse view of this. Worse, in our view, they have totally misread the dynamics of what is going on in our market sector.”

"We don't have the flexibility, or the infrastructure of 3G. These Ofcom charges risk killing off a business before it even gets started. Our cost base is totally different. We have to invest up front in a very expensive satellite. They don't. We have to cover Europe. They don't. Ofcom has taken a very Mickey Mouse view of this. Worse, in our view, they have totally misread the dynamics of what is going on in our market sector. The network capabilities we have could be very advantageous to existing mobile operators. We are not looking to damage them, but to complement them. Ofcom seems to have become hooked up on [revenue] dogma without understanding what the market is." 

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.



Ondas Media & Solaris Mobile — More than just friends?

Dave Krueger, of Ondas Meida says. "Ondas Media is cooperating with Solaris Mobile and have been very supportive of their campaign from the beginning. It is clear that we do so with the intent of becoming even more aligned over time as we both move to commercialize our respective projects. As you would expect, our teams are highly focused on developing the current system now that the anomaly investigation is complete. We will certainly help each other in crucial fundraising activities as both companies need capital to carry out their full business plans."

Steve Maine, of Solaris Mobile says, "It is important that we are very clear as to what we are going to do. We are not going to invest a penny [of the \$130m insurance claim received for the antenna problems] into a service provider. We will put our cash into network infrastructure. We are looking to position ourselves as a network service provider on a commercial basis. This is not to rule out that downstream we might engage in the provision of services to end users, but this is not where we are today. It is all down to priorities and we do not yet have our core services up and running. And they need more investment."

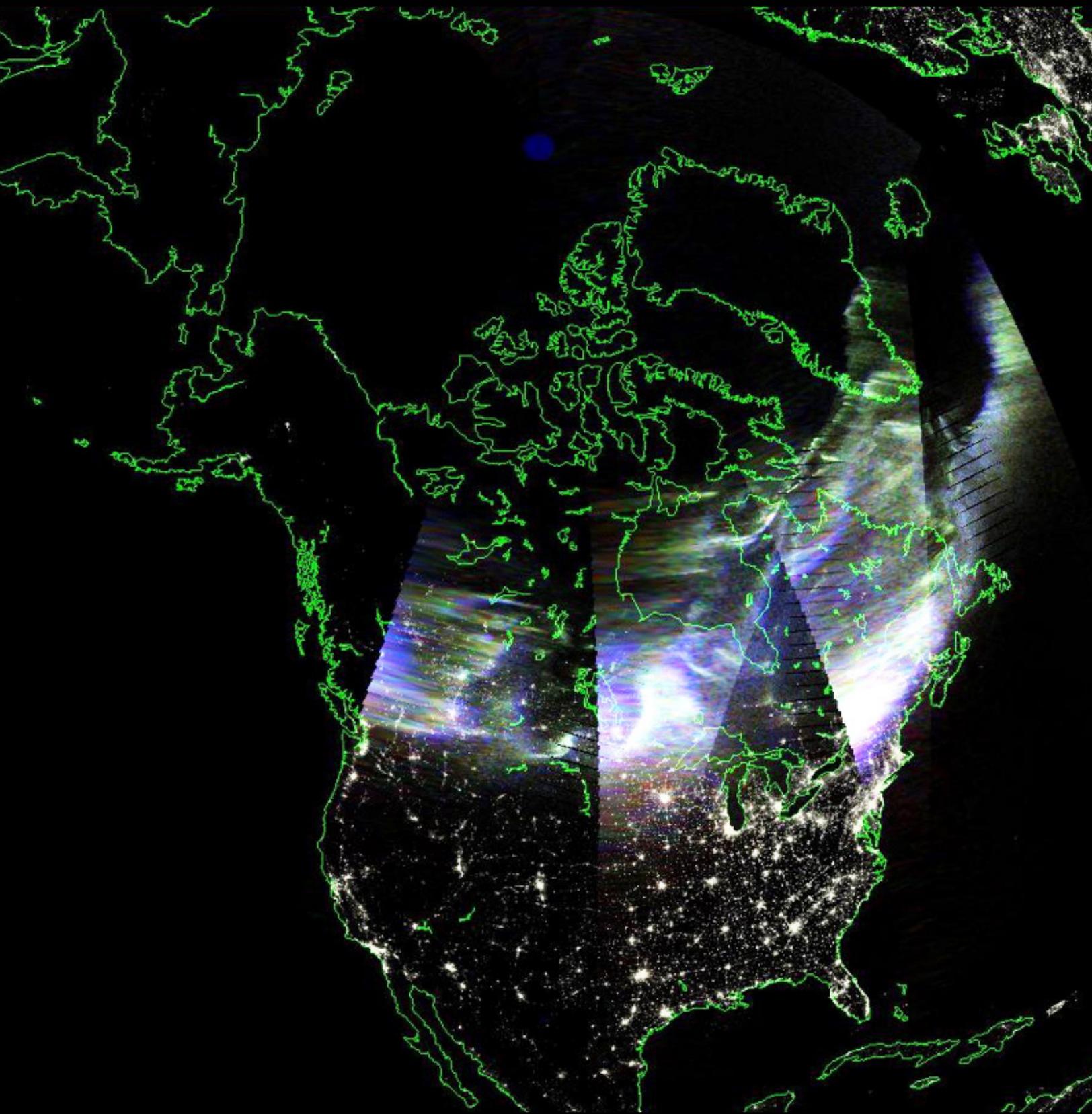


Image courtesy of NASA/APL/Meteorological Satellite Applications Branch, Air Force Weather Agency

SatApps Innovation = Industry Growth

Despite a tough economic environment, innovation continues to be observed in satellite services and a number of new applications are emerging. The current development cycle appears to be driven by an increase in diversity but also in the quality of TV broadcasting, along with growing needs for mobility and broadband services in satellite-based communications.

