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Asia-Pacific Satellite Communications Council

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APSCC
Asia-Pacific Satellite Communications Council

IN-FLIGHT CONNECTIVITY

INTERVIEW

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FOCUS ASIA

Satellite Capacity Supply &
Demand in Asia Pacific

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CONTENTS

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MESSAGE FROM THE PRESIDENT

I stated that the keyword for the growth of satellite business in coming years would be "Mobility Service", in the message on the last issue of this newsletter. Since, this issue features aeronautical broadband service, I would like to revisit on the future of satellite broadband business for airplanes and discuss in more detail.

There is an Internet site named flightradar24.com (www.flightradar24.com) or a special application software for smart phones and tablet devices, which shows real-time information about flying airplanes on a map background. When we see this, we are amazed to know that so many airplanes are flying all over the world days and nights. It is hard to know the actual number of airplanes flying, but at least we can sense a feeling that "It's a big number". Referring to the statistical data issued by International Civil Aviation Organization (ICAO) about two years ago, over 3 billion people are traveling on airplanes a year and over 16,000 jet airplanes are operated. It means that over 8.2 million people are traveling on airplanes per day in average. Considering that some airplanes are flying several times a day, more than 30,000 jet airplanes are flying daily. And it is said that these numbers will double by year 2032.

The reason I brought up these numbers is to back up my thought that the future of satellite broadband service for airplanes is bright. As I discussed in the last newsletter, most of the people on board airplanes are likely to carry smartphones or tablet devices and want to communicate via Internet even when they are on airplanes as they do on the ground. Many of the airlines worldwide are introducing Internet connection service using satellites, which are the only measure to provide such service for airplanes, and also the usage of Wi-Fi communications on board tends to be allowed and widely adopted. So, let's assume only 30 % of the airline passengers are going to use such service with about 20$ charge per flight. Then we can get rough total market size estimation to be about 20 to 40 billion dollars based on current and future airline customer trends. We can use different set of numbers for assumptions, but anyway we can say the market size is big enough for every player of this service.

In addition to the Internet connecting service for passengers on board airplanes, there is also significant demand for broadband communications for airline crews for flight operation and maintenance activities considering 16,000 to 32,000 jet airplanes are operated daily. This also supports the future of satellite broadband service business.

Yutaka Nagai
President, APSCC

Asian In-Flight Connectivity Finding Its Wings

James Collett, Director, Mobility Services Product Management, Intelsat
Patrick M. French, Head, Business Development, Asia Pacific, Intelsat

Over the past several months, one particular question keeps getting asked "How in today's world of instant connectivity can an airplane just disappear?" In the satellite industry, we already know that solutions are readily available – solutions that would provide far more information than simply the coordinates of an aircraft. The problem is not an issue of technology, but simply of cost and advocating change to entrenched modes of operation for commercial airlines.


Intelsat-33e

Tracking vs. Broadband Connectivity

Many within and outside of the satellite sector and the general aviation industry have focused on the "tracking" solution, often confusing it with and using it interchangeably with "broadband connectivity". In

fact both services are quite distinct, offering very different approaches and solutions to the critical in-flight connectivity and safety issues facing the airline industry.

In terms of tracking, it should be noted, however, that no fixed satellite operator can in fact provide true, global tracking services. This is simply because GEO satellites cannot adequately serve polar regions, especially the North Pole where many commercial flights traverse daily. To truly provide anywhere tracking on a global basis using satellites, a more appropriate technical solution is offered by a MEO or LEO satellite constellation. Perhaps the best known example of this would be the upcoming Aireon service planned as a hosted payload on the 72 Iridium Next second-generation mobile communications satellites.

Conversely, for a broadband connectivity services that mainly address passengers on commercial flights, the main driver is putting the most cost effective capacity as possible into the geographic regions where the majority of flight hours occur. This is exactly the strategy being taken by Intelsat for its Intelsat Epic^{NG} aeronautical broadband infrastructure, which supports leading service providers such as Panasonic Avionics for its global network.

As recently reported in the 24 February 2014 issue of Via Satellite, David Bruner, Vice President of Global Communications Services at Panasonic Avionics says "Ninety-nine point six percent of all airline flight hours are covered by our [current] network. Now what we are doing is going back and adding massive capacity in areas that have the air traffic to demand that capacity and purchase that capacity at really attractive prices." Bruner adds in the Via Satellite article that "You've seen us commit on [Intelsat's satellites] IS-29 and IS-33, and it is highly likely that in the next couple of months we will have the next two announcements that will complete the footprint around the world with high capacity spot beam service overlaying today's traditional Ku footprints."

Intelsat, the leading provider of aeronautical broadband services, estimates that current throughput on our global broadband Ku-band aeronautical platform is 350 Mbps, with that number expected to 'take off' as our Intelsat Epic^{NG} satellites begin to launch in 2015, each providing 25-60 Gbps of capacity to power broadband services. And not a moment too soon, as airline passengers are demanding Wi-Fi connectivity and choosing those airlines that can provide them with uninterrupted, high quality broadband connectivity and live television transmission, particularly on long-haul flights.

Additionally, the number of planes with broadband connectivity is expected to more than double over the next five years. Airlines are choosing in-flight service providers that deliver reliable, high quality, seamless in-flight broadband connectivity that is designed to provide a consistent user experience. This is particularly true for the most profitable routes, such as trans-oceanic flights over the Atlantic and northern Pacific, as well as routes over South America, Asia and Australia.

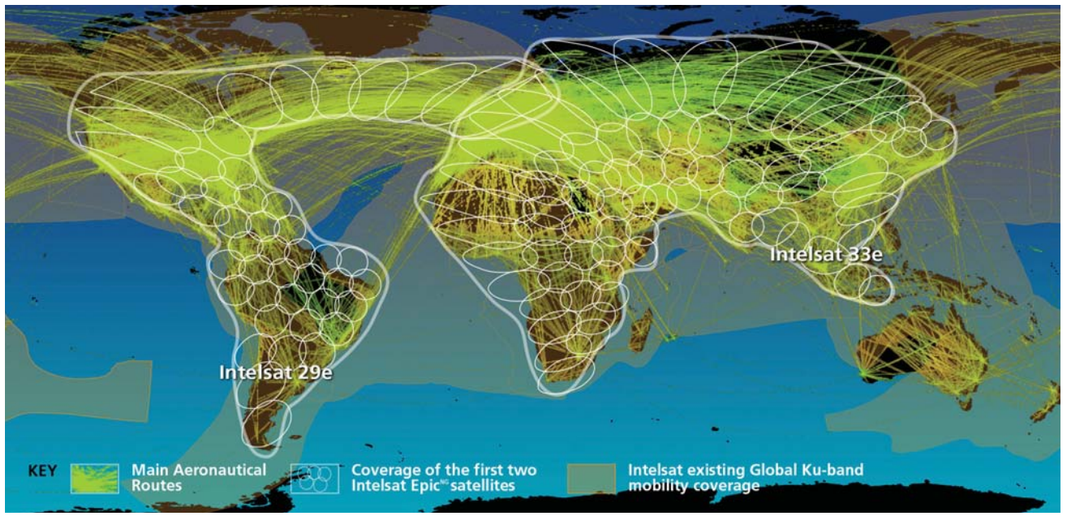
Asian Airlines Tilting Towards Ku-band Aeronautical Services

Many in the Asian satellite industry will remember the original excitement surrounding in-flight connectivity and the big push by Connexion by Boeing (CbB) to develop the service. In fact, Asia was the region where one of the very first satellites primarily driven by aero demand was launched … the AMC-23 satellite which later became GE-23 and is now Eutelsat-172A.

While the CbB program stumbled, it must be noted that in the ashes of this service were the seeds for a re-emergence of in-flight connectivity services in Asia. Just over the last year, Japan Airlines, Singapore Airlines, and Air China have all announced plans for broadband in-flight services and trials. Furthermore, ANA, Garuda and SriLankan Airlines have inked deals for lower throughput L-band based "Wi-Fi" services that could eventually migrate to one of the leading broadband solutions offered today from the likes of Panasonic, Gogo and Row 44.

For the main aero broadband service providers, each has unique designs that differentiate them in this dynamic market. That being said, as Wi-Fi connectivity becomes more established in airplanes, airlines should select service providers with global service capabilities that are flexible and with enough bandwidth to meet broadband connectivity demands that will yield a superior user experience – thus building passenger loyalty.

It is Intelsat's view that achieving a superior user experience implies putting the most bandwidth where the majority of flight hours occur. This principal dictated the design of the Ku-band aeronautical capacity on our upcoming Intelsat Epic^{NG} satellites.



Main Aeronautical Routes with Coverage of the First Two Intelsat Epic^{NG} Satellites

The Intelsat Epic^{NG} platform will provide traditional wide beams and Epic^{NG} spot beams, enabling intelligent use of spectrum that frees more throughput for broadband – as much as 200 Mbps per spot beam available to a plane flying through any given beam as well as up to 125 Mbps available for each spot for communications from the plane, with a total throughput per satellite of 25 to 60 Gbps.

The combination of traditional wide beams with the Intelsat Epic^{NG} spot beams will help aero service providers deliver cost efficient, live video content with no impact to performance and throughput for broadband services, facilitating a better and more reliable end-user experience.

The Intelsat Epic^{NG} design provides a worldwide footprint in terms of flight hours and the extra bandwidth needed for the airline industry's heavily traveled and most profitable transoceanic routes over the Atlantic and northern Pacific oceans, as well as routes over South America, Asia and Australia.

Based upon recent industry analyst market size assessments, and Intelsat's current contracted capacity for commercial aeronautical broadband applications, Intelsat's share is well over 50% of the current global aeronautical broadband market. In Asia, the two leading airlines that have adopted or are trialing Ku-band aeronautical services are Japan Airlines and Singapore Airlines.

Another indicator of the driver for satellite-provisioned in-flight connectivity in Asia is how much capacity aero service providers are planning to provide per aircraft. While North American service providers likely lead the way based on this criterion today, in Asia it is the Ku-band aero service providers that are well ahead based on this criteria.

Inmarsat continues to state that its Global Xpress service speeds will top out at 50 Mbps. However, analysis indicates that, allowing for real world efficiencies for aero antennas, the typical commercial airline could expect about 40 Mbps delivered per aircraft, though no pricing per this level of service has yet been publicly articulated for their service. Plus, Imarsat will be selling Global Xpress services across a wide variety of customer bases – Aviation, Maritime and Land – and each of these clients will be vying for a share of the capacity within each individual spot beam on the Global Xpress system.

Yet, Gogo has already stated that its wireless broadband service deal with Japan Airlines will be capable of speeds over 70 Mbps when the service is launched in mid-2014 and there is the intention to expand that to up to 100 Mbps soon after.

It is Intelsat's view that when airlines look at the business case for in-flight broadband connectivity, the amount of capacity per aircraft and the cost of that capacity will be prime drivers. This includes airlines currently using lower throughput L-band services that will likely think of migrating to true broadband in the coming years once the initial services prove themselves. In Asia, airlines in this category could include ANA, Garuda and SriLankan Airlines.

And as Intelsat continues to roll out more of its Intelsat Epic^{NG} satellites, five of which are already on order today with our partner, Boeing: Space, Defense and Security, we will be able to continue to add layer upon layer of cost efficient capacity exactly where needed by the airlines and their in-flight connectivity service providers.

Another strength of the Intelsat designed Epic^{NG} platform is the open architecture approach, preferred by carrier and enterprise grade service for enabling highly flexible network topologies. Since many customers already have networks deployed, it is more cost efficient to leverage their existing hub and remote hardware. Plus, the open architecture approach allows the in-flight service providers to choose what they consider the best satellite equipment solution, both on the ground and for the antennas on the aircraft, without being constrained to specific equipment that is more typical of the "closed" systems.

The Skies Have Room for All

There are a number of core drivers that do tend to determine which services perform best overall for each specific need. The first is recognizing that the driver for tracking, is true global coverage including the poles. Tracking need not be a bandwidth intensive service and several satellite MEO and LEO players could be well positioned to meet this type of demand rather than GEO satellite network operators.

But for broadband in-flight connectivity, "global" coverage such as offered by certain players can be a disadvantage because capacity is unavoidably being stranded over regions where the level of demand is low. As such, pricing for high demand markets needs to be raised in order to offset the low demand areas. Further, there is a very good chance that specific beams in the high traffic areas will quickly become saturated and this will impact quality of service.

In the case of Intelsat's Epic^{NG} aeronautical services, our mobility capacity complements our existing coverage, which serves 99% of the world's populated regions. Epic^{NG} mobility capacity is being concentrated where the large majority of flight hours occur and these are well defined areas. Further, Intelsat's orbital rights and Epic^{NG} design allows us to layer more capacity into these high traffic routes over time, ensuring that the user experience will be maintained as bandwidth needs inevitably increase as users and rich content grow. And in working with key partners, Intelsat can even implement load balancing techniques to further improve efficiencies of its aero services. All leading to a better overall quality of service and more affordable price point for the consumer.

Intelsat recognizes that no one solution for in-flight connectivity fits the needs for every commercial airline and every service provider. The long-term aero market will certainly be big enough for a number of players and healthy competition helps ensure that at the end of the day the person paying for the service … that guy or gal in the seat next to you … is getting the best product possible for their dollar, yen, renminbi or ringgit.

James Collett is Director, Mobility Services Product Management at Intelsat, responsible for profitably positioning, developing and growing Intelsat's Mobility Services product line, ensuring that Intelsat remains a leading provider of managed services and space-only solutions to the maritime, aeronautical and government sectors. Previously Collett had a thirteen year career at Inmarsat holding a number of senior management positions.

Patrick M. French is Head of Business Development, Asia Pacific for Intelsat responsible for driving forward Intelsat's long-term growth in terms of orbital asset development as well as partnerships with key entities in the Asia-Pacific region. Prior to joining Intelsat, Patrick worked for Northern Sky Research as well as Frost & Sullivan and the International Space University (ISU).

GX Aviation Update: Firmly On Track

Bill Peltola, Vice President, Asia Pacific, Aviation, Inmarsat

Inmarsat F1 Vacuum testing
(Photo: Boeing)

When the Inmarsat-5 F1 satellite was launched into orbit in December 2013, it brought Inmarsat a step closer to delivering a connectivity revolution: smoother, faster communications for millions of customers worldwide.

