APSCC
Asia-Pacific Satellite Communications Council

# MARITIME SATELLITE SERVICES

INTERVIEW
Samer Halawi, CEO, Thuraya Telecommunications Company

FOCUS ASIA
Aero & Maritime #SATCOM Mobility in Asia

APSCC
Asia-Pacific Satellite Communications Council

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# CONTENTS




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# MESSAGE FROM THE PRESIDENT

Maritime Satellite Communications play a vital role in the global economy. With up to 80,000 merchant, cruise, and government vessels at sea at any given time (www.marinetraffic.com) and more than 1400 offshore oil-rigs (www.statista.com), there is a pressing need for the connectivity and benefits that satellite provides.

With Maritime Satellite Communications, ship headquarters can communicate with their fleet enabling real-time ship monitoring, navigation, and surveillance. Oil-rigs can receive and transmit real-time operational data. Crew and passengers can stay connected to family and friends, and receive the latest entertainment. Once considered a luxury, broadband connectivity is now viewed as a must-have for maritime vessels. Correspondingly, Maritime Satellite Communications are available across the globe.

The demand for Maritime Satellite Communications also continues to grow. According to a 2014 report from Comsys, the installed base has nearly doubled since 2010 and shows no sign of a growth slowdown. Despite the headwind of lower crude-oil prices, revenue was over USD 1.3 billion in 2014 up from more than USD 1.2 billion in 2013.

Innovation is flourishing, given the robust market. High-throughput satellites using Ku-band are being launched, aimed at the maritime and aeronautical markets. Technology developments are advancing at a fast pace including gyro-stabilized ground terminals, high speed broadband modems, multi-frequency dish antennas and even an all-plastic design that would be more resilient to the harsh environmental conditions offshore. Up to recently, the oil and gas sector has been using C-band services whilst the shipping and maritime industry has leaned more towards Ku-band for their specific needs. Soon Ka-band broadband satellites will add more options to the market. Having been a highly fractured market of about 172 operators (Comsys), we have seen a trend towards consolidation as well.

It is for these reasons and others that APSCC chose to focus on Maritime Satellite Communications for this quarterly newsletter. It is an exciting time and we hope you find this issue useful in informing you about the latest in Maritime Satellite Communications.

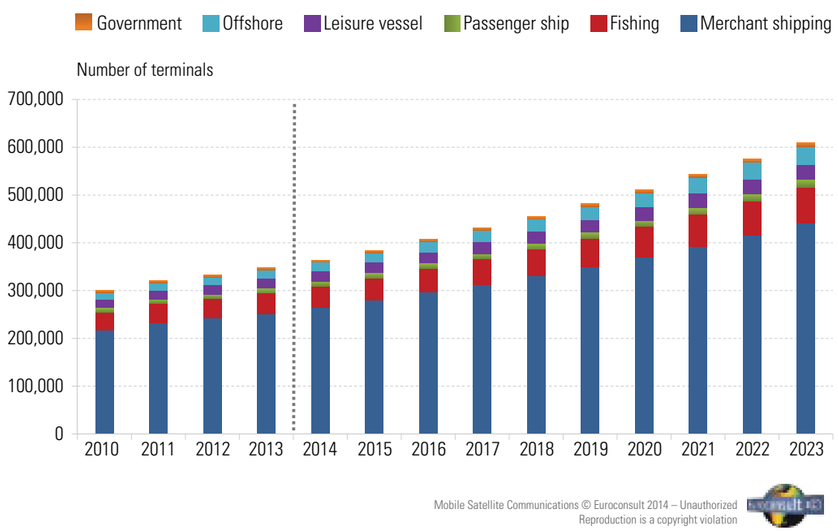
**Paul Brown-Kenyon**
**President**
**APSCC**

# New Satellite Systems and Data Intensive Applications to Drive the Maritime Market

Wei Li, Senior Consultant, Euroconsult

The satellite communications industry seems to have entered into a new era of technologies. Recently announced new projects such as OneWeb, SpaceX and Google Loon are believed by many people to able to bring structural changes to the industry. Indeed, if all the planned small satellites, drones and balloons were put into service, the business of satellite communications would change significantly. Even without counting these new systems, the ongoing deployment of High Throughput Satellite (HTS) systems from established players such as Inmarsat, Intelsat, SES, ViaSat, Eutelsat and Telesat will already increase satellite capacity

**NUMBER OF ACTIVE MARITIME SATELLITE TERMINALS BY SEGMENT (2010 - 2023)**



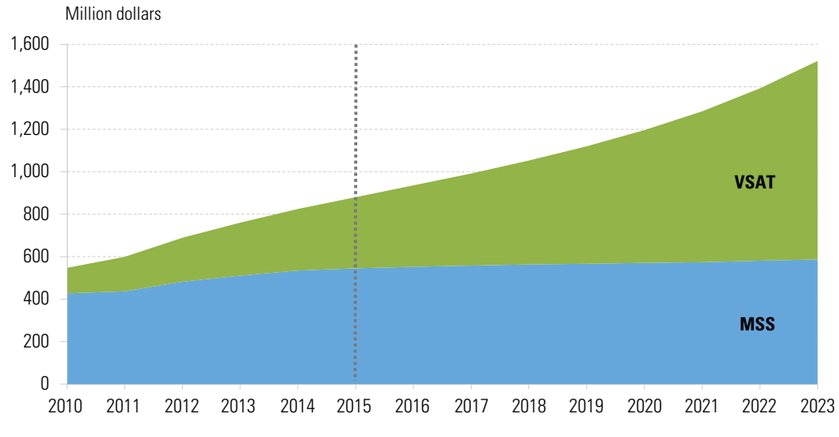
supply by around 15 times over maritime regions in the next three years. Satellite capacity for maritime services is definitely becoming much cheaper due to the incremental supply.