Insight

The four innovation fields presented below illustrate the dynamism of satellite technology and its capability to allow for new applications to develop.

HDTV Services Continue To Spread While 3DTV Is Nascent

Challenged by the competition of terrestrial and other satellite TV broadcasters, satellite pay-TV platforms are investing massively in the development of innovative services, including HDTV, and even 3DTV services.

Despite the economic crisis, satellite pay-TV platforms continue to roll out HDTV services. The more mature digital TV markets lead the way (the United States, Europe, Korea, and Japan) and emerging markets have recently jumped on the bandwagon. The number of satellite platforms offering HDTV more than doubled in the last couple of years to reach almost 50 in 2009. Slovakian platform **MagioSat** was the latest to do so in early 2010. The two US satellite broadcasters, **DirecTV**

and **Dish Network**, have the largest HD offers with each broadcasting more than 150 HDTV channels.

The next valuable service to be offered by platforms will be **3DTV**. In 2009, the flourishing of public 3D demonstrations was largely driven by TV manufacturers and movie producers. In 2010, 3D screens will progressively be rolled out around the globe by **Samsung, Panasonic** and **Sony**.

The soccer **World Cup** in South Africa and the success of 3D movies are expected to boost public awareness of 3DTV. **SkyLife** in South Korea became the first satellite TV platform to offer a 3DTV channel in early 2010, and **Sky Digital** and **DirecTV** should follow this same path in the first half of 2010.

Even with these developments, we are several years away from a 3DTV mass market. While growing, the consumption of HDTV is still small in most national



TV markets. The cost of a 3DTV screen, the need for glasses and the lack of compelling content should limit the launch of 3D channels in the next few years, giving it a similar growth pattern to that found in the early years of HDTV. Nevertheless, it is a growth driver for satellite operators because of the bandwidth requirements and the possible difficulty in transmitting 3D channels over sections of terrestrial networks.

Broadband Satellite Services Outside The USA

While broadband access and distribution by satellite in Ka-band was introduced several years ago, this application field remains an emerging market. Beyond services currently in place that have signed around 1.5 million subscribers worldwide (of which 1 million are

in the US), the new satellite systems that are planned for launch in the next three years should dramatically increase Ka-band availability in North America and EMEA as a result of the investments of **Viasat**, **HNS**, **Eutelsat**, **Avanti**, **Arabsat**, **YahSat**, and **O3b**.

While satellite network operators have begun to sign distribution and reselling agreements, continuous innovation at terminal and service levels will generate a progressive increase in Ka-band usage as satellite broadband services target not only consumers but also businesses and military users. It will, however, require several years to educate customers to use this new frequency band, as was the case with C- and Ku-bands.

New SATCOM Solutions For The Aeronautical Market

The airline industry is currently the target of a wave of new satellite applications that include high-speed broadband communications, in-flight passenger entertainment services and low-data rate flight tracking solutions.



Today, more than 30,000 SATCOM terminals are estimated to be deployed on aircraft and business jets, most still operating with L-band satellite capacity. New aero SATCOM solutions are primarily driven by growing data communications requirements. On one hand,

broadband systems such as **Inmarsat SwiftBroadband** are close to gaining traction for cabin communication solutions in order to support GSM usage on-board through pico-cell technology.

New contracts have been announced recently which see **Oman Air** and **Afriqiyah Airways** adopting **Inmarsat** solutions from **OnAir**. On the other hand, lighter and smaller low-data rate terminals are in development for flight tracking applications such as the **Iridium SBD 9601**.

Aero SATCOM systems in Ku-band have recently gained major attention with the idea of in-flight broadband connectivity services for passengers on commercial airlines. Currently **Arinc** and **Viasat** (both using **ViaSat** technology) as well as **Row44** (based on **Hughes HX**) and **Panasonic Avionics** (based on **iDirect** technology) provide commercial service, or are in trial phase. Viasat recently stated its ambitions for aeronautical systems in Ka-band as the company sees bandwidth demand exceeding Ku-band capacity.

M2M Satellite Communications Begin To Takeoff

Machine-to-machine (M2M) is a growing communications market that benefits from satellite technology. Satellite systems serve a wide range of

customers for M2M applications with more than 1.5 million terminals in 2009. A number of new products and services have been released and adopted in the last 12 months.