For the aviation community, GX will have wide range of impact and application from in-flight connectivity in commercial and business jets to enhanced cockpit communications to government and military applications.

It will be the only Ka-band network designed around the requirements of moving assets, such as aircraft. The flexibility to keep aircraft connected throughout every flight is an inherent and existential part of GX Aviation.

GX Aviation's global network comes from a single supplier with a history of providing satellite connectivity to the aerospace market for over 20 years. Inmarsat is in a unique position to guarantee stringent service level agreements to each market segment because, as with all its satellite networks, the company will manage GX Aviation dynamically to ensure the right capacity is being delivered to the right place at the right time. Inmarsat designs and runs its own global network and can therefore move capacity where and when it is needed.

Commercial Aviation

Inflight entertainment has come a long way. Gone are the days of waiting an hour for a movie to be projected onto the bulkhead. Passengers want to watch live news as it happens or their favourite programme when it suits them. Video on demand has become an expectation. People also want Internet access in the air with the same speed and reliability as they have on the ground so they can keep in touch with the office, connect to social media, play online games and make video calls. And they expect all this wherever they fly.

Inmarsat-5

Passenger experience is an on-going competitive battleground and cabin connectivity is the latest frontier. Connectivity solutions have been around for some time, but don't yet replicate what we're used to on the ground, in terms of speed, coverage and price.

All of these changes with GX Aviation, which is on track to be available to airlines in 2015. The Ka-band network will be the only high-speed global broadband service providing consistent coverage for flight routes across the world. GX Aviation will uniquely provide airlines and aviation customers with the ability to deploy new types of solutions and services at a cheaper price, at a higher speed and with higher bandwidth. Passengers will be able to quickly and effortlessly connect their smartphones, tablets and laptops to a WiFi hotspot or on-board cell phone network. Perhaps the most important element is that all this is available around the globe.

While other Ka-band solutions were originally designed for TV broadcast type services and therefore have limited coverage over oceans, passengers using GX Aviation services will have a continuous, consistent service across all time zones as traffic is handed seamlessly across a network managed by a single operator, as opposed to a patchwork network that's stitched together.

"What is particularly important is that GX Aviation has been specifically designed as the only Ka-band network to provide consistent global coverage, over both land and sea. Passengers and crew will have the same experience wherever they are flying," said Kurt Weidemeyer, Inmarsat's VP Strategy and Business Development, Aviation.

From a safety and operational perspective, Inmarsat will continue to enable all communications with Air Traffic Control for the flight crew through existing Inmarsat Aviation services.

While communications connectivity is at the core of what GX will provide to the aviation industry, GX Aviation will also be able to offer various new applications, including real-time TV, on-demand TV and high-speed broadband Internet access for enhanced browsing. GX Aviation will also provide enough bandwidth and capacity to replicate 4G cell phone services. Once GX is commercially available and users come to truly understand its potential, Inmarsat believes that a host of new passenger, flight deck and cabin crew applications will be developed.

GX Aviation for Government

Along with commercial market, GX Aviation will be an ideal option for government aviation, designed to meet a wide variety of requirements including reconnaissance, surveillance and attack, rescue operations and observations and transport.

Capabilities offered through GX will include continuous data connection, voice conference lines and typical telephone communications. Multiple aircraft on a surveillance mission can have open communications with each other and with the command centre. Surveillance data can be delivered to a web-page, allowing access from anywhere in the world. Live video, still images, radar images and full duplex voice can be shared and exchanged between the aircraft and points on the ground.

GX Aviation will also support both cabin and cockpit requirements, using data compression and acceleration as well as multiple VoIP channels and services.

Safety Services

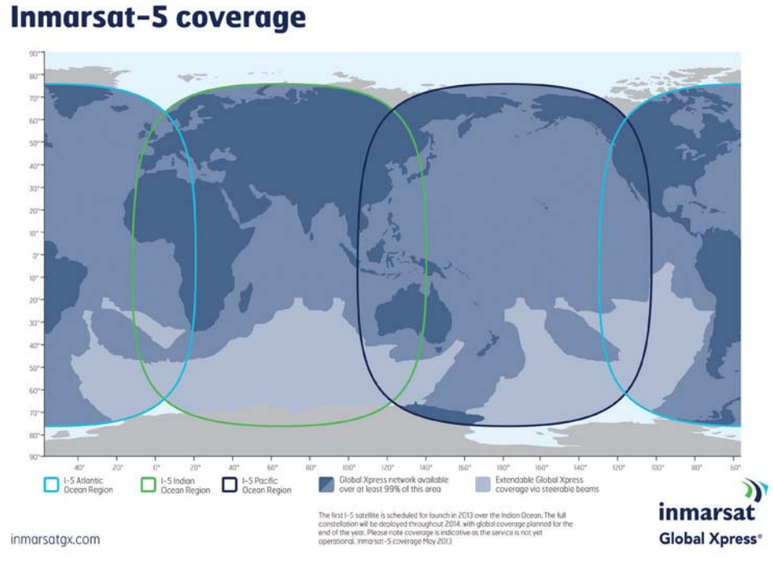
For safety services and extra resilience, GX Aviation will be complemented by Inmarsat's Classic Aero and SwiftBroadband services on the Inmarsat-3 and 4 satellites which deliver on average 99.9% network availability. Inmarsat will have the only satellite network that combines both Ka-band and L-band technologies.

The Satellites

The first of three GX satellites, F1, was launched on December 8, 2013. The December launch from the Baikonur Cosmodrome in Kazakhstan was a milestone for Inmarsat's GX Aviation programme; the first step in a project three years in the making, all with the intent to respond to the growing demand for better communications and passenger connectivity on-board aircraft.

Boeing manufactured the GX satellites, which are 7-metres tall weighing 3,750 kg. At the end of the assembly process, and before packaging up the first satellite for transport, the F1 was subjected to tests that simulate the extremes of temperature to be experienced in space to ensure the heat transfer technology worked perfectly. During the process, electronics inside the satellite operated at room temperature, despite a difference of around 300°C between the back and front of the satellite.

The F1 also underwent rigorous simulation testing of launch conditions, both through vibration and acoustic testing. The acoustic testing uses nitrogen to subject the satellite to up to 152 Overall Sound Pressure Level (OASPL).




Inmarsat-5 F1 Lift Off

In November, Boeing transported the F1 under police escort from El Segundo, California to Los Angeles LAX airport. The satellite was then flown on board an Antonov cargo plane to Baikonur, 1,300 miles (2,100 km) south-east of Moscow – where its real journey was to begin.

After the launch on December 8, the F1 satellite was carried into geostationary transfer orbit by the ILS Proton Breeze M launch vehicle. Once there, the satellite's solar arrays were deployed, their span similar to that of a Boeing 737 commercial airliner.

Finally, 48 days after its launch, the I-5 arrived in geostationary orbit, above the Indian region around 23,000 miles (37,500 km) from earth where the gravitational pulls of earth, the sun and the moon balance one another.

The F1 satellite is currently in orbit and continues to undergo onsite acceptance testing. The satellite is already connecting the gateways to GX terminals with great success and it is on track to start a regional service in Q3 this year.

The second satellite, F2, will cover the Atlantic Ocean Region (AOR) and the Americas.

F3 will complete the constellation, covering the Pacific Ocean Region (POR). It has completed the mechanical environmental and thermal vacuum testing at Boeing's El Segundo facilities in California.

Each satellite will be served by two ground stations, the first of which is operational. The other stations are on track to meet the satellites when they are launched later this year. The Indian region satellite, F1, will be serviced by ground stations on Fucino and Nemea, in Italy and Greece, respectively. F2 will be managed by ground stations in Lino Lakes, Minnesota and Winnipeg in Canada. The Pacific region's ground stations are undergoing final preparations in Auckland and Warkworth, both in New Zealand.

Demand for high-speed Ka-band connectivity is so high that Inmarsat has ordered a fourth satellite from Boeing.

Inmarsat partner Honeywell is responsible for the development and production of GX Aviation avionics. The aircraft avionics was subject to the final Critical Design Review in February, marking the final stage of development of the airborne hardware. Inmarsat and Honeywell engineers completed the evaluation on schedule and executed a comprehensive audit of the system design, engineering model hardware and programme. During the process, Inmarsat's team reviewed the final functional specifications of hardware designs, and the results of engineering units' tests. These reviews will enable the continued progress of the GX Aviation programme through product certification in 2014, product launch and global entry into service for commercial, business aviation and government customers in the first half of 2015.

The programme has now entered the production phase, and Honeywell has signed an agreement with Air China to test GX Aviation on the carrier's A330 aircraft in 2015.

2015 – GX Aviation service entry

In 2015, GX Aviation is scheduled to be fully operational and commercially available. Inmarsat's airline, business jet and government customers will have at their disposal greater consistency, better on-board communications including high-speed mobile and fixed broadband services at speeds of up to 50Mbps, all on a global basis.

"Airlines and their passengers want consistency – they want the same service wherever they are flying in the world. This requires two things. The first is reliable global coverage and the second is a service designed specifically for aircraft," said Weidemeyer.

What next?

GX Aviation will be available to airlines through a range of partners, including Gogo, OnAir, Rockwell Collins and Thales. These providers have already been working with airlines around the world and the announcement of the launch airline customer is imminent.

Once the constellation of satellites is flying and operating in 2015, the next airlines and passengers will have at their fingertips superior power of Inmarsat's global Ka-band network.

Bill Peltola, Vice President, Aviation at Inmarsat, is responsible for developing market opportunities for Inmarsat aviation services in the Asia Pacific region. His experience spans from avionics systems, passenger services and regulatory requirements across a number of connectivity technologies in markets including air transport, business aviation, and the government sector.

Satellite Proving to Be Key to More Valuable In-flight Services for Passengers and Airlines

Don Buchman, Vice President, Exede Mobility, ViaSat, Inc.

Halfway through 2014, the long-term outlook for satellite in-flight Wi-Fi has never looked better. Even market-leader Gogo, launched with an air-to-ground cellular network, has made it clear that for long-term success, satellite must be the choice. But airlines need to be careful to choose the right satellite technology.

Just about everyone following the in-flight connectivity market continues to cite the dismal uptake of services to date. Typical comments include this one in a *Bloomberg BusinessWeek* story (Gogo's Problem: Inflight Wi-Fi Is Expensive, and No One Uses It, by Justin Bachman, 6-24-13): "Only about 6 percent of fliers on Gogo-enabled flights used the service in the first quarter, the company says." Even with faster Ku-band satellite services now added to the market, the take rate is maxing out at about 10% of passengers.

That level of Wi-Fi use does not indicate happy or "engaged" passengers. Will airlines continue to invest thousands to install terminals, wire airplane cabins, and start up a service that only five to 10 percent of their customers would ever use? To get the best return on investment, a new focus is the answer: A

JetBlue-0397: One of the aircraft carrying the new high-capacity Ka-band in-flight Wi-Fi systems is this one, with the radome visible on top and painted in a "binary code" motif (Photo courtesy JetBlue Airways)

change from simply the number of planes connected to total passengers using the service.

An engaged audience on board is what will create value for airlines, and is also what other potential partners hoping to tap into that audience are looking for. Unless a substantial percentage of passengers (at least half) are getting online in the air, there are limited opportunities for Wi-Fi to create the loyalty factor airlines want or the active audience that could represent meaningful additional value for airlines and airline partners.

We've seen this story before

In the service market for fixed Wi-Fi services, we have seen a similar story already play out. People enjoy being connected, but it wasn't always easy or affordable to do so. It wasn't that long ago that we all had to pay for Wi-Fi at the local Starbucks, hotel, or airport.

And if you were lucky enough to have the expense account or budget to get that connection, it might be passable for minimal web surfing, but not much more, and certainly not a good experience compared to your home or office. You were scratching for your share of bandwidth with many others, and it seemed like you were always the one left starving for bits for your online activities. Often, you passed on the opportunity because of the cost or expense.

Then came the shift.

Hotels started offering free Wi-Fi. The coffee houses followed suit. Soon airports, malls, restaurants, and other gathering places came to see connectivity as a perk that made their customers happy. Even when those customers saw an advertisement or portal page in front of them, promoting the place of business or complementary services. Not only that, but the connection was better. Now you could tunnel into work with your VPN or watch YouTube without frequent loss of service.

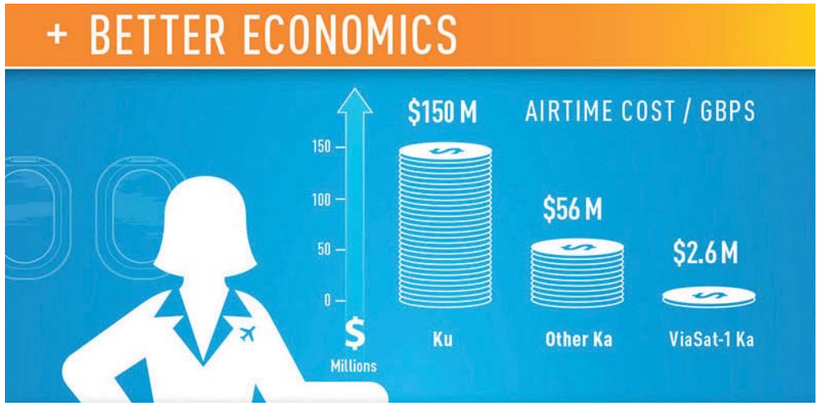
Should we expect passengers who come from free Wi-Fi in a hotel, to free Wi-Fi on the train, to free Wi-Fi in the terminal to be happy when that option is not available on the plane?

In-flight connectivity services need to meet the market where it is headed. A good view of what is ahead is the story "Don't Count on Millennial Travelers to Pay for In-Flight Wi-Fi" (http://t.co/NfY3gTwJ3N) posted on in-flight travel blog SKIFT in April of this year. Author Marisa Garcia accurately states that, simply offering Wi-Fi is not enough, but that "airlines will need to develop smart models" that give the service away, but attract a substantial audience who will then be willing to pay for things they can do with it.