The question now for all satellite operators and investors is whether the demand will rise in line with the capacity increase or whether the capacity price decrease will weaken the earning of satellite operators. From Euroconsult's perspective, we believe that in the very short term the decreasing price will intensify the competition which is favorable to maritime service providers that lease capacity from satellite operators and also to shipping companies that actually use the capacity. The revenue for certain satellite operators could be affected in a negative way due to competition and the generally softening capacity price. However, over the longer term, we do believe the demand will grow, and the overall revenue for satellite operators in the maritime sector will maintain the growing momentum in the next decade.

At present there are roughly 14,000 VSATs active globally. Many of these users have migrated from legacy Inmarsat systems; they are demanding more bandwidth and want to have more traffic per month and the legacy MSS services are too expensive to support this kind of usage, so they are moving to VSAT. The end users' bandwidth requirements are evolving, and communications' needs are growing. Dedicated crew welfare and entertainment satcom systems are gaining popularity as ship owners try to make life on the vessel more attractive for crews. Usually these systems include e-mail, voice, and messaging applications that allow the seafarers to stay in contact with their families. VSAT is often a cost-effective solution for these mainly low- and medium-data applications. New applications, such as video conferencing and video surveillance, will require even more bandwidth.

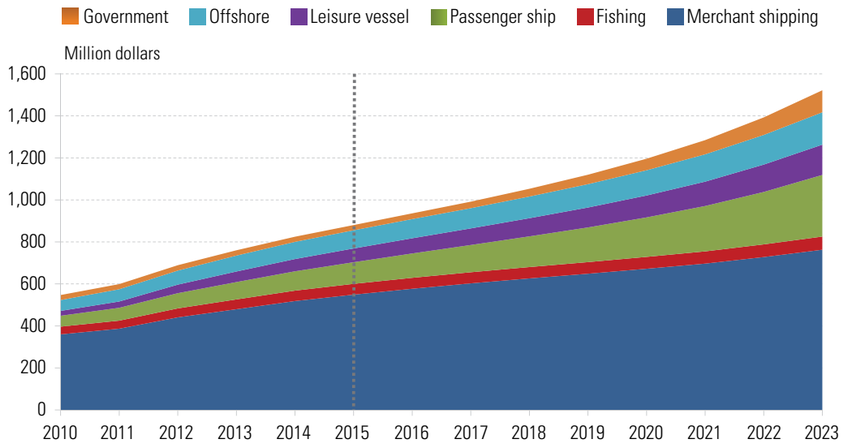
The smart ship concept is also gaining in popularity as ship operational communications requirements play an increasingly critical role in the decision of satcom adoption in the merchant shipping market. Common applications include coordinated file transfers, e-mail, Internet access, route optimization, engine diagnostics, and remote management applications. Given the actual global economic situation and high competition in the market, merchant ships are increasingly interested in implementing the smart ship concept.

**MARITIME SATELLITE CAPACITY REVENUES BY TECHNOLOGY (2010 - 2023)**






**MARITIME SATELLITE CAPACITY REVENUES BY SEGMENT (2010 - 2023)**






The behavior of people using communications on vessels will also change significantly. In the last 20 years the maritime satellite communications market has largely been driven by the satellite companies, because on ships the crew and passengers don't have the same connectivity as on shore so there's a limit on what they can and cannot do. Now, with HTS, vessels might have connectivity that is comparable to terrestrial users, so in the next 10 or 20 years the growth will not be driven by the companies which provide connectivity but by the companies which provide applications and solutions which bring value to maritime users using connectivity. Companies that understand all of the IT needs of the shipping company and provide an integrated solution will be the market winner. Because shipping companies do not want to have 50 different providers, for engine monitoring, for fuel saving, and so on, companies that can provide integrated solutions and remain flexible to each individual shipping company's needs will be the providers of choice.

At Euroconsult we see four main types of applications that will drive this. Cloud computing will increase efficiency and reduce costs for servers and reduce complexity, that's one of the big applications for both business and crew welfare, as crew and passengers can have movies and other content in the cloud.

The second is Big Data, like sensors collecting engine data, etc. There are so many different machines from different providers on one vessel, there's a need to move real time data to shore to allow people on shore to analyze it. It's not about collection and transmission, it's moving on to the software element needed to analyze this data. Ship managers don't want to receive 2,000 pieces of data per minute, they want to see the result that the engine is doing well or not so well. Maybe some very big shipping companies like Maersk are investing in their own in-house solutions, but for most shipping companies they'll need IT companies to provide these solutions, collect and analyze the data and provide the results.

The third type of application is Bring Your Own Device (BYOD), which is already happening, mostly on the crew side; they want to use their own tablet or smartphone to access the internet and not the ship's computer. In the future we believe this will happen more, like in the airline industry – in the cockpit on business jets

pilots are using their own iPad with applications that are easier to have on an iPad than built into the cockpit itself. We think that will happen more and expand to the operational side of shipping companies.

The last application type is video. So far people have been talking a lot about video for crew entertainment but in the future there will be video for telemedicine, for repairmen to see parts of the engine, for example, live videoconferencing, video surveillance