In July 2009, **Globalstar** launched a new generation of terminal, SPOT 2.0, which is smaller in size and more capable than previous versions; the terminal is priced at \$170 with an annual service plan starting at \$100, making it affordable for various consumer applications.

In December 2009, Orbcomm announced that its new AIS (Automatic Identification System) service has proven its capability in search and rescue missions by the International Maritime Organization (IMO) and Australia's Rescue Coordination Center.

In early 2010 Iridium unveiled its next-generation Iridium 9602 satellite data transceiver which is significantly smaller and lighter and considerably less expensive than the first-generation SBD modem. This new system was chosen by SkyBitz, a leader in asset tracking services, for its Global Locating System (GLS) services targeting primarily the commercial trucking industry.

With the acquisition of SkyWave, a large M2M SATCOM service provider, Inmarsat captured more than 50,000 subscribers operating in Canada, the US and Mexico.

A growing need for the monitoring of critical goods and infrastructures in remote areas should also benefit VSAT solutions using Ku-band satellite bandwidth. More than a capacity and terminal business, this market should offer large service opportunities in the coming years. 

SAT Expo Europe 2010

Internationalization and B2B meetings were the keys for this show's success. The third edition of SAT Expo Europe 2010 held at Rome Fair has ended. Over 6,000 visitors, more than 2,000 business meetings, and 20 foreign delegations, were present over the three days of the exhibition. SAT Expo Europe successfully achieved its objective of presenting itself as a Mediterranean benchmark for the market of space services and applications.



“The space agencies that took part in the exhibition (ASI, ESA, NASA, ISRO, ISA), the India Partner Country and 20 foreign delegations gave the event an international profile, which was our main objective” said *Paolo Dalla Chiara*, president of **SAT Expo Europe** at the close of the event. “Particular satisfaction,” continues *Dalla Chiara*, “comes from the number of B2B meetings that were over 2,000 in number, held in the B2B Meetings Area, and which saw the participation of 243 company representatives (210 suppliers, 43 buyers and 39 exhibitors) and more than 160 between industries and institutions from 20 foreign countries (Algeria, China, Czech Republic, France, Germany, Ireland, Israel, Italy, Morocco, Holland, Palestine, Russia, Spain, Syria, Tunisia, Turkey, United States, England, Uzbekistan and India).

Dalla continued, “This confirms the fact that the event stands as a candidate for being a natural location for the presentation of Space services and applications, all widely encouraged thanks to the support from the **Istituto ICE** (the *Italian Institute for Foreign Trade*), the **Italian Ministry of Foreign Affairs** and the **Italian Ministry of Economic Development**. Plus, for the first time, an important role was performed by SMEs for **Italian Aerospace Enterprises** (ASAS, AIPAS and AIAD) who made SAT Expo Europe their official event.

“On this point,” added *Dalla Chiara*, “in addition to having widened its reach, SAT Expo Europe has also organically involved the main actors from the aerospace sector, from the top players (**Finmeccanica Group**, **EADS ASTRIUM**, **Eutelsat** and **Skylogic**) to interested institutional bodies and new technology incubators.”





The event, sponsored by the President of the **Italian Republic**, the **European Commission** and the President of the **Council of Ministers**, received the institutional collaboration of the **Municipality of Rome**. SAT Expo Europe 2010 was off to an outstanding start at the **Campidoglio** in Rome with a presentation by the **ISRO** (*Indian Space Research Organization*) to more than 70 company representatives and more than 15 newspapers.

On Wednesday, February 3rd, in the afternoon, Mediterranean space agencies presented their programs for development, research and cooperation in the *Pietro da Cortona Hall* at the **Musei Capitolini** in Rome. The deputy mayor of Rome, *Mauro Cutrufo*, who participated in the meeting, declared the meeting “re-launched core activities of the Italian aerospace industry and particularly those in the Latian region, which serves as a hub for all those activities that, in Rome, could be connected to proposals for new advanced technology and their diffusion into emerging countries.”

Thursday, February 4th, witnessed the inauguration of SAT Expo Europe at the Rome Trade Fair and saw the presence of two important institutional figures: the Deputy Minister *Adolfo Urso* and the Vice President of the European Commission, *Antonio Tajani*, who took

part in the Conference with the **EGNOS** European navigation program.

Mr. *Urso* reaffirmed that “the Institutions and the Italian Government are engaged in encouraging the internationalization of Italian industry — the aerospace sector, which is the seventh largest in the world, has a key role that includes the fundamental function of establishing the natural arrival point for advanced research and innovation.” Such support was also confirmed by Vice-President *Tajani*.

Earth Observation played the main role on the second day of the conference and was dedicated to European programs and the **BMM** (*BlueMassMed*) project. The excellent solutions offered by the Italian industry in this arena characterized the intervention of *Massimo di Lazzaro*, the Senior Vice President of **Thales Alenia Space**, who, due to his proven experience in the **COSMO-SkyMed** program by **ASI** (the **Italian Space Agency**), was selected as the prime contractor by the **ESA** for the construction of the **Sentinel 1** and **3** satellites, integral parts of the **GMES** (*Global Monitoring for Environment and Security*) program.