That kind of audience can enable airlines to attract sponsors, or other partners working with airlines, who value the opportunity to interact with passengers and associate their brands, products, content, or games with the airline. An approach that is in line with the way much of the e-commerce industry has developed.

The right technology

True high-capacity satellite technology is the key to high-performing, economical satellite services that will be valued by passengers. While the industry often stretches its definition of "high throughput satellites" down to satellites with as little as 10 or even 30 Gbps of throughput, there is no way for those satellites to compare to a 100 Gbps spacecraft. The cost per gigabit in space – gigabit per megabuck – pencils out into favorable business models only when this major new leap in capacity comes into play, not incremental gains from legacy technologies. With a single high-capacity satellite carrying nearly 100 times the capacity of a typical Ku-band satellite, at a similar capital cost per satellite, the economic equation becomes obvious.



This comparison of the "manufacturing costs" for bits using different technologies illustrates the economic advantage that true high-capacity satellites bring to the market.

There is no doubt of the growing demand among consumers for more and more bandwidth. Only satellite can keep up with that demand for in-flight services, and only high-capacity satellite, with its large "inventory" of cheaper bits, can provide the best value to the airlines and airline partners.

Rather than a single bucket of bandwidth to the aircraft to be shared by all passengers, a 12 Mbps service level for each seat is now possible. The economics are also such that airlines will have much greater flexibility when it comes to pricing service to the passenger. They can give away a basic connection for email and browsing, just as you get your soda and peanuts or pretzels today, then provide passengers with an option to pay a little more to stream video or use other bandwidth-heavy apps.

The market is already responding

With services based on high-capacity satellite systems, satellite Internet has overcome its reputation as a slow and expensive alternative for residential Internet access. In just two years, nearly a million new customers have flocked to satellite services that are as good or better than even some wireline services.

Now the same can be seen in the in-flight market. JetBlue Airways is live with its new Ka-band service on about 50 aircraft and reports that it is installing more at a rate of 10 planes per month. United Airlines also is up and running on close to 50 planes using Ka-band.

More importantly, the optimized performance and economics of high-capacity Ka-band is re-writing the take rate statistics. JetBlue is reporting a major increase in take rate among its passengers with flight

statistics showing as many as 136 connected devices on a single flight, with average uptake at 30-40 percent of passengers. Even late night red-eye flights are attracting an audience, as 20-30 people are sometimes logged on. With JetBlue promising a connection speed of 12 Mbps to each seat, speed tests routinely are showing actual connection speeds of 18-20 Mbps.

Can high-capacity satellites provide high bandwidth and broad coverage?

One ongoing debate about high-capacity (or high-throughput) satellite systems has centered on the tradeoff between optimizing total system capacity and optimizing coverage. One Ka-band mobile service provider, Inmarsat, has opted to launch a three-satellite constellation that will blanket the globe with Ka-band in one swoop. That option figures to serve those customers who may choose to maximize coverage over capacity while also giving the bandwidth economics advantage of high-capacity satellites (as seen in the previous chart).

But what if you didn't have to make that tradeoff?

Enter ViaSat-2, the next class of high-capacity satellite. It is designed to bust the myth of "coverage or capacity," instead spreading seven times the coverage of ViaSat-1 combined with an equally impressive doubling of bandwidth economics.

ViaSat 2 Coverage: ViaSat-2, the next generation of high-capacity satellite, will not only improve bandwidth economics by a factor of two, but provide seven times the coverage compared to the current state of the art.

As seen on the coverage map, ViaSat-2 is designed to retain all the economies of serving the residential customer, while building out coverage south to the tip of South America, to the Caribbean, and over primary air routes in the North Atlantic, building a bridge to high-capacity Ka coverage in Europe, the Mediterranean Basin, and the Middle East.

Forward looking operators and service providers in the Asia-Pacific region can seize this opportunity to build and launch similar "ViaSat-2 class" satellites, with the ability to create roaming agreements for other satellites and for mobile applications.

New plane orders point the way to growth in 2014 and beyond

According to market researcher IHS Inc., just over 4,000 aircraft had been outfitted for Wi-Fi by the end of 2013, representing only 21 percent of the global fleet, so there's plenty of room for growth.

Airlines also continue to order new aircraft. Just considering the two leading aircraft manufacturers, Boeing and Airbus, the total backlog at the end of 2012 was 9,055, up 847 units from the previous year, according to Aviation Week. That backlog grew even faster in the past year, with the two companies reporting a backlog total of over 10,600 aircraft by the end of 2013 (according to Bloomberg BusinessWeek).

Airliner manufacturers also want to get ahead of the curve. One example is a recent deal between ViaSat and Boeing Commercial Airplanes (BCA) who reached agreement to work together towards offering ViaSat Ka-band airborne satellite terminals as a factory line-fit option on Boeing commercial aircraft. Airlines will be able to specify ViaSat in-flight connectivity on new Boeing aircraft and take delivery of planes with the equipment already installed, with a target availability of next year.

Move to where the ball will be

The expectations for in-flight Internet seem clear. Passengers want more service and more speed and aren't going to be satisfied with a degraded experience in the air. Airlines stand to gain more value and loyalty from their passengers if more people use it.

Satellite communications is the unanimous choice as the right technology to deliver that kind of service over both land and sea. Only high-capacity satellite systems can provide both the great service and economics to satisfy those expectations.

Like the player on the football pitch who anticipates where the ball will be and arrives at just the right time to make the play, those wanting to take advantage of in-flight Wi-Fi need to see the trend and position their businesses in the same way, to provide the service that will deliver both a great service experience for all passengers and attractive economic opportunities for airlines.

Don Buchman is VP, Exede Mobility at ViaSat Inc., providing high-speed Ka-Band Internet to aviation markets. At the leading edge of military and commercial communications for 23 years, including a leading role in developing several ViaSat products and technologies. He holds a BS in Aeronautical Engineering from University of Illinois Urbana-Champaign and an MSEE from the University of Southern California.

Spectrum for In-Flight Connectivity

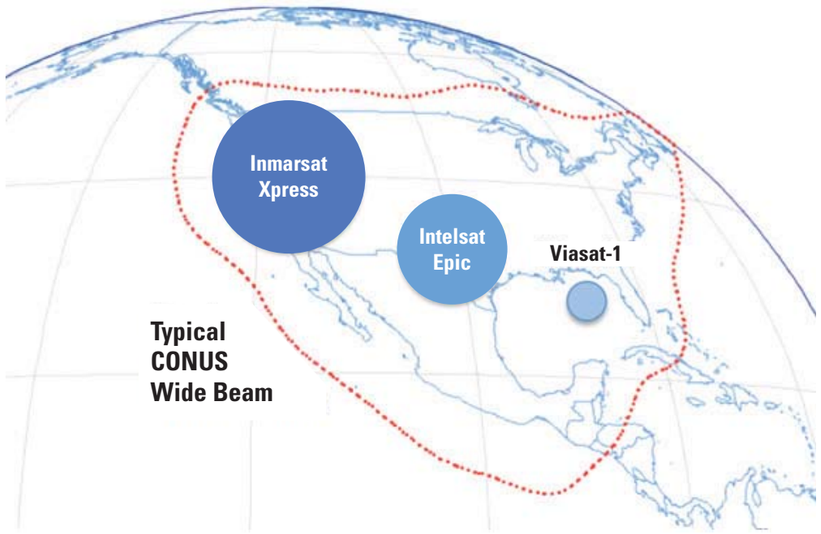
Chris McLain, Principal Satellite Network Engineer, Panasonic Avionics Corporation

The future of in-flight connectivity is in high throughput services. High Throughput Satellite (HTS) payloads will greatly increase the amount of bandwidth available to in-flight applications, allow higher data rates to and from the aircraft, and make in-flight connectivity more affordable. The benefits of HTS technology are independent of frequency and both Ku and Ka-band operators are taking advantage of them. Marketing rhetoric aside, service providers will likely select the band they use based on where they have access to spectrum because the performance difference between the bands is not significant. Users of in-flight connectivity services, in turn, will select their service providers based on coverage, services and price-point that best fits their requirements.

The High Throughput Future

HTS payloads are characterized by the use of spot beams and frequency reuse.

Figure 1. Relative Spot and Wide Beam Size



Spot beams are small, generally circular, beams that individually cover only a portion of the service area. An HTS payload may use between 15 and 80 beams arrayed in a grid to cover the full service region. Spot beams are typically 500 km to 2000 km in diameter, which is much smaller than the shaped wide beams (4000 to 5000 km across) that are used by conventional satellites today, as shown in Figure 1. The smaller beam size allows the payload to concentrate its power and increase its receive sensitivity so it can support wider bandwidths and higher data rates without using more satellite resources. This translates to lower cost per Megabyte.

Frequency reuse is the ability to use the same frequencies in two or more beams that are separated by some distance in the same service region. Reusing the same frequency many times breaks the limitation of the allocated spectrum on the total bandwidth of the payload. Frequency reuse schemes generally break the allocated spectrum into four or seven "colors" – four to seven unique combinations of frequency and polarization, as shown in Figure 2. The satellite can distinguish two users using the same color if they are in beams that are physically separated by at least one beam diameter. Reusing frequencies means that an HTS payload can essentially manufacture an unlimited amount of spectrum by dividing a given service region into smaller and smaller spot beams. Some HTS payloads reuse the same frequency up to 15 times. This greatly increases the total satellite throughput a payload can support, which also reduces the cost per Megabyte.

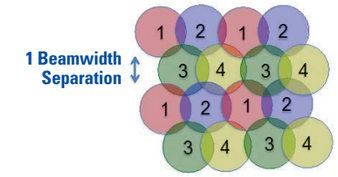


Figure 2. Four Color, 4X Frequency Reuse

It is important to note that the benefits of HTS payloads are a function of the size, number and placement of the spot beams, which are essentially independent of which frequency band the payload uses. The supportable throughput for the same satellite resources will be similar for similar size terminal antennas and similar size spot beams, and independent of frequency band.

History Repeats Itself

More attention has been paid to the frequency bands that in-flight operators use – Ku versus Ka-band - than is merited by the technical differences between the bands.

The frequency band debate has often been driven by marketing imperatives and mirrors a debate about frequency band that took place in the US mobile phone market in the 1990's. The initial frequencies allocated to mobile phones in the US were around 800 MHz, which were called 'Cellular' frequencies. The operators that were awarded these allocations built out then state-of-the-art 1G mobile phone systems. Later, new allocations were made to new operators at around 1600 MHz, which were called the 'PCS' frequencies. The PCS operators were quick to build out 2G networks in the 1990's and marketed PCS as being inherently better than Cellular, conflating the frequency band with the mobile phone standards. Of course, both Cellular operators adopted 2G standards, 3G standards and now 4G. Today, the operators have consolidated and the distinction between the Cellular and PCS bands is gone. Mobile operators use whatever spectrum they have access to and not one person in a thousand in the US could tell you what frequency band their mobile phone is operating on. What matters to the customer is the service offering and not the frequency band.

A similar trend can be seen with in-flight service providers. Ku-band started to develop in the 1980's and was widely adopted by Fixed Satellite Service (FSS) operators like Intelsat, Telesat and Eutelsat by the 1990's. These FSS operators used continental scale wide beams to provide video distribution and VSAT

services. Connexion by Boeing, the first Ku-band in-flight service provider, sponsored the development of several Ku-band satellites to cover the Pacific and Atlantic Oceans, which allowed Ku-band to achieve full global coverage. Other early in-flight service providers such as ViaSat, Tachyon, Row44, GoGo and Panasonic also adopted wide beam Ku-band for their services.

Ka-band started gaining interest in the 1990's as the incumbent FSS operators locked up the desirable Ku-band orbital slots. Ka-band developed later because the band was allocated later, the equipment costs were higher and it is more susceptible to rain outage. However, the availability of new orbital slots allowed new operators to enter the market, often with different business models. While Ku-band HTS systems like IPStar were pioneers in the field, Ka-band has often been more closely associated with HTS architectures because the new Ka-band operators focused on markets where HTS satellites have a significant advantage like direct to home internet service. Only in the past few years have in-flight service providers such as ViaSat and Inmarsat started looking at Ka-band. Ka-band mobile services are available regionally today and the first global Ka-band offering is scheduled for 2015.

The incumbent Ku-band FSS operators have been somewhat slower to adopt HTS architectures because they already have successful business models. However, operators like Intelsat and Telesat have now announced seven new HTS satellites between them under the Epic and Vantage brand names and other operators are widely expected to enter the Ku-band HTS market in the near future. Panasonic was the first announced customer for Intelsat's Epic satellites and is committed to a global roll out of HTS capacity dedicated for the in-flight market. Other mobile operators have followed suit. HTS payloads, regardless of the frequency band, will soon dominate the mobility market.

Spectrum is Plentiful

The amount of spectrum available at Ku and Ka-band is similar in many cases but depends significantly on local and international regulations. These limitations are largely made irrelevant by frequency reuse.

There is 1.5 GHz of Ku-band uplink spectrum allocated between 12.75 GHz and 14.8 GHz for commercial satellites applications, as shown in Figure 3. Likewise, there is 2.5 GHz of Ka-band allocated between 27.5 GHz and 30 GHz for commercial satellites applications. However, in both bands, only 500 MHz is allocated for mobile services globally – 14.0 GHz to 14.5 GHz in the Ku-band and 29.5 GHz to 30.0 GHz in the Ka-band. It is possible that other portions of the uplink bands will be used for mobile services. However, the other portions of the uplink bands are often reserved for feeder links or shared with other services such as terrestrial fixed wireless, which may limit their use for mobile terminals. In practice, most operators have limited their mobile users to the spectrum allocated for mobile service and use the remaining spectrum for feeder links.

There is 2.1 GHz of Ku-band downlink spectrum allocated between 10.7 GHz and 12.8 GHz for commercial satellite applications, as shown in Figure 3. However, up to 500 MHz of this may be allocated to broadcasting applications in portions of the world. Typically, 750 MHz to 1.5 GHz are available for mobile applications. Likewise, there is 2.5 GHz of commercial Ka-band down link spectrum between 17.7 GHz and 20.2 GHz for satellite applications. How much of the non-mobile allocated spectrum is usable for mobile applications will depend on region specific limitations.

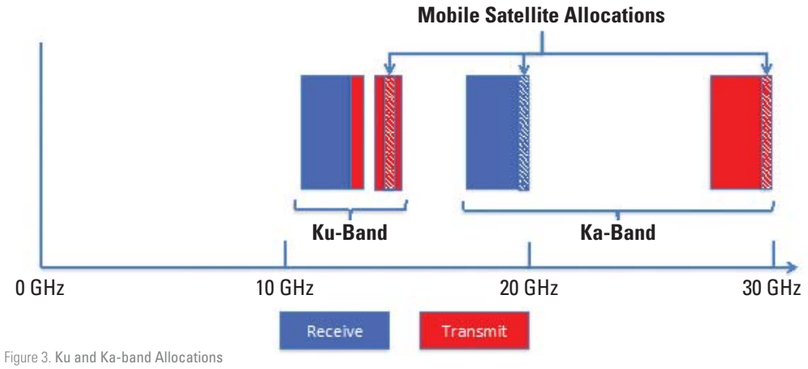


Figure 3. Ku and Ka-band Allocations

Advocates can debate how much spectrum is usable for mobile applications at a given band. However, this misses a fundamental point that HTS payloads can create vast amounts of bandwidth through frequency reuse in either band. Current HTS payloads may reuse the same frequency up to 15 times, creating a usable bandwidth that is 15 times greater than the allocated spectrum. And this is only the beginning. Future HTS payloads will support even higher levels of frequency reuse to keep up with the demand for bandwidth.

Orbital Slots are Scarce

The idea that HTS payload can create as much bandwidth as is needed runs counter to the oft repeated statement that the satellite industry is running out of spectrum. The satellite industry is not running out of spectrum. What it is running out of are unclaimed orbital slots.

Orbital slots are allocated to countries and their respective satellite operators by the ITU. In some bands, this is done based on a predetermined plan but in most bands it is done on a first-come-first-served basis for countries that file for a given slot. Operators must bring the slot into use in the filed frequency band within a certain time period to retain their claim on the slot. After more than 30 years of use, almost all of the Ku-band slots have been claimed by incumbent operators and have been brought into use. The situation might appear better in Ka-band, but after 20 years of intense interest, most of the desirable Ka-band slots have been claimed and many of them have already been brought into use.

Whether the scarcity of orbital slots is a problem depends on an operator's perspective. From the standpoint of a new satellite operator, new slots in the Ku-band are all but impossible to acquire and slots in the Ka-band are becoming increasingly difficult to obtain. However, from the standpoint of an in-flight service operator spectrum in the Ku-band is plentiful.

There are over 190 operational Ku-band satellites with approximately 4000 transponders. The dominant business model in Ku-band makes raw satellite capacity available for lease so in-flight service operators can add bandwidth on demand, where and when it is needed. In addition, typical satellites have a lifespan of 10 to 15 years, so 10 to 15 Ku-band satellites are replaced each year. This gives in-flight service providers who are willing to make longer-term commitments ample opportunity to fly new HTS payloads that are customized for their market.

The situation is more problematic for service providers in Ka-band. There are fewer Ka-band satellites in operation and fewer of those lease raw capacity. Most of the Ka-band development so far has taken place in regional direct-to-home systems where capacity is only available as a managed service from the satellite operator. This has limited the development of Ka-band for mobile services to providers who are willing to make expensive, long lead-time investments in new satellites.

Ultimately, in-flight service providers will select the band to which they have access. Service providers that are willing to partner with satellite operators in the Ku-band will use Ku-band. Those that want to build their own satellite constellations will use Ka-band. Which band they use will not matter to the end customer.

The Service is What Matters

In-flight service providers will be differentiated by the services they provide rather than the band they provide it in. The aspects of service that matter to the end customer are:

- Coverage – Does a service provider cover the customer's flight routes?
- Capacity – How much capacity does the service provider have in the intended coverage area? How quickly can they add capacity as demand increases?
- Data Rate – What data rates can the service provider support to a single aircraft on uplink and downlink?
- Terminals – What terminals are available now and what will be available in the near future?
- Type Certifications – Are the available terminals certified for installation on the types of aircraft the customer uses? How long will new certifications take if they are required?
- Factory Installation – Is the terminal offerable for line-fit by the major airframe builder? Type certification does not necessarily mean that the terminal is available for factory installation.
- Business Model – Does the service provider brand their service or leave the branding to the customer?
- TV and Mobile Phone Service– Does the provider offer other services like live TV and mobile phone service as well as data?
- Pricing – Does the service provider sell based on a revenue share basis or provide wholesale capacity?

A Place to Build a Business

Spectrum is like land. Spectrum is a place where an in-flight service provider can build a business. Service providers will likely build their businesses where they have access to spectrum and what they will build there will increasingly be HTS payloads. Where a service provider builds their business, whether it is Ku or Ka-band, matters less than the quality and cost of the services they provide there. It is the ultimately the service that matters to the customer.

Chris McLain is the Principal Satellite Network Engineer for Panasonic Avionics Corporation. He is responsible for capacity analysis and acquisition strategy for the eXConnect in-flight internet system and has worked on other in-flight communications systems for Boeing, Lockheed and LinQuest. Chris has a BS from University of Washington and an MS from the Massachusetts Institute of Technology.

Interview with CHENG Guangren

Executive Director & President, APT Satellite Company Ltd

Dr. Cheng Guangren has been engaging top management responsibilities in the satellite operations since 1994. He had been the Board Director and President of Sino Satellite Communications Company Limited and the Board Chairman of China Direct Broadcast Satellite Company Limited. He has been appointed as the Executive Director and President of APT Satellite Company Limited (APT Satellite) since 20 June 2008.

Q. We learnt from public available information that APT Satellite has achieved an excellent year in 2013, could you give me a brief?

A. APT Satellite's revenue growth is outstanding in recent years. During the five-year period from 2009 to 2013, APT Satellite has continuously achieved brilliant financial performance with CAGR at 18.45% and 21.04% in Turnover and Profit after Tax respectively. For the year 2013, APT Satellite reported record high audited result in Turnover and Profit after Tax at HK$1,138,055,000 (US$145,904,000) and HK$545,471,000 (US$69,932,000), representing year-on-year increases of 26.36% and 53.90% respectively. The share price of the company increased by 378.5% in 2013.

Q. How did you achieve such a growth in a short time?

A. We pay more attention to broadcasting services than we did before. We have built up MCPC platforms on each of our satellites to cater for the growing demand of the broadcasters for the launch of new feeds or HD channels. We have a strong TV neighborhood in our APSTAR-7 and APSTAR-5, such as HBO, DISNEY, AXN, NBC, BBC, RTL CBS, NBA, Celestial Tiger, Now TV, GMA, CTN, ZEE, MNC etc. We have also several important DTH platforms on our satellites including Hong Kong Cable TV, Combo, Cosatech, CSTV, DDish, Skynet, Great Wall Platform

and the Central Platform which carries 34 foreign channels with secured landing rights in the Mainland China etc. That makes the broadcasters much easier to penetrate their respective targeted market. Subject to certain condition, we are willing to offer to our clients free of charge antenna seeding services, as we did in Philippines and Vietnam. As a result of the improved services, now all Bangladesh TV channels and most of the Maldives and Nepal channels are on board of our satellites.

Q. What made APT Satellite Company Limited successful?

A. Generally speaking the market is growing rapidly in recent years. The region has just experienced great demand increase on telecommunication services as well as entertainment. Internally we have the following key drivers that contributed to the growth:

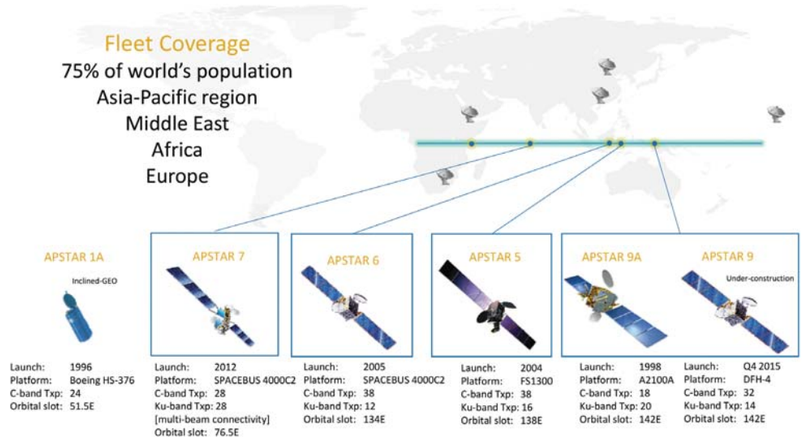
- A powerful and wide coverage APSTAR satellite fleet. APSTAR satellites provide improved communication performance, power and efficiency to our customers, with the largest geographic coverage over all visible landmass, including all of Asia, Australia, most parts of Africa and Europe, as well as numerous islands scattered across the Pacific and Indian Oceans.
- More Exposure in trade shows, exhibitions, conference panel discussions to allow customer to understand us, and be proud of using our services.
- Emphasize the value our product and service bring to the customers, through reasonably pricing, introducing one-stop solution provisions, and continuously improving our services. The on-site training for emerging markets and antenna seeding programme for TV customers are typical examples.
- We weigh equally data services and broadcasting services thus to make our business sustainable for the long term and also lucrative for the short period.

  We treat our client fairly and uphold high standard of business ethical conduct, in one word, we are trustworthy.

Q. Do you have new satellite launch plan in recent years?

A. Yes, we plan to launch two new satellites in near future, namely APSTAR-9 and APSTAR-5C.

As a milestone in the company history, APSTAR-9 is a new satellite to be launched to the orbital slot 142°E in late 2015 so as to meet the growing market need on both C-band and Ku-band transponders in



the Asia Pacific Region. Most importantly, it is specially designed to meet in-flight connectivity and maritime navigational needs in the region. In November 2013, the company managed to drift APSTAR-9A, an in-orbit telecommunication satellite, to 142°E under a lease arrangement, as a bridging solution, to fill up the rapid increasing market demand in transponder capacity and secure customer base prior to the launch of APSTAR-9. Upon the launch of APSTAR-9, the business and customers will migrate from APSTAR-9A to APSTAR-9. So far, the filling rate of APSTAR-9A is very encouraging, evidencing our sensitivity to the market pulse, and ability to grasp business opportunity.

APSTAR-5C will be the replacement satellite of APSTAR-5. Since its launch in 2004, APSTAR-5 has served in the orbital slot at 138°E for well over 10 years. It is a hot-bird for both TV and telecommunication customers. For the purpose of providing smooth transition for customers, the company will soon make decision to kick off this replacement programme in the second half of 2014, with a target satellite launch date in 2016/2017.

Q. How do you foresee satellite industry in the next 10 years?

A. APT Satellite's success is partly attributable to the booming telecommunication and TV market in the region. Our customers come from every country in the region, no matter whether they are large-sized or small-sized, in developed markets or developing markets, we have been trying to provide quality, stable and cost-effective services to them. As the global economy is undergoing substantial reforms, the region's growing pace could have been affected in short term. However, we are confident that as a result of the fact that more and more people, families and countries migrating to the middle-income tier in the region, their telecommunication needs will continue to grow and become more sophisticated. We believe satellite industry will continue to grow in the next 10 years.

Satellite Capacity Supply & Demand in Asia Pacific

Prashant Butani, Senior Analyst, NSR India

Where is the Market Going?

Asia has not been an easy market to conquer for satellite operators over the past decade. Yes, **there have been pockets of growth** in the continent. DTH platforms in India opting for "foreign" capacity or the 100% fill rates that the first NBN satellite commands in Australia. But the region still has strong **domestic operators with growing "regional ambitions"**. Then there are the nation-backed smaller commercial players and, of course, PrideSats. This makes Asia a market where one has to be prepared to fight many battles. Some with regulators, some with weak economies but almost all with a domestic incumbent.

A quick look at what's in orbit and what's in store for the region tells many a tale.

Figure 1. **Listing of Major Regional Satellite Operators in Asia**

Orbital Arc	Satellites	Operator	Payload Power	TPEs (All Bands)	FSS / HTS
75E	ABS 1-3/A Series	ABS	1.5kW to 12.5kW	20 – 174	FSS Only
75E – 165E	APSTAR I-IX	APT Satellite	600W to 8.4kW	28 – 61	FSS Only
100E – 120E	AsiaSat 2-9	AsiaSat	6.5kW to 8.5kW	28 – 56	FSS & HTS
46E – 148E	Measat 1-3/a/b	Measat	1.2kW to 11.6kW	18 – 52	FSS Only
93E – 162E	JCSAT, N-Star, Superbird	SKY Perfect JSAT	1.4kW to 9.5kW	24 – 71	FSS Only
81E – 125E	Chinasat 5-13	ChinaSat	3.8kW to 7.7kW	10 – 53	FSS Only
88E – 164E	Optus A-D, 10	SingTel Optus	600W to 9.2kW	19 – 38	FSS Only
108E – 118E	Telkom 1-3	PT Telkom	2kW to 5.6kW	24 – 48	FSS Only
78E – 120E	Thaicom 1-8	Thaicom	400W to 11.5kW	17 – 40	FSS & HTS
55E – 93.5E	INSAT 2-4/GSAT 8-16	ISRO	800W – 8kW	12 – 48	FSS Only

Until recently (2012), Asian operators ordered relatively smaller and less powerful satellites than their counterparts in the West. This reflects in a high percentage of these satellites having a **payload power of less than 6kW**. Even for China, which had a much higher percentage of satellites in the 6kW to 9kW range, there were no satellites above 9kW. India, with all its domestic capability and burgeoning DTH market, had all but one satellite with payload power less than 6kW.