This European program is already, partly, in operation, and as *Thomas Beer* from the GMES office of the ESA recalled, 72 percent financed by the ESA and for the remaining portion by the European Commission.

Mr. *Di Lazzaro* highlighted the need by the aerospace industry to be able to count on continuing financial commitments from institutions, without which, “competitiveness in acquired know-how could be lost in a short period of time.”

From this point of view, Mr. *Di Lazzaro* considers, “the use of ASI (Italian Space Agency) investments, which, thanks to various programs such as COSMO-SkyMed, have enabled Thales Alenia Space, and specifically, its Italian member, to become a center of European excellence for the large-scale production of T/R (Transmit/Receive) modules as concerns volume capacity, performance and the technology adopted to be extremely valuable.”

Interoperability of the GMES system, an institutional program that confirms the will of the European Commission to work towards a coordinated policy for the environment, the safety of citizens, meteorology and climate change, was the issue focused on by *Claudio De Bellis*, the head of sales at **Elsag Datamat**, a group company of **Finmeccanica** that uses and expands data collected from the satellites taking part in the GMES program.

GMES, as a European project, requires substantial technical coordination, which presupposes perfect political agreement between the Institutions involved.

The third day of the event closed with the collaboration of the “*Sapienza*” **University of Rome** on the subject of scientific education for research progress in aerospace and for university training aimed at new professions

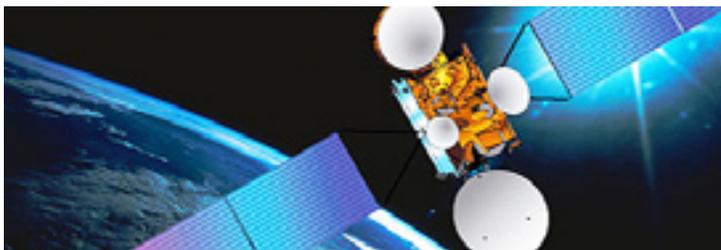
in the Space sector. Universities and the ASI (Italian Space Agency) are actively engaged in this role, offering specialized Masters degrees that are increasingly pertinent and result in the proficiency required and necessary for the aerospace industry. Many foundations, such as the Space Academy, are providing active commitment to these educational programs.

An important workshop meeting on international NASA – ASI cooperation illustrated the different research missions that have been, and continue to be, carried out by these agencies. The participation of *Roberto Somma* from **Thales Alenia Space** and *Andrea Cisbani*, Vice President of the *Payloads for Earth Observation* segment of **SELEX Galileo** (both companies part of the Finmeccanica Group), explained how this collaboration has, on the one hand, requested Italian Industry to supply the extremely sophisticated equipment and devices required, and on the other hand, to enable the development of acquired space know-how for the companies involved.

The Italian industry, which has produced more than 50 percent of the volume currently in orbit, has been extremely active in the Space sector in regard to telecommunications, sensor systems, and measuring devices. The Italian industry has often enabled direct collaboration between Italian universities and NASA Laboratories.

The SAT Expo Europe 2010 also hosted the conference on “**Space, An Opportunity For SMEs**” by **EADS ASTRIUM**, which facilitated a meeting between the ASI and ESA Space associations and the aerospace industry in general. The workshop highlighted the important opportunities offered by the aerospace industry regarding small and medium-sized enterprises.

Also announced at this event was the renewal by **Telespazio** of their lease agreement with Eutelsat Communications for the two satellites that deliver professional video and other content for **Rai**, the Italian state owned public service broadcaster. Two 72 MHz transponders were leased on a multiyear basis on the ATLANTIC BIRD 1 and W3A satellites. Both satellites provide coverage of Italian national news and also support RAI requirements for broadcasting news, sports and special events throughout Europe, Northern Africa, and the Middle East. 



ATLANTIC BIRD 3 + W3A satellites, images courtesy of Eutelsat

CASBAA's India Satellite Industry Forum

The Cable & Satellite Broadcasting Association of Asia (CASBAA) concluded its annual India Satellite Industry Forum in New Delhi on 22nd March. Themed “*On the Digital Edge — Where Broadband HITS The Streets*”, the Forum featured three policy addresses from government departments, as well as high-level inputs from global industry specialists.



Pictured: (L) Uday Kumar Varma, Special Secretary, Ministry of Information & Broadcasting, Government of India + (R), Simon Twiston Davies, CEO, CASBAA

Most notable for the high powered gathering of domestic and international officials, delegates and media was a government commitment to the long-awaited harmonisation of the multiple taxes and tariffs affecting India's satellite, DTH, cable TV and IPTV sectors. Broadcasters, operators and technology vendors believe this is essential if India is to achieve its goals of industry-wide digital networks.

During a keynote address, *Uday K. Varma*, Special Secretary, **Ministry of Information & Broadcasting, Government of India**, said, “the time frame for digitization needs to be ‘staggered’ in view of the number of TV homes and players in the market. He

continued, “Digitization is essential if the need for greater transparency and accountability for investment is to be met.”

Most recent data shows some 84 million (overwhelmingly) analog cable TV homes, with 18 million DTH households. There are less than 7 million digital cable and IPTV homes in India.