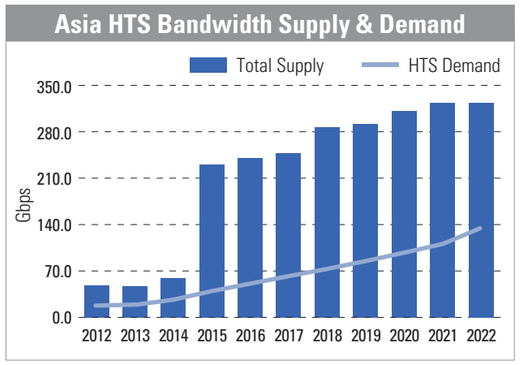


Figure 2. Asia HTS Bandwidth Supply & Demand, 2012-2022

If we change the benchmark to number of TPEs (36 MHz equivalent) the story is no different. 70% of satellites launched between 2000 and 2012, operated by Asian operators have less than 40 TPEs. The bulk of the remaining 30% have between 40 and 60 TPEs. China changed the game a bit here, where until 2010 most satellites carried **less than 40 TPEs**. Today, about half the satellites have between 40 and 60 TPEs. All of India's satellites have less than 40 TPEs.

On High Throughput Satellites (HTS) the story so far is largely that of Thaicom. Of the 20-odd satellites, both FSS and HTS, visible over the next half decade **only four have any HTS capacity**. Two of them are part of Australia's NBN fleet, the future for which is anybody's guess. The other two satellites have part FSS & HTS payloads perhaps with more of a "spectrum grab" objective than anything else. Clearly, despite the demand, albeit latent, for broadband access and trunking the HTS model is still unproven in Asia. The fact that Thaicom took almost a decade to land big (SoftBank) business does not help business plans. As a result, most HTS constellations (Global Express, EPIC etc.) have their Asian satellite only launching towards the end of the decade. Figure above shows the combined HTS capacity coming online over the next decade with the big jumps in 2015 and 2018 from the Intelsat and Inmarsat fleets.

Who is doing What?

Big Four – Eat or be Eaten!

The Big Four seem to have **very diverse strategies for Asia**, again reflecting the complexity of the market. Telesat has very litte, if any presence in the continent. Eutelsat's deals in Central Asia and the Middle East show an intention to make inroads into Asia. Given their recent acquisition of SatMex and cash position, another acquisition to gain foothold in the region cannot be ruled out. Intelsat has captured C-band neighborhoods in South and South-East Asia but still cannot claim very high utilization. SES has the SES-9, which, with its fixed Indonesia capacity, may signal an **intention to go "local"** but whether this is a trend across operators remains to be seen.

Another important factor to note is that while every major global operator is claiming to add capacity over Asia, **many of them are steerable beams** that allow flexibility to move to Africa / Far East if the demand in South and South-East Asia doesn't hold up. Examples are India and Indonesia, where despite the seeming influx of Ku-band capacity, the demand still remains largely focused on C-band. Also the dynamics of these countries with regards to the incumbent and regulator make them difficult markets to penetrate. It would not be surprising to see **strategic partnerships where the Big Four put up the CapEx** to quickly bring supply into the region.

Regional Operators – Domestic Replacement & Foreign Expansion

Leaving aside the Big Four, sorting satellite operators by their published annual revenues brings out further trends.

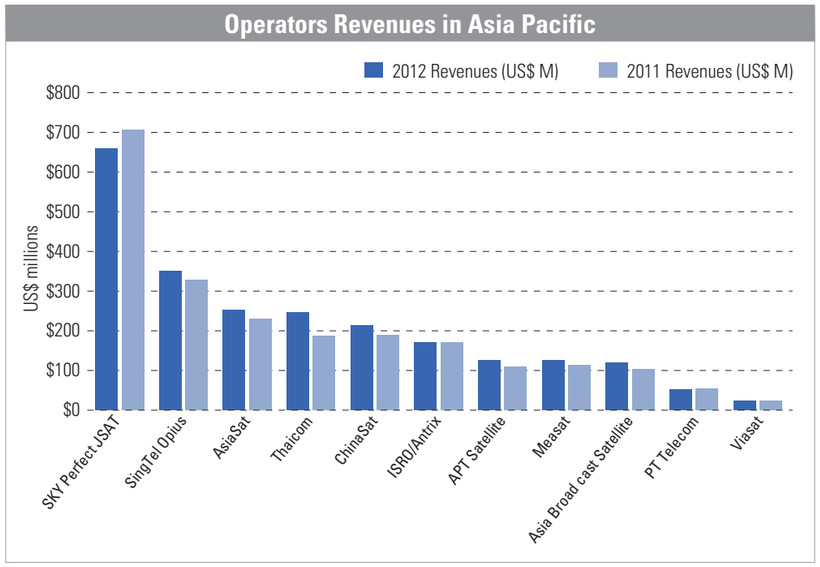


Figure 3. Operators Revenues in Asia Pacific 2011 & 2012 (US$ M)

Regional operators in Asia clearly have a very strong domestic market, one that they have built on handsomely. The bigger regional operators are ordering their next generation of satellites with two objectives in mind – **replacing capacity based on domestic demand and expanding capacity to grow in foreign markets**.

JSAT, AsiaSat, ChinaSat and ABS have about three satellites each planned for the next half decade. Thaicom and APT Satellite have one or two each. Almost all these satellites have replacement domestic capacity and foreign footprints for expansion. APT Satellite for example has a strategy of focusing on the global market, becoming an important player in Asia Pacific all the while co-operating with ChinaSat in China. Most Asian operators follow a similar approach with their country of operation.

The Australian Government's NBN interim satellite has already reached 100% utilization - years before it was expected to - showing how extremely strong the demand is for satellite broadband in Australia. NBN will hopefully launch two Ka-band satellites by next year, offering more than 150Gbps of bandwidth, for consumer broadband. Jabiru 2 will also launch some time this year, providing more than 200 MHz of capacity, covering much of the areas where mining and oil and gas are done in Australia. Regions where there is high demand for satellite imagery and communications. Optus 10 is also launching this year again primarily for enterprise markets mostly in the mining industry. In Australia at least, there'll be **significant capacity coming online in the short-term** to cater for high demand.

For the others, the ambition is clear, to **go from domestic to Pan-regional** coverage. Frankly, there isn't much choice. Domestic spectrum is more or less exhausted and new orbital slots are difficult to come by. The only way to grow then is to **re-use the spectrum** they have in the domestic market, in neighboring countries. The question for the smaller players is do they do it all themselves or bootstrap with the Big Four for cash to speed up expansion plans.

Smaller Operators – More Ambition than Spectrum?

The smaller players, Measat and ABS included, are still in the process of establishing their niche in this crowded market. Again, whether it is ISRO or Indosat, the **domestic incumbent status** remains the same. Not all have been successful in maintaining it, especially with India's DTH players now almost exclusively on "foreign" satellites with the exception of Tata Sky. If one had to speculate, it would be one of these smaller players that would be prime candidates for acquisition.

However, the fact that these **smaller players are considered "national assets"** makes it difficult for the regulators in these countries to allow free M&A activity. The choice the Big Four often have to make in this context is do we Partner, Acquire or Compete head-on. The answer varies depending on the specific country market in question. So far, it has been only partnership and, to some extent competition, but it won't be long before acquisition begins.

National "Pride"Sats – Adding to the Fragmentation

The final trend is that of the **PrideSats adding to fragementation**. While this is universal in a way, Asia is a bit ahead of other emerging markets such as Asia and Latin America. Many that started as national satellites are already partly or completely commercial. Smaller ones are too close to being national assets to transact purely on a commercial basis. The question of whether Asian operators will consolidate has been around for nearly two decades. Eventually the more commercial "small" players will realize that the only way to grow is to join forces. **Consolidation is inevitable but as with all things Asian, it is not easy**.

NSR's Bottom Line

Asian markets are difficult to navigate, for more reasons than those listed above. **Every country is a different market** in terms of demand applications, pricing and regulations. **Every major country also has a satellite incumbent**, often with national support. The Big Four have been opportunistic in their growth, especially in markets like South Asia and will continue to chase after pockets of demand in South-East Asia. Large regional operators have exhausted domestic spectrum (not domestic demand, however) and have **no choice but to expand pan-region**. The region, as a whole, has shown pockets of growth exist but the applications vary from consumer broadband in Australia to DTH in India and trunking in the Far East. In order to succeed here, the strategy has to be both: flexible across the continent and country-specific in terms of opportunity.

Prashant Butani joined NSR in February of 2008 and currently holds the title of Senior Analyst. He has authored first editions of NSR's Direct-to-Home and Satellite Manufacturing & Launch studies along with providing coverage of the satellite and telecom market in India, Middle East and Africa. His areas of expertise include Satellite Capacity Supply & Demand, Direct-to-Home, Satellite Manufacturing, Satellite Launch and Emerging Media Applications. For client specific projects, he has worked on topics as diverse as Satellite Broadband, MILSATCOM, M2M and Equipment Manufacturing.

Why Business Agility is Crucial for Successful Satellite Communications Business Models

Koen Willems, Strategic Marketing Director, Government, Defence and IP Trunking, Newtec

Technological innovations, socio-political dynamism and economic uncertainty are contributing to an ever-changing satellite industry. To succeed, then, improved agility and increased adaptability is needed to meet market and technology changes. The fulfilment of these key requirements, writes Koen Willems, Market Director at Newtec, will result in profitable growth – even in the face of the challenges satellite service providers and end users are facing today… and tomorrow.

CHALLENGE 1: More Speed, More Data

As data rates increase and the volume of data grows, satellite service providers, no matter what their size, have had to adapt in order to accommodate this – but what has caused these increases?

Growing media-rich traffic (Video-on-Demand) and a market push-pull effect for HDTV (High Definition Television) and UHDTV (Ultra High Definition Television) are just a few factors that immediately spring to mind. At the same time more users are going online, not only through traditional devices such as computers and laptops, but also through smart phones and tablets. These devices are portable and are not as dependent on electricity power proximity or availability, something which is important in developing countries.

More Government initiatives, designed to lose the digital divide, to educate people, to respond quickly to emergencies and to gather intelligence from the field, have also been introduced, while machine-to-machine communications which use bandwidth-hungry sensors that must always be connected, are also increasing.

The launch of various new High Throughput Satellite (HTS) initiatives and constellations is a direct response to cater for the increasing data demands. But with today's end user expecting to receive both the data rates and quality of service to fit his or her application requirements, these measures are not enough.

CHALLENGE 2: Users Expect More for Less

As the users' expectations for speed and data volume increase, so too does competition, leading to another expectation from the user – a better service for a lower cost. The relentless advances and competition from fiber and other terrestrial and wireless infrastructures has put pressure on both prices and margins.

In order to stay competitive, then, satellite service providers are being forced to engineer and deploy new services that provide a higher quality of service at a much lower operational cost.

CHALLENGE 3: Ever-increasing Market and Technology Complexity

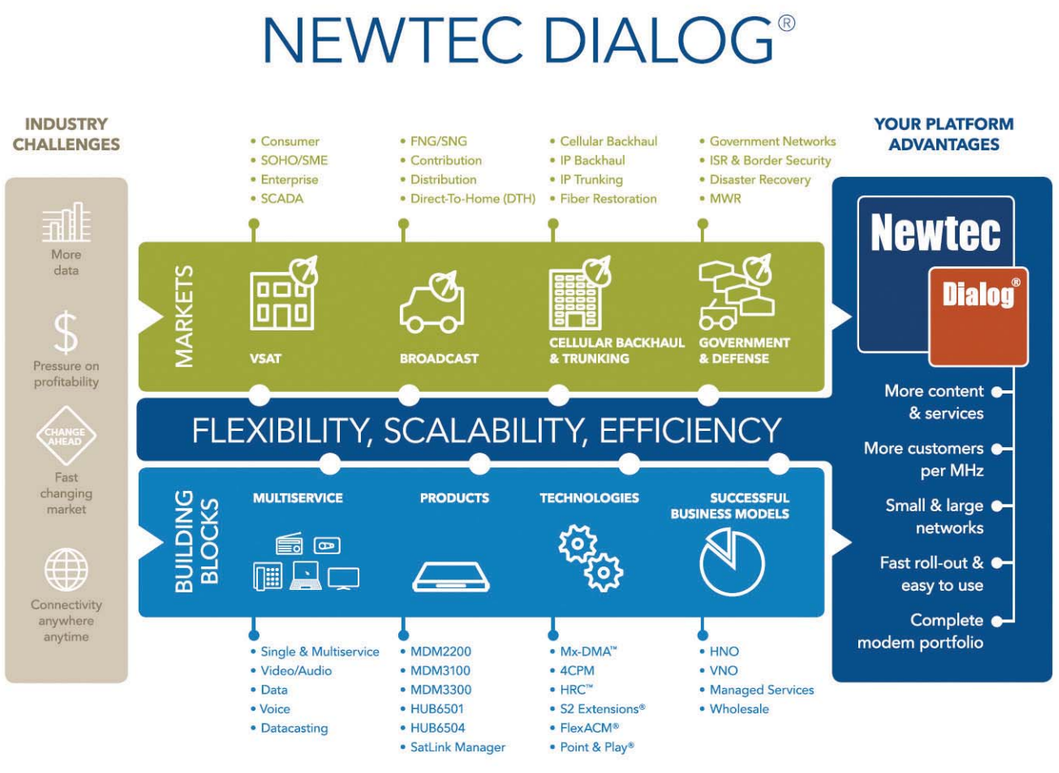
Over recent years, the satellite communications market has witnessed important changes both on the technology side and on the value chain side. If service providers are unable to adapt to the rapidly changing environment, their business is likely to fail or, at least, face serious challenges. Adapt or die. It is a blunt statement but a truthful one. Socio-political changes and economic uncertainty are additional drivers of complexity, all of which are, of course, linked.

A major industry enabler which is helping to improve speeds, to increase data volumes and decrease the cost of satellite transmission is the introduction of HTS satellites. Due to the architecture of most of the current HTS satellites, satellite service providers are forced to access those satellites through a geographically distributed network of gateways. This requirement clearly increases the complexity for operating those networks.

Adding to this complexity is the fact that the introduction of the first HTS satellites over North America was not triggered by the 'historical' satellite operators, but the result of a handful of technology vendors who drastically changed the business value chain by becoming both satellite service provider and operator. Suddenly several satellite service providers saw their technology provider become one of their biggest competitors.

Fortunately for satellite service providers, the historical satellite operators have now started launching new HTS satellites. This move sees operators embrace their traditional role of providing space segment only and enables satellite service providers to revert to buying bandwidth capacity on HTS beams that are of interest to their business offering.

With the business environment becoming complex, the pitfall for many service providers is to build their services on equally complex infrastructures that have organically grown over time along with their business. These platforms become difficult to manage and operate, impacting heavily on both operational and capital expenses. Small changes to improve operational efficiency, or to satisfy the customer, prove difficult when different technologies, topologies and platforms on top of each other are involved.



Industry Challenges and Newtec Solutions' Answers: Newtec Dialog has flexibility, scalability and efficiency at its core

CHALLENGE 4: Ubiquitous Connections

Last but not least satellite communications need to serve users not only at home or in the office, but also when they are travelling or on assignment in a remote location. People are getting used to the fact that they can be reached and have connectivity anywhere anytime. They expect to be able to get access to the Internet on trains, planes, ships and in their car.

Embrace Change

Confronted with such massive changes in the satellite communications environment, it is key, in order to survive and capitalize on frequent alterations, that change is embraced in business strategies. Satellite service providers must be ready to adapt to new market opportunities. Agility and a quick response are critical to survival and growth.

Investment in satellite communication technology and flexible and scalable platforms that can cope with altering situations is also vital. Differentiating service definitions and service packages from competition is also imperative, along with ensuring that all eggs are not being put in one basket. The satellite service provider can spread risk and allocate bandwidth according to changing market demands by applying a multiservice offering from a single hub.

In order to apply a specific comprehensive SLA scheme to fit the needs of different customers, understanding the requirements of the different applications and user profiles is absolutely critical. Likewise, while introducing technology to the satellite network that further optimizes network efficiency and service speeds will be essential, making sure the platform is independent from any satellite constellation or satellite frequency in order to quickly adapt if the business or customer base changes might be equally as important.

When a service provider is able to grow with demand and has the option of investment in a modular way, when opportunities arise, they will be able to realise the potential that comes with growth.

Different Horses for Different Courses

Today, satellite service providers interact with many different communication technologies across a broad range of platforms. The operator, satellite service provider and end-users all expect to receive the data rates and the quality of service level to fit their application requirements.

Here, the key for the satellite service provider is to fully understand the business or the operation of his or her customers and to provide services according to the nature of these applications. A good approach is to draft different user profiles per market, application or segment in the value chain based on typical satcom usage, priorities and performance attributes.

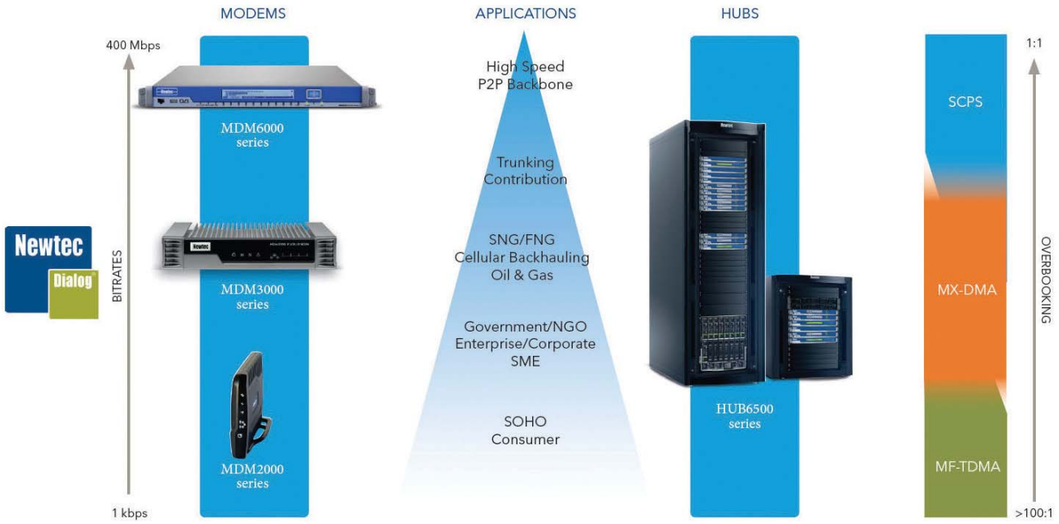
Different applications and markets have different needs. The user profile and performance attribute expectations of a home user with satellite Internet, for example, will be entirely different from a broadcaster. For the broadcaster, not losing the satellite link during a live sports video feed will have priority over pricing, whereas 'assertive' consumer VSAT users will hunt for the service which gives the best user experience for the lowest price.

Multiservice, Multiservice, Multiservice!

Considering customer feedback and the aforementioned variable market conditions and guidelines, we believe that the adoption of a multiservice satellite communications approach will begin the journey to achieving profitable growth. In particular, Flexibility, Scalability and Efficiency are of utmost importance for success.

Whether the satellite service provider addresses a single application or multiple markets, they should be able to optimize technology without compromise. If this is achieved optimizing the usage of infrastructure and satellite capacity for different markets becomes possible.

As an example, an operator with a history of mainly servicing broadcast clients should be able to easily add new services and



Newtec Dialog®'s Applications and Supported Bitrates: Newtec Dialog can optimally address a variety of different markets, ranging from consumer broadband, corporate, cellular backhauling and IP trunking, as well as broadcast market applications such as SNG/FNG and fixed contribution and exchange

use the same infrastructure to start targeting cellular backhaul and trunking, consumer and enterprise, VSAT or government markets.

The service provider should also be able to scale as appropriate from, for example, a small network with just five remotes, up to the largest networks, with hundreds of thousands remotes; also from single coverage to multispot HTS networks. Additionally, satellite service providers should be able to invest as the business grows with minimal CAPEX.

Of course, efficiency is as important, if not more important, as it always has been. In this new world extra bandwidth, throughput or the savings satellite service providers are craving should be secured by the technology. The highest number of customers per MHz should be accomplished at maximum availability in order to meet the toughest Service Level Agreement requirements.

So, What's Next?

In the satellite market, the successful business strategies are those which are based on platforms and technologies that embrace change and increase profitability. The need to innovate business models, strategies and network infrastructure leveraging on change has never been so pressing for satellite service providers, network operators and broadcasters. It is needed in order to play a significant role in the entire satellite communications ecosystem.

Companies that fail to do so expose themselves to the risk of losing ground and profitability in their core markets. All satellite service providers, big and small, can seize the opportunity today to fulfil their ambitious business objectives. Flexibility, scalability and efficiency are three key principles that are directly related to the agility and success of business operations, and therefore profit, efficiency and market share too. Change should not be feared, but embraced.

Meet Newtec Dialog

Newtec has developed a platform that is capable of coping with changing business environments in the satellite market. Newtec Dialog® is a scalable and flexible multiservice satellite communications platform that allows satellite service providers to build and adapt their infrastructure easily as their business and the satellite market grows.

It is designed to secure the future of operators, giving them the power to offer a variety of services while making hassle-free decisions on the technology to use. The platform assists the satellite service provider to select the best transmission technology for their particular application. For the return link technology they can opt for the flexibility of MF-TDMA (Multi-Frequency Time-Division Multiple Access), the efficiency of SCPC (Single Channel per Carrier) links or the best of both worlds with the patented and brand new Mx-DMA™ (Cross-Dimensional Multiple Access) HighResCoding™ technology. This revolutionary technology fills the gap between the MF-TDMA and SCPC return technologies and at the same time solves the difficult choice to select the one or the other. The implementation of Mx-DMA typically results in a doubling of the transponder throughput using the same bandwidth, or alternatively reducing the required space segment capacity by 50 percent. The new technology also ensures low jitter and delay, perfect for applications like voice and streaming video.

The Newtec Dialog platform combines the efficiency of the forward and return satellite links with Newtec core technology such as FlexACM, Bandwidth Management and Cross Layer Optimization. With these technologies, Newtec Dialog is able to provide the most optimal modulation and bandwidth allocation, while guaranteeing the highest efficiency and availability.

The Newtec Dialog® Hubs: The Newtec Dialog® platform consists of hub(s) and terminals. The hubs are modular and scalable and can be configured in different sizes fitting the needs of Newtec's customers. The picture shows the HUB6501 1IF (right) and the HUB6504 4IF (left) Hub Modules.

Koen Willems started his career in 1998 as project manager in the Consulting & Services division at Lernout&Hauspie. He then joined Toshiba as Product Marketing Manager for the Benelux and later for the European market. Currently Strategic Marketing Director for Government, Defence and IP Trunking at Newtec, a market leader in satellite communication technologies, He has been in charge of market launches for a number of professional IP modems and technologies in the last four years.

Mobile Satellite Communications in Aerospace Industry Prepares for Lift Off

Kim Gram, Vice President, Aeronautical Business Unit, Cobham SATCOM

Introduction

It is a fascinating time in the growth and development of aeronautical satellite connectivity. Airborne connectivity has reached a level where it is no longer a novelty, it is now an essential part of air travel. Flight crews will be connected in flight, almost as well as any other business concern on the ground. Passengers will be able to use their electronic devices in flight, in the same way they do when connected in their homes and businesses.

For the providers of mobile satellite systems, there is now an opportunity to change the airline industry from an environment where an aircraft to a large extent remains the only workplace without an IP data link for professional communications. Aircraft are the only remaining workplace where the people working there are not connected with the rest of the organisation, be it maintenance, operation or flight planning with an IP Pipe.

Cobham SATCOM's AVIATOR terminals support an extensive range of communications applications for passengers in the cabin

We are now in a position to provide technologies and systems that, in a cost effective way, will ensure that the operation and maintenance department of the airlines will have the option of being connected to the aircraft continuously for all aspects of the work. That is what we have achieved in the maritime industry during the last decade.

We are talking about developing a new generation of technologies which will handle the specific requirements in the airline industry. Advances in satellite services, such as Inmarsat's SB200 service class, have helped drive this latest generation of terminals and will continue to do so in the future.

Connectivity in the cockpit and cabin

The advantages for passengers provided by wireless connectivity are well-known and enjoyed on many airlines already. The SwiftBroadband service that our AVIATOR terminals are made for has already proven popular in the business aviation market, supporting an extensive range of communications applications for passengers in the cabin by offering built-in Wi-Fi, enabling entertainment services and 'office in the sky' applications such as voice and email.

Airline passengers can look forward to cheap or affordable connectivity for their personal needs, such as email, social media such as weibo or wechat (Chinese version of Twitter) and whatsapp. In the meantime, in-flight entertainment systems can provide local content services, while passengers can use their own device for specific requirements.

As well as the push for broadband in the cabin, the flight deck is increasingly looking at its use of streaming data for tasks such as air traffic control and aircraft operation. Wireless connectivity can support a host of applications in the cockpit, from enabling on-line use of modern EFBs to accessing real-time weather reports, flight planning and chart information. Pilots are connected for all the information they require, while crew will be able to offer services such as credit and debit card authorization. We are actively engaged in the ARINC committees working on future SATCOM systems that will provide the connectivity to make aircraft a business domain where people can be connected with the rest of the organisation.

In future years, we will see more bandwidth capacity and flexibility for passengers and flight crews to access and leverage. Operating costs are coming down and will continue to do so, which in turn will increase usage, driving more market demand. Airborne connectivity is not only just for passengers, but for airlines, business aviation and even UAV's. Connectivity drives more efficiencies in all phases of flight and gives passengers a greater overall experience. It provides greater choices for entertainment and communication while passengers are away from their homes and offices.

The AVIATOR systems and connectivity will continue to support current and future advances in cockpit technology. However, we need to be sensitive to the security issues and need for versatility of the future satcom communication systems. This is why we committed to providing a new, smaller, less expensive terminal that will provide the capability for forthcoming safety services, which will be a very big focus in the coming years.

Safety services and new developments

Representing much better value for the money, the trend has definitely been towards smaller, lighter, less expensive systems that are still feature rich. Inmarsat's development of SwiftBroadband Safety Service (SB-S) is providing the opportunity to develop our next generation of terminals and antennas called AVIATOR S.

Wireless connectivity can support a host of applications in the cockpit, from enabling on-line use of modern EFBs to accessing real-time weather reports, flight planning and chart information.

Leading the way in this next generation of L-Band terminals and antennas, AVIATOR S will meet the needs of all three aircraft domains and will be the most versatile family of SwiftBroadband systems on the market. AVIATOR S will deliver both safety services and IP connectivity simultaneously. Airlines will no longer need to depend on multiple satcom systems to meet the needs of the flight deck and the cabin.

The development of the AVIATOR S series terminal and antenna product family has been driven by the latest specifications formulated by the Air Transport Air-to-Ground-Communications working group (ARINC 781), along with anticipated requirements for safety services and network domain separation for air traffic control (ATC).

The first system to be made available will be the AVIATOR 200S – a unique, compact two LRU (Line Replacement Unit) satellite communication system which will exploit the unique features of the Inmarsat SwiftBroadband packet data communication system.

AVIATOR 200S will combine the provision of SwiftBroadband Aircraft Communications, Addressing and Reporting Systems (ACARS) data services for Air Traffic Control and Aircraft Operation with an IP data pipe for the transfer of operational and flight data to ground maintenance and control facilities, or real-time weather and other flight relevant information updates to EFBs or flight management systems.

The system will meet the requirements for FANS 1/A operations as well as the support of anticipated satellite service requirements for LINK2000 in Europe and Next Gen in the United States air spaces.

The new capabilities of the AVIATOR S series will significantly benefit aircraft operations by offering an extremely compact LRU and antenna configuration for safety services, such as FANS-1A and CPDLC and safety voice, over SwiftBroadband. Additionally, it will simultaneously provide data connectivity for non-safety use in the flight deck with tablets, EFB and other data needs in a segregated manner as the S series is designed to the latest ARINC 781 Chapter 8 specifications for safe segregation of data between the aircraft domains.

One capability, which has recently taken the spotlight, is tracking. With the Malaysian MH 370 disappearance, a renewed emphasis has been placed on the need for robust satellite tracking of all aircraft continuously. Our current and next generation have built-in tracking capability and can also leverage Inmarsat's tracking capabilities which should meet the needs of any potential mandates to come.

Antennas revolution

Airlines will no longer need to depend on multiple satcom systems to meet the needs of the flight deck and the cabin. Cobham SATCOM's next generation HELGA and ELGA antennas will provide maximum flexibility for operators who are looking for an economical SwiftBroadband Safety service solution.