A second high-value address to the meeting came from *Andrea Appella*, Director of Legal, Competition and Regulatory Affairs for **News Corp** in Asia and Europe, who picked up on the theme of viable regulatory frameworks, noting that rapid pay-TV market growth follows the implementation of light-touch regulatory policies. “Governments should reserve intervention in wholesale TV markets for cases where market failure can be proven,” he said.

During panel discussions the industry leadership highlighted that digital sports content will be one of the most effective tools for promoting advanced services such as broadband-based IPTV, HDTV and digital cable.

“The introduction of 3G and HDTV along with the staging of the Commonwealth Games in October will boost new media growth,” said *Jawahar Goel*, President of the **Indian Broadcasting Federation** (IBF) and MD of DTH provider **Dish TV**. “Regional areas where billions of subscribers need broadband services are the silver lining for this industry.”



Pictured: Andrea Appella, Director of Legal, Competition and Regulatory Affairs, News Corp, Europe & Asia

According to *Shyamal Ghosh*, Chairman of the **IPTV Forum India**, the *FIFA World Cup* will certainly create new demand for IPTV. “Before the Commonwealth Games 2010 starts, IPTV and mobile TV should be pushed.”

Rajesh Sawhney, President, **Reliance BIG Entertainment** said, “IPTV is a sexy technology and along with HDTV and 3G it will change the future of our industry. On the content side, conditions are just right... If we digitize, we will see around 500 channels in India with more regional channels.”

Despite issues yet to be addressed for the India’s communications sector, regional satellite operators are still very optimistic with the local business opportunities.

“There is vast potential for satellite services in this market. But we also need a regulatory environment that enables more spectrum that can propel HD platforms,” said *Terry Bleakley*, VP, Commercial Operations, **Measat**.

“I see India as a most dynamic market. There is a huge demand for satellite services in military, DTH and many other services in India, and I believe that this productive demand will keep rising. However, easy access technology for Internet growth is still required,” said *Srini Prasanna*, VP, Business Development & Regulatory Affairs, **Asia Broadcast Satellite**.

“India needs to follow a road map that is pro-consumer supported by a pro-industry approach. Service providers can provide best services for everyone only when the environment for them is conducive and profitable,” said *Simon Twiston Davies*, CEO of **CASBAA**. “A light handed approach to regulation is necessary for a robust growth of the sector.”



Pictured, left to right: Shyamal Ghosh, Chairman, IPTV Forum India — Pranav Roach, President, Hughes Network Systems India — Jawahar Goel, MD, Dish TV and President, IBF — T R Dua, Acting Director-General, Cellular Operators Association of India — Srini Prasanna, VP for Business Development and Regulatory Affairs, Asia Broadcast Satellite

SatBuoyancy In Maryland @ The Gaylord

There's always something to talk about at the annual Washington satellite show, this year held at the impressive Gaylord National Harbor site about a million miles out from downtown DC. Two topics dominated the commercial satellite sector: interference issues and the lack of a 3rd launcher. Delegates gave a warm welcome to 'new boy' *Michel de Rosen*, CEO at Eutelsat, who acquitted himself with confidence at the important opening CEO 'gang of four' session.



Michel de Rosen,
CEO, Eutelsat

Unasked by the moderators was any sort of question as to what shape each of the four might be in a year from now. While **SES** seems reasonably well insulated from threat, the other three (**Intelsat**, **Telesat** and **Eutelsat**) all have challenges ahead (Intelsat's likely IPO; Telesat's freedom to acquire, or be acquired, and an IPO; and Eutelsat's Ka-Sat launch).

The interference issue is a two-headed problem. On the one hand there's the pesky issue of

signal jamming, which has badly affected Eutelsat clients over the past year including the **BBC**'s Persian service, jammed "professionally" according to Eutelsat insiders by Iranian interests.

Bad as that sort of problem is, the greater problem, according to *Dave McGlade*, president/CEO at Intelsat, is

VSAT-type interference, which creates 99.99 percent of the problems. He added that such creates "at least 100 events a month".

Eutelsat's *Michel de Rosen* told delegates that governmental pressures were now being exerted in a coordinated fashion, with authorities in France, Germany, and the UK now adding their voices to Eutelsat's own efforts.

McGlade, along with CTO *Thierry Guillemain*, set aside a separate 30-minute session devoted to the problems, arguing that while most of the VSAT interference was unintentional, this did not minimize the end resulting problems. *Guillemain* said there were three sources for this 'unintentional' interference: SNG and OB traffic, the military, and VSAT activity.

The influential **Global VSAT Forum** is helping raise awareness of the problem, and the issue gained widespread all-industry support at the show, with **SES**, **Telesat**, **Arabsat**, **J-Sat**, **AsiaSat**, **Amos**, **Telenor**,

by Chris Forrester

Nilesat and others all promising support and technical help. **Intelsat** says it will provide free training courses for VSAT installers, and ‘ordinary’ two-way broadband-by-satellite installers. Their fear was that with Eutelsat targeting up to 750,000 Ka-band ‘**Tooway**’ installs, and a growing interest from **SES Astra** from their **Astra2Connect** system, the ingredients were then in place for future problems.

The consensus was that “badly trained” (or zero-trained) installers were the nub of the problem. “Everyone must come together on this,” said *Guillemin*, “because the trend is definitely up, and as we move towards more home and SME two-way installations, the problem will only get worse.” He said that even with a correct installation, a subsequent problem with a wind-battered dish, or an inadvertent knock, could be creating the problem. Intelsat was creating 400 free training places for installers, but take up was – to date – low.

However, this view of events was strongly rebutted at a separate panel session when industry VSAT experts stated bluntly that their industry was not responsible. Panelists, which included senior representatives from **HNS**, **Gilat**, **Newtec** and **EMC** said that self-installation, or installation by ordinary DTH dish installers, had not created any notable problems in the US or Canada where ‘domestic’ two-way broadband installations were now commonplace.



Launchers

The second major worry for the operators was that of launch capacity — or lack of! Currently, with **Arianespace** and **ILS/Proton** working flat-out “and doing a fantastic job” according to **Telesat’s Dan Goldberg**, the worry was “what happens when something happens, and something always happens.”

Intelsat is strongly backing the emergence from Chapter 11 of **Sea Launch**. **Dave McGlade** argued that pricing was also a worry, as well as the risk of a launch failure. He called for a return to the launch market of **Atlas** and **Delta** vehicles “and at competitive prices.” He also welcomed the potential of the **SpaceX** vehicle.

As the show was winding down came news that Sea Launch has been permitted to draw down more cash to keep it alive as it moves towards an exit from its Chapter 11 situation.

Paris-based **Eutelsat** also helped the show with news that it is committed to spending about €450m each year on capital expenditure from now until 2012. That translates into almost two satellites per annum. But the spending won’t stop in 2012. CEO **Michel de Rosen** said that while the satellite operator had yet to give formal guidance, he saw capital expenditure continuing to average about €400m per annum for the mid-term future “while staying profitable.”



He added that while some of this cash would go on fleet replacement, his firm intention was to see the Eutelsat fleet add fresh capacity, and develop new markets. However, he repeated that he saw this effort concentrated more in an Easterly direction, than Westerly. He said that North America was now generating only modest growth while there were many other parts of the planet represented considerable growth opportunities.

However, Mr. **De Rosen** said that Eutelsat was very keen to build on its recent successes with the US Department of Defense, which was buying significant quantities of capacity. The DoD is responsible for some 80 percent of Eutelsat’s ‘multi-usage’ take-up, and that while contract lengths were shorter, there was still good business in military and governmental sales.

Mr. **de Rosen** confirmed in Washington that Eutelsat had previously looked at acquiring the **SatMex** assets (**EchoStar** pulled out of purchase talks last week), but had left the then discussions in the hands of **Hispasat**, in which it has a shareholding and a common shareholder. Now it says it may re-enter the discussions. Mr. **de Rosen** said, “We will probably look again,” although explained that the due diligence conducted by Hispasat had resulted in a lower valuation than that agreed by EchoStar and the SatMex management. “We have a philosophy of being creatively stingy,” he explained, “and I must stress an expansion [into Mexico] is not a ‘must’ for us.”

Mr. **de Rosen** stated emphatically a merger between Eutelsat and Hispasat was not in the cards, despite the cross-over interests of **Abertis Telecom**. “We have no need to be global,” he said. “Our customers do not ask for this.”

As the show was taking place, there was another meeting, this time in Berlin, hosted by **SES Astra**, and where Astra unveiled their latest ‘satellite monitor’ statistics. The satellite story, as far as SES Astra is concerned, is more than spectacular. **SES** says

they have added three million new satellite homes in Europe over this past year, and that the number of European satellite homes now exceeds that of cable. Moreover, satellite is now almost totally a digital audience, while cable lags behind with barely one-third of homes viewing digital channels.

SES Astra is now broadcasting to 125m TV homes across Europe and North Africa, three million more than the year before. For the first time, satellite reaches more households than cable in Europe, with 77m satellite and 71m cable households. Terrestrial infrastructures reach 86.5m households; however, not even half of them (48 percent) are digital.

The digitalization rate of satellite increased to 92 percent, with a total of 71m out of the 77m satellite

households being digital. Cable still shows the lowest digitalization rate, with one third or 34 percent (24m) of all 71m cable households being digital. IPTV is 100 percent digitized and reaches 9m households across Europe.

In High Definition (HD), Astra counts around six million HD viewing homes and currently broadcasts 114 HD channels. The success of HD is underpinned by the high number of HD screens sold across Europe. 125 million HD Ready TV sets have been sold since the start of HD in 2005. It is expected that by 2013, an estimated 55 million households will be equipped with both, an HD Ready TV set and a suitable HD receiver. Satellite is expected to remain the largest distribution platform for HD.



Ferdinand Kayser, President and CEO, SES Astra

“The significant increase in reach and the success of SES Astra are based on a stable business model and on strong drivers which allow us to develop our business despite the difficult market situation,” says *Ferdinand Kayser*, President/CEO of

SES Astra. “The underlying dynamics of Western European key markets, and the growth in Eastern Europe, impressively demonstrate that we are able to maintain our competitive position and further develop our reach, in technical and commercial terms. Whether in HD, hybrid reception or 3D TV, we are extremely well positioned to play a leading role in future innovations.”

Astra’s highlights:

- » **Total of 244m analog and digital TV homes in Europe**
- » **Astra fleet reaches 125m analogue and digital TV households in Europe and North Africa (57m DTH, 68m through cable head-ends)**
- » **Around 60 percent or 146m TV homes receive programs digitally (includes all reception modes: satellite, cable, terrestrial, IPTV)**
- » **Satellite serves every second digital TV household and reaches 71m digital homes (49 percent of the digital market); cable reaches 24m digital homes (16 percent), terrestrial reaches 41.7m digital homes (29 percent), IPTV reaches 9m homes (6 percent).**
- » **Astra serves 52m digital satellite homes (72 percent of all digital satellite homes)**
- » **Astra currently features 114 HD channels and reaches around 6m HD viewing homes**
- » **Digitalization rate of satellite is 92 percent, compared to 48 percent for terrestrial reception and 34 percent for cable networks**

Just as the important show was winding down, SES and EchoStar announced they would use an SES associate

company in Mexico to aggressively start selling capacity on 48 transponders, via three satellites. The agreement wholly sidesteps EchoStar’s earlier plan to buy three Mexican satellites from SatMex.

That deal is now seemingly dead in the water, and the new agreement — now officially licensed by Mexico’s government (which bizarrely is a ‘golden’ shareholder in SatMex) — sees SES use its locally-backed business **Sistemas Satelitales deMexico** to re-sell capacity on SES-owned **AMC-15** (105 degrees West) and **AMC-16** (85 degrees West). In other words, EchoStar will now be competing directly against troubled SatMex.



Dean Olmstead, President, EchoStar Satellite Services

The third satellite in the **SES/EchoStar** arsenal is **QuetzSat-1**, a craft due to be launched next year into the 77 degrees West slot. EchoStar is already contracted to use QuetzSat. “EchoStar is well positioned to leverage its satellite operations and uplink expertise in the US to expand its fixed satellite services throughout Mexico, including the delivery of satellite Internet services to rural communities,” EchoStar Satellite Services President *Dean Olmstead* said in a March 19th comment. 

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.



Reader comments...

“I just read your book on the plane home. It is fantastic! ”

“Just wanted to let you know I took your book home to read, because I am certain you wrote it for people like me.”

“Need to purchase a few more copies of Tony’s book. Will be a good learning guide for our new hires.”

“Tony, I got the book yesterday, and it is really great! I love the phrasing and voicing... it’s definitely you, but it reminds me a bit of Anthony Bourdain. It is highly informative, and spoken with a command of the subject matter that’s coupled with humor which makes it memorable and lasting. Thanks.”

“I recommend that every company in the industry buy this book for every employee. It’s the best book yet. I am waiting for the movie starring Danny DeVito as Tony.”



SatBroadcasting™

Drama In Somalia

by Bob Hildeman, CEO, Streambox, Inc.



SatBroadcasting™

Canadian freelance journalist *Amanda Lindhout* was in **Mogadishu**, Somalia, reporting how violence and famine affected refugees from armed conflict when she, Australian photographer *Nigel Brennan*, two drivers, and a translator were kidnapped by gunmen in August of 2008.



The drivers and translator were freed within a few months, but the kidnappers wanted substantial ransom for *Lindhout* and *Brennan*. Finally, in November 2009, after payment of a reported US\$600,000, *Lindhout* and *Brennan* were set to be released.

Members of *Lindhout*'s family and **Canadian Broadcasting Corporation (CBC)** reporter *David McGuffin* were in Nairobi, Kenya, waiting for her.

Back home, Canadian television viewers were waiting, as well.

Formerly, due to the long distance and because of infrastructure limitations associated with reporting from much of sub-Saharan Africa, the CBC reporter on the ground in Kenya would have recorded his or her story and sent it as a digital file back to the CBC production and broadcast facilities in Toronto. Even with everyone

working as quickly as possible, that process, which requires manual encoding of the video data at one end, and decoding at the other, would mean — at minimum — a 30- to 45-minute interval between the shoot and the broadcast with the unreliability of local Internet connectivity potentially delaying things even further.

The *Lindhout* story, however, marked CBC's inaugural use of innovative technology from **Streambox** in conjunction with a broadband global area network (**BGAN**) **X-Stream™** satellite connection from **Inmarsat**. As a result, *McGuffin* was able to deliver the breaking news story to the riveted Canadian audience — live from a hotel rooftop — with all the compelling immediacy live broadcast implies.

The **Streambox® ACT-L3™ Portable Video Transport** solution is a comprehensive, software-based platform that performs both live and file-based video transport and acquisition over an IP connection. Using the Streambox solution, broadcasters, government agencies, relief agencies, or any enterprise can deliver high-quality live (or stored) broadcast video over low data rate connections such as broadband, BGAN, and other IP and satellite networks.

For a reporter on assignment in the field like *McGuffin*, the platform can be loaded onto a laptop computer to communicate with the video management and playout systems at the broadcast center. By integrating the encoding step, the software dramatically simplifies the process for the reporter, making it possible for news,

SatBroadcasting™

or other information, to be delivered fast from even the most remote location.

Another plus for remote broadcast is that the equipment required easily fits in a backpack. To deliver the breaking news story, *McGuffin* needed only his Streambox-loaded laptop computer, a video camera, and the BGAN X-Stream device, which transmitted his live footage at between 350 and 400 kbps to the satellite. Once the signal left the BGAN terminal device, it was received at the Inmarsat Earth Station in Amsterdam, and from there followed CBC's dedicated path to their Toronto broadcast facility.

In Toronto, the video and audio streams were decoded in real-time via Streambox decoders for on-air broadcast.

Thus, the Streambox/BGAN combination yielded a transmission channel sufficient to deliver the video quality required by a professional news operation — and it did so using transmission rates of only 350-400 kbps. In fact, the Streambox® ACT-L3™ Portable Video Transport system can even work at rates as low as 64 kbps. Also contributing to the solution's efficient delivery of solid-quality video at low bandwidth are advanced forward error correction and burst error protection to help mitigate packet loss, and overcome jitter and network buffering.

SatBroadcasting™



Canadian journalist Amanda Lindhout and Australian photographer Nigel Brennan recover in the Somali capital of Mogadishu after they were freed from kidnappers who held them for 15 months. (Government of Somalia/Reuters)

While CBC's use of the Streambox solution for mobile newsgathering represents its most typical deployment, the system is suitable any time portability, flexibility, and minimal power consumption are needed.

Additional uses include emergency response and mobile command centers for defense purposes. In fact, the system was designed with specific features to accommodate rigorous conditions. For example, during electrical outages, it automatically switches to backup battery power while continuing to deliver uninterrupted video.

Streambox solutions are based on the company's proprietary ACT-L3™ (*Advanced Coding Technology, Level 3*) codec. At the heart of ACT-L3™ is its distinctive compression engine, one that is powerful enough to deliver high-quality video over low data-rate IP networks, supporting fast transmission and playout. In fact, Streambox encoders and decoders deliver reliable video transmission in real time not only over satellite networks and IP, but over T1 and E1 networks, as well.

CBC kicked off its use of Streambox and BGAN while reporting the *Lindhout* story from Nairobi. Since then, it has extended Streambox use to multiple

bureaus elsewhere, including Jerusalem and Beijing. CBC finds the technology most useful in places where Internet connectivity is poor or unreliable. That's where the BGAN connection is so much more solid than the low-latency link afforded by traditional Internet, while the quality of data transmitted is equal to that of the Internet.

Amanda Lindhout and *Nigel Brennan's* were released on November 25, 2009, bringing a happy ending to their 15-month ordeal. *Lindhout* flew to Nairobi to join her family a week later. Thanks to the Streambox® ACT-L3™ Portable Video Transport solution and the BGAN X-Stream satellite link, CBC viewers were able to follow the story as it unfolded — live. 

Masthead + Advertiser Index



SatMagazine
Vol. 3, No. 3—April 2010

Silvano Payne, Publisher + Writer
Hartley G. Lesser, Editorial Director
P.J. Waldt, Editor
Jill Durfee, Sales Director, Ass't Editor
Simon Payne, Development Manager
Chris Forrester, Associate Editor
Richard Dutchik, Contributing Editor
Michael Fleck, Contributing Editor
Alan Gottlieb, Contributing Editor

Authors & Contributors

CASBAA
Hoyt Davidson
Euroconsult
Chris Forrester
Bob Hildeman
Hartley Lesser
P.J. Waldt
NASA/John Hopkins University
Elliot H. Pulham
SatExpo Europe

Published monthly by
Satnews Publishers
800 Siesta Way
Sonoma, CA 95476 USA
Phone: (707) 939-9306
Fax: (707) 838-9235
© 2010 Satnews Publishers

We reserve the right to edit all submitted materials to meet our content guidelines as well as for grammar and spelling consistency. Articles may be moved to an alternative issue to accommodate publication space requirements or removed due to space restrictions. Submission of content does not constitute acceptance of said material by SatNews Publishers. Edited materials may, or may not, be returned to author and/or company for review prior to publication. The views expressed in our various publications do not necessarily reflect the views or opinions of SatNews Publishers.

All included imagery is courtesy of, and copyright to, the respective companies.

The New Horizons satellite cover image is courtesy of NASA/Johns Hopkins University, Applied Physics Laboratory.

Advertisers

Advantech	17
C-COM	12
Comtech EF Data	05
CPI	55
Dubai World Trade Center	25
Euroconsult	39
Global Link Productions	61
iDirect	41
Integral Systems	33
Intelsat General	04
MANSAT	47
MITEQ	49
NAB	63
Near Earth LLC	21
Newtec CY	03
O3b Networks	02
Paradise Datacom	53
SATCOM Guide	57
Singapore Exhibition Services	51
Wavestream Corporation	45
Xicom Technology	23

*A SatNews Publishers publication
Copyright 2010, SatNews Publishers*