Following the integration of Cobham and Thrane & Thrane's broad-based portfolio of antenna systems, we are able to tap into this potentially huge market as the demand for connectivity continues to grow. There is a very broad range of aircraft requiring wireless communications, including turboprops, light jets, air transport aircraft, military aircraft and unmanned aircraft vehicles. The range of systems needs to be compact and lightweight, offering simple and cost-effective installation.

Including the lightest HGA on the market, Cobham SATCOM's range of standalone AVIATOR High Gain, Intermediate Gain and Low Gain antennas features an aerodynamic profile and a small footprint for optimum performance. The family of phased array fuselage and tail cap mount Inmarsat antennas range from the AVIATOR HGA-8000 to the LGA-3000. AVIATOR antennas feature precision navigation sensors and GPS antennas and are designed for use on Inmarsat SwiftBroadband, SB200 and Classic Aero (H/H+/Swift64) services.

One of the key components of the AVIATOR 200S is the exceptionally compact HELGA antenna which reduces the number of LRUs to two – making the AVIATOR 200S so important for operators. This is achieved by reducing the SDU into a 2 MCU unit and incorporating the RF power amplifier and diplexer into the antenna unit. The antenna footprint is defined by ARINC 781 Attachment 7 and compatible with ARINC 741 LGA mounting footprint. The exacting environmental considerations have all been taken into account in this revolutionary design concept. The antenna achieves excellent low angle performance due to its unique multi-element phased array architecture.

The space and weight savings achieved by the AVIATOR 200S represents a step change for the industry as this new solution is suitable for all aircrafts.

Cobham SATCOM has developed its next generation of terminals and antennas called AVIATOR

Asia region

Asian airlines are increasingly signing up to offer in-flight connectivity and entertainment for passengers, but the move towards cabin connectivity seems to be less of a priority. Jianmin Cui, Regional Sales Director, China Region, Cobham SATCOM, has many years' experience in the industry.

He said: "In the Asia region, airlines are working and looking forward to offering in-flight entertainment, but it seems that fewer airlines are considering cabin connectivity. Air China is one of the leading airlines in terms of connectivity and is testing On Air solution (Satcom), ATG (domestic provider) and expecting Gx on I5 of Inmarsat Ka certification.

"From my experience, airlines are more interested in cabin connectivity than cockpit connectivity now. However, airlines are becoming more aware that cockpit connectivity brings significant value in terms of safety and efficiency. Because CAAC mandated satcom for cockpit voice, it is more beneficial to have both voice and IP connectivity in the cockpit than just voice only. There is already a lot of interest in the Cobham SATCOM AVIATOR 300 in China, for example.

"The global trend of satcom airtime and hardware becoming cheaper is also the case in Asia, enabling the airlines to equip the compact product for cockpit and broadband product for cabin, either Ku or Ka. Our Aviator 300 or Aviator S would have good potential for cockpit application. In general, the SwiftBroadband solution, single channel, could be a good solution for data hungry airlines.

"In terms of future developments, for broadband, Ka and Ku would be the main choice for wide body aircraft and maybe some narrow body aircraft. Swiftbroadband will play a niche market role for connectivity market, but I see SwiftBroadband data (IP and ACARS) as having great potential for cockpit application as it could physically separate the cockpit data channel from cabin connectivity. SwiftBroadband will be the future choice on narrow body aircraft for the cockpit solution. In the narrow body market, multi-channel SwiftBroadband may have a role for airlines to have just right connectivity, such as Sky shop transaction real time verification, social media only for cabin, and so on.

"For the China market, due to the strict internet curfew, the web surfing may be very limited to very few sites. Airlines need to have a very smart solution to ensure people 'feel connected', rather than just having random browsing with very bad experiences. Secondly, passengers will be looking for free connectivity, so who will pay the connectivity cost could be an issue too. Currently, airlines just try to use inserted advertisements to cover its cost which could affect the customer experience."

It is certain the drive to develop new technology and provide reliable, cost-effective communication systems for the broadest range of aircraft will continue in the coming years.

Our industry segment is experiencing a tremendous amount of technological advancement and there is a wealth of opportunities to pursue. Cobham SATCOM are positioned well to be at the forefront of mobile satellite communications proliferation and will continue to champion the adoption of these new technologies in order to transform the aerospace industry for years to come. We are truly living in exciting times.

Kim Gram has held the position of Vice President Aeronautical Business Unit at Cobham SATCOM, previously Thrane & Thrane A/S, since 2009 and has commercial responsibility for the global aeronautical business of Cobham SATCOM. He joined Thrane & Thrane A/S in 2001 as Sales Director Global Maritime Sales, before taking on the role of Director of Sales Asia Pacific and Global OEM Accounts from 2003 until 2009. He was appointed Vice President Maritime BU in 2008.

Australasia Satellite Forum 2014

With a robust market outlook, the Asia Pacific region has the focused attention of global satellite industry. As satellite service providers continue to expand their reach into this key growth region, industry thought leaders from around the world flew to Sydney to attend a sold-out 2014 Australasia Satellite Forum. Taking place from 20th to 21st May, the conversation concentrated on current trends and challenges for satellite across the Asia Pacific and abroad.

Australian Government recognises unique strengths of satellite

Global players were in attendance such as SES, Intelsat, O3b, Lockheed Martin, Airbus Defence and Space, ViaSat, Arianespace and ITC Global as well as local representatives from NBN Co, Optus and NewSat. The Parliamentary Secretary to the Communications Minister, Paul Fletcher opened the event discussing the potential, perils and practice of satellite communications for the Australian Government, National Broadband Network (NBN) and highlighting that it is about, "recognising the unique strengths of satellite and not using it to serve customers it is not well suited to serve."

With a focus on the key issues of the Australasian satellite industry including WRC-15 and C-band spectrum crunch, the role of NBN Co's satellites in the Australian market, and evolving technology to improve satellite services, professionals across government, industry as well as customer organisations attended to hear the latest in satellite and beyond.

Satellite operators debate the region's big issues

Moderated by talk Satellite's Kevin French, the Satellite Operator Roundtable featured SES' Glen Tindall, Intelsat's Terry Bleakley, Inmarsat's Andy Start, IPSTAR's Phil Cross, Optus' Paul Sheridan, Kacific's Christian Patouraux and NewSat's David Ball to discuss the outlook for their organisations in general and what the new technologies actually mean for their markets. While the primary focus for most of the global operators is across content distribution/consumer broadband markets, NewSat's David Ball highlighted that as an emerging satellite operator in the region the focus is "competing in areas where satellite is appropriate" and with the amount of capacity coming online with their upcoming Jabiru-1 and Jabiru-2 satellites to "tailor that capacity exactly for the customers and verticals we are addressing".

Another topical discussion for the panel was the satellite component of Australia's NBN and the role it will play. SES', Glen Tindall stated that "we created a monster we didn't need to create" and are therefore consequently dealing the inherent issues that follow. Ball spoke about the danger of the satellites not reaching service fulfilment. "We're a little concerned for the potential for 'scope creep' for NBN beyond the consumer. There has been a lot of concern about whether they're going to tackle the enterprise market and we've seen commentary on the terrestrial side and we're equally concerned on the satellite side," Ball explained.

WRC-15 and spectrum crunch

Another matter across the industry is the upcoming WRC-15, where the future of C-band spectrum will be decided across terrestrial and satellite services. With terrestrial services attempting to claim more C-band spectrum, the satellite industry is concerned about interference with the C-band satellites already in the sky, and to be launched supporting vital services worldwide. Christopher Hose, Executive Manager Spectrum Planning and Engineering from Australian Communications and Media Authority also presented and discussed Australia's stance with the forum audience.

Customer expectation motivates industry innovation

Innovation was a recurring forum theme, as highlighted by the opening panel with a number of panellists discussing an industry renaissance with high-throughput satellites, the shift from Ku-band to Ka-band, customer driven efficiency demand and growing mobility requirements. All of these elements are driving organisations to innovate to continue to meet customer expectations. Chief Technology Officer and Managing Director Asia Pacific, Chris Hill from ITC Global discussed the growing requirements of oil and gas operations in the region and the importance of innovation and listening to the customer, from design lifetimes

and speeds to network considerations for larger or smaller vessels and shorter term construction communications. Hill also highlighted that ITC Global are establishing another global office in Singapore, a hub for both energy and maritime industries.

Mobility demand in the air

The growing demand of mobility requirements, particularly in the aeronautical space is also of considerable interest and dominated the discussion on the forum's mobility panel with representatives from ViaSat, SpeedCast, Kymeta, Intelsat, EM Solutions and SES. Moderated by Comsys Senior Analyst, Simon Bull, panellists explored the land, sea and air elements of this global satellite growth area. As Intelsat's Terry Bleakley commented, "It's a market where there's a hell of a lot of growth out there. If you look at Boeing and Airbus, they're going to double their fleets by 2020. And the penetration of true broadband to aircraft is quite low at the moment."

Teleport operators versus satellite operators

From the sky to the ground, the end of the day 1 saw representatives from Newtec Asia, Gateway Teleport Ltd, Telstra Global, and NewSat debate the challenges for the ground segment and teleport sector. The situation raises questions such as, "how satellite operators can better support teleport operators?" and "do satellite operators compete with their customers, the teleport operators?". Head of Satellite Sales, Telstra Global Sandeep Kumar said that pressure on the relationship between teleport operators and enterprise customers is heightened because more often than not, satellite operators being inflexible can impact the solutions they provide to their customers. As a teleport operator soon to be a satellite operator, NewSat's SVP Global Sales, Andrew Matlock stated that the company focuses on end-user engagement to demonstrate the services NewSat provides and then works with partners to complete the process, maintaining a balance and maximising the outcome for both partner and end-user.

ADF Director General ICT Policy and Plans said…

For the first time, the forum continued into a second half-day opening with a keynote from Air Commodore Nick Barneveld, ADF Director General ICT Policy and Plans who discussed the importance of the ADF's dependence on satellite and that global reach has become a daily requirement to support defence operations. Government and military applications were an important discussion as budget cuts from the US administration, pivot towards Asia Pacific, Unarmed Aerial Vehicles versus 'boots on the ground' and the influence of the Wideband Global SATCOM system (WGS) have all impacted satellite services worldwide.

The defence panel was moderated by industry specialist, NewSat SVP, Strategic Planning Don Brown who was also joined by representatives from Inmarsat, Orbital Sciences, Airbus Defense and Space and Air Commodore, Nick Barneveld. The conversation, highlighted by Barneveld, explored how commercial satellites can support the government requirements of tomorrow and more specifically, the military mission-critical applications that require fast and reliable capacity to function effectively. As Barneveld highlighted "a lot of what we do can be satisfied by commercial satellites…we need industry knocking on our door as I don't know how we are going to satisfy next generation satellite requirements".

Asia Pacific growth

Yet another successful and engaging event down under, the 2014 Australasian Satellite Forum presented a fantastic opportunity to meet and discuss the local and global industry of today as well as what the future holds for satellite. Clearly evident, the Asia Pacific region is positioned for an exciting phase of opportunity and prosperity. With the launches of multiple satellites across region, strong growth prospects and increase in demand for mobility and innovation, the Australasia region continues to play an important role in the global satellite industry and beyond.

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ABS Asia Broadcast Satellite

AIRBUS DEFENCE & SPACE

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SPACEX

THAICOM

ThalesAlenia Space

Affiliate Member

ASSI Asosiasi Satelit Indonesia

casbaa INFORM. REPRESENT. CONNECT

UA SCBT

ITSO

MSUA

PITA

Pacific Telecommunications Council

SIA SATELLITE INDUSTRY ASSOCIATION

iRG

SME FORUM PART OF VERTICAL

WTA

Regular Member (Governments)

NICTA

Thailand

VTI Vietnam

Regular Member

ACeS ASIA Cellular Satellite

AETHERIC ENGINEERING

APT

APSI Asia Pacific Satellite Industries Co., Ltd.

AsiaSat

BOEING

B-SAT

GWIC

中華電信 Chunghwa Telecom

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SEA LAUNCH

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ViaSat

ZODIAC DATA SYSTEMS ZODIAC AEROSPACE

APSCC Welcomes a New Gold Member

Space Partnership International LLC

Space Partnership International LLC (SPI) is a highly specialized full-service space and telecommunications advisory firm established in 2008. Our expertise is sought by customers who require independent guidance and support on a full range of financial, strategic, business, regulatory, technical, legal, and risk management matters related to satellite communications and earth observation. The SPI Team has all of the necessary skill-sets to assist new and established companies across the entire satellite value chain in meeting their business objectives.

The company, operated by senior level executives, each with well more than 20 years of experience, has a unique cross section of talent including business development, space and ground system engineering, financial planning, procurement support and oversight, legal, regulatory (ITU and FCC), risk management, insurance, training and program management.

Over the past decade we have focused on emerging markets, specializing on the North, Central and Southeast Asian Regions, CIS, Middle East, North and Sub-Saharan African Regions. As an example, we are currently supporting Government of Bangladesh for their first national satellite procurement and launch, in which all of the above-mentioned tasks are included.

Our deep understanding of these markets plus our network of relationships with satellite operators and suppliers throughout the world, places SPI in a unique position to bring right strategies, technologies, partners, etc. to satellite programs. We are committed to building effective bridges between the customers and the projects. Acting as advisors primarily to existing and new satellite operators and with direct development experience ourselves, we bring the perspective of hands-on practitioners to each assignment.

APSCC Welcomes a New Regular Member

Kacific Broadband Satellite

Kacific Broadband Satellite has a vision of driving economic growth throughout the Pacific with low cost, high throughput satellite broadband. In other words Kacific's goal is to enable the residents of the region to fully embrace the digital economy and truly participate to the connected world.

Kacific is developing a broadband offering for the 40 million people in underserved markets in the Pacific islands, New Zealand, eastern Indonesia and Papua New Guinea. It will address the gap in supply with a satellite specifically designed for this market using multi-beam high throughput communications transmitting over the Ka Band direct to end users' premises. With typical speeds of 10 Mbps and up to 50 Mbps the satellite will substantially improve internet broadband access for all islanders, local businesses and rural areas.

Using proven, cost-effective equipment, including small, low-cost, easy-to-install, highly robust receivers, Kacific will provide better broadband quality at significantly lower prices than currently available. This combination will foster greater internet usage and help fuel economic growth and improvements in service delivery in remote islands and territories throughout the region.

The business was established by a small team of seasoned satellite professionals with the backing of a small group of global investors. Founded by Christian Patouraux (Measat, O3b, SES, EADS, Hughes, Boeing), Mark Rigolle (O3b, SES, Belgacom), and Soft-Venture Singapore it has a five member Board made up of highly experienced satellite, technology and business strategy professionals, including Candace Johnson, the founder of SES. A wide range of partners are already involved in the project and have started giving shape to Kacific's new value chain. Satellite operators, telecom infrastructure manufacturers, telecommunication companies, local governments, regional aid programs and local entreprises all have a role to play and will benefit from Kacific's vision.

Kacific will launch its satellite in late 2016, offering direct internet access, via wholesale channels, to 99 percent of the government agencies, institutions, businesses and households within the total footprint area from 2017.

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SATELLITE INDUSTRY NEWS

Thales Alenia Space to Build Koreasat-7 and Koreasat-5A Satellites

May 12, 2014 - Thales Alenia Space has signed a contract with the Korean satellite service operator KT Sat, subsidiary of KT Corporation, to build two telecommunications satellites, Koreasat-7 and Koreasat-5A, winning the contract against an international field of competitors. The two satellites will provide Internet access, multimedia, broadcasting and fixed communications services. As program prime contractor, Thales Alenia Space is in charge of the design, production, testing and On Ground Delivery (OGD) of the satellites. It will also take charge of the launch campaigns, the launch and early operations phase (LEOP) and in-orbit tests (IOT). Built on the Upgraded Spacebus 4000B2 platform from Thales Alenia Space, Koreasat-7 will be fitted with Ku-band transponders and Ka-band transponders. Koreasat-5A will carry Ku-band transponders. Koreasat-7's coverage zone encompasses Korea, the Philippines, Indonesia and India, while Koreasat-5A will cover Korea, Japan, Indochina and the Middle East. Each satellite will weigh about 3,500 kg at launch and will offer payload power of about 7 kW. Koreasat-7 will be positioned at 116 degrees East and Koreasat-5A at 113 degrees East.

MHI to Launch SKY Perfect JSAT Satellite

May 14, 2014 - Mitsubishi Heavy Industries (MHI) has received an order for satellite launch services, for the first time from SKY Perfect JSAT Corporation. The satellite is scheduled to be launched from the Tanegashima Space Center in fiscal 2016, using MHI's H-IIA launch vehicle. The H-IIA rocket is Japan's core launch vehicle and one of the most reliable launch vehicles in the world, with 22 of 23 launches to date carried out successfully - making for an outstanding success rate near 96%. By now winning its first order from SKY Perfect JSAT, MHI intends to undertake even more aggressive marketing of its satellite launch services both in Japan and abroad, and continue to fulfil its central role in maintaining and enhancing the Japanese space industry, ensuring our continued access to space.

SES First to Offer O3b's MEO Offerings on GSA Schedule

May 19, 2014 - Global satellite solutions provider SES Government Solutions (SES GS) will offer O3b services on their General Services Administration (GSA) Schedule as of June 30, 2014, making them the first distribution partner to offer the O3b capability directly to the U.S. Government. The O3b next-generation Medium Earth Orbit (MEO) constellation of satellites offers customers affordable connectivity for up to 1.6 Gbps throughput and fiber-like latency (less than 150 msec). The first four satellites were launched in June 2013. The second four are scheduled for launch in July 2014, with another four scheduled in early 2015. SES GS provides global fixed and mobile satellite solutions in the geosynchronous (GEO) orbit. By combining this capability with O3b's MEO offerings, SES GS offers government customers the benefit of having one provider for fixed and mobile GEO satellite service with broad coverage and complementary MEO satellite service with high throughput over O3b coverage areas. This combination will provide connectivity for customers in remote areas where terrestrial fiber infrastructure is not available and low-latency applications are required.

Thuraya and ViaSat Form M2M Partnership

May 19, 2014 - Thuraya and ViaSat Inc. have signed a partnership agreement to develop and launch a dedicated Machine-to-Machine (M2M) platform combined with M2M specific products and commercial packages. Together, the companies will leverage their respective strengths to create a highly competitive offer for the satellite M2M market. The Thuraya/ViaSat M2M solution will be a highly secure, end-to-end managed service boasting a low Total Cost of Ownership (TCO) over the life-

SATELLITE INDUSTRY NEWS

time of an M2M project. The M2M service is ideal for end-users across the energy, utilities, logistics and enterprise sectors, among others. M2M will be a key growth engine for satellite services in the next few years. Thuraya and ViaSat have a vision for a faster and more secure offering to address the higher-end requirements of the energy, enterprise and military sectors. The Thuraya ViaSat M2M service is planned for launch in early 2015. In the meantime, the focus is on recruiting M2M application developers and further augmenting distribution capabilities.

Orbital Begins Production of Thaicom 8 Commercial Communications Satellite

May 19, 2014 - Orbital Sciences Corporation announced that Thaicom has authorized the company to begin the development, manufacturing, integration and testing process for the Thaicom 8 commercial communications satellite. Thaicom 8 will be the second satellite that Orbital will build for Thaicom, following the launch and in-orbit testing and activation of Thaicom 6 in January 2014. Thaicom 8 will join the many GEOStar communications satellite platforms ordered by customers around the world. The new satellite will be produced at Orbital's state-of-the-art satellite manufacturing facility in Dulles, VA. The Thaicom 8 satellite's payload features 24 active Ku-band transponders to provide services to Thailand, South Asia and Africa. The satellite will generate approximately 5.0 kilowatts of payload power and will be located at 78.5 degrees East Longitude. It is scheduled for completion and launch in the first half of 2016.

Hughes Technology Selected by HISPASAT to Bridge Digital Divide in Rural Colombia

May 21, 2014 - Hughes has been awarded a contract for an HX broadband satellite system and terminals by HISPASAT Colombia, a subsidiary of Spanish satellite operator HISPASAT, to power delivery of high-speed satellite Internet service as part of Colombia's Ministry of Information Technology and Communication's (MinTIC) Vive Digital program. It is the latest in a series of government contracts to help bridge the digital divide in seven underserved regions of the country. Hughes is supplying its market-leading HX System, comprising an economical gateway and high-performance broadband terminals, for approximately 650 Vive Digital kiosks (KVDs) in a HISPASAT service region of Colombia. HISPASAT, which has formed a consortium with NEC Colombia for the program, will install and operate the system as a managed service for MinTIC.

Lockheed Martin Commercial Launch Services to Launch WorldView-3 Satellite

May 22, 2014 - Lockheed Martin Commercial Launch Services (LMCLS) will launch the WorldView-3 commercial remote sensing spacecraft, placing it into orbit on August 13 for DigitalGlobe. WorldView-3 will be launched aboard an Atlas V from Space Launch Complex-3E at Vandenberg Air Force Base in California. WorldView-3 is the first multi-payload, super-spectral, high-resolution commercial satellite for earth observations and advanced geospatial solutions. Operating at an expected altitude of 617 km, WorldView-3 will have an average revisit time of less than one day and will be capable of collecting up to 680,000 square kilometers of imagery per day, further enhancing DigitalGlobe's capacity for rapid and reliable collection.

JAXA Launches Daichi-2 Earth Observation Satellite

May 26, 2014 - Mitsubishi Heavy Industries and the Japan Aerospace Exploration Agency (JAXA) launched the H-IIA Launch Vehicle No. 24 (H-IIA F24) with the Advanced Land Observing Satellite-2 "Daichi-2" (ALOS-2) onboard on May 24, 2014 from the Tanegashima Space Center. Daichi-2 (ALOS-2), a follow-on mission of its predecessor ALOS satellite, is equipped with L-band Synthetic Aperture Radar (SAR) for improved resolution and wider observation range than ALOS. It is expected to

SATELLITE INDUSTRY NEWS

contribute significantly to earth observations in terms of disaster monitoring, environmental protection, resource exploration and forest monitoring.

Newtec Enables Indonesia's New Premium DTH Platform VIVA+

May 27, 2014 - New Indonesian prepaid Direct-To-Home (DTH) satellite service VIVA+ will deploy Newtec equipment to deliver all of its content, initially consisting of two HD and 35 SD channels. The DTH platform, which launched in April 2014 to coincide with the World Cup, is featuring nine premium value 'Ultimate World Cup Channels' dedicated to broadcasting the upcoming World Cup taking place in Brazil between June 12th and July 13th. Newtec has been the technology partner to VIVA+ parent company PT Digital Media Asia since the new DTH service was just a concept in the planning stage in 2010. Newtec's modulation equipment for three transponders have already been installed and are operational with plans to add more as more subscribers join. In April the company announced that it expects 300,000 new subscribers in the first half of 2014 and potentially up to a million over a longer period.

EUTELSAT 3B Satellite Successfully Blasted into Orbit by Sea Launch

May 27, 2014 - Eutelsat Communications announces the successful launch of its EUTELSAT 3B satellite by a Zenit-3SL rocket operated by Sea Launch AG from the ocean-based Odyssey Launch Platform in the Pacific Ocean. Built for Eutelsat by Airbus Defence and Space using its E3000 platform, EUTELSAT 3B has been designed to increase and diversify Eutelsat's resources and footprint at its 3 degrees East orbital position. The first commercial satellite to assemble Ku, C and Ka payloads in a single platform, it will operate up to 51 transponders. Its innovative tri-band configuration will enable customers to select from three frequency bands connected to footprints covering Europe, Africa, the Middle East, Central Asia and Brazil. EUTELSAT 3B will replace the EUTELSAT 3D satellite that will subsequently be co-positioned with EUTELSAT 7A at 7 degrees East to provide expansion capacity and enhanced in-orbit security for data, telecom and video markets in Europe, Turkey and Africa.

Globecomm Receives Contract Extension from NATO for GPS-Based Force Tracking System

May 27, 2014 - Globecomm has received a contract extension from NATO Communications and Information Agency (NCI Agency) valued at $9.6 million to extend communication services and onsite support for the Company's previously deployed GPS-Based Force tracking System. Globecomm previously announced approximately $74.7 million in contracts from NATO for this project to design and install a GPS FTS, bringing the combined contract value to approximately $84 million. The FTS provides NATO with high levels of tracking data and messaging traffic. It enables NATO to identify where its personnel are located at all times, identify other multi-national forces and have the ability to do so in routine and operational situations. This is critical in assisting with the identification of friendly forces and helps prevent fratricide or "blue-on-blue" incidents.

RSCC's New Express-AT2 Satellite is Commissioned at 140 Degrees East Orbital Slot

May 28, 2014 - On May 27, 2014 RSCC has started direct broadcasting services to the Far East using the Express-AT2 satellite. Express-AT2 was orbited on 16 March 2014 and positioned at the 140 degrees East orbital slot. Express-AT2 was designed specifically for TV and radio broadcasting. Its specs make it possible for DTH operators to ensure reliability and ease of signal reception Express-AT2 was built on RSCC order by OAO ISS Reshetnev Company in conjunction with Thales Alenia Space France. Built on the Express-1000K platform, the satellite will have a service life of 15 years. Express-AT2 carries 16 Ku-band transponders on board.

2014

01	02	03	04	05	**06**	
07	**08**	**09**	10	11	12	

CALENDAR OF EVENTS

JUNE

02-04 **Global Space Applications Conference 2014** - Paris, France
www.glac2014.org

04-05 **Latin American Satellite Communication & Broadcasting Summit (LATSAT)** - Mexico City, Mexico
www.euroconsult-ec.com

16 **CASBAA Satellite Industry Forum 2014** - Singapore
www.casbaa.com

17-20 **CommunicAsia2014** - Singapore
www.CommunicAsia.com

18-19 **SatComm 2014** - Singapore
www.CommunicAsia.com

AUGUST

27-28 **MilsatCom Latin America** - Rio de Janeiro, Brazil
www.milsatcomlatinamerica.com

SEPTEMBER

08-12 **World Satellite Business Week** - Paris, France
www.satellite-business.com

11-16 **IBC 2014** - Amsterdam, the Netherlands
www.ibc.org

17-19 **VSAT 2014** - London, U.K
http://vsatevent.com/

22 **APSCC 2014 Satellite RF Interference Mitigation Meeting** Phuket, Thailand
www.apscc.or.kr

23-25 **APSCC 2014 Satellite Conference & Exhibition** Phuket, Thailand
www.apscc.or.kr

25 **IRG Workshop** - Phuket, Thailand

29-30 **Telecoms World Middle East 2014** - Dubai, UAE
www.terrapinn.com/conference/telecoms-world-middle-east/

ADVERTISERS' INDEX

2rd Quarter 2014

APSCC Newsletter - A Great Way to Advertise

With a vast international circulation that includes the most prominent members of the satellite, space and communications communities, APSCC Newsletter is seen by an elite readership of industry professionals around the Asia-Pacific and globally.

Your message will reach the right people. Advertising in APSCC Newsletter is a cost-effective way to reach your potential clients and business partners. APSCC Newsletter can bring your company to the attention of key personnel in the satellite and space technologies, telecommunications and broadcasting industries. We offer you exclusive contact with people in the government, academic and industry sectors.

APSCC 20th Anniversary

APSCC is a non-profit, international regional association representing all sectors of satellite and space related industries. APSCC membership is open to any government body, public and private organization, association, or corporation that is involved in satellite services, broadcasting, manufacturing, launch services, risk management or associate fields such as datacasting, informatics, multi-media, telecommunications, and other outer space-related activities with interests in the Asia-Pacific region.

APSCC aims to exchange views and ideas on technologies, systems, policies and outer space activities in general along with satellite communications including broadcasting for the betterment of the Asia-Pacific region. Conferences, forums, workshops, summits, symposiums, and exhibitions are organized through regional coordination in order to discuss issues that affect the industries and to promote and accelerate the efficient introduction of outer space activities, new services and businesses via satellites.

In order to disseminate industry related information, APSCC publishes a quarterly satellite magazine as well as a monthly e-newsletter, which are distributed worldwide to members and others. The quarterly magazine and other publications are available on the Web at www.apscc.or.kr.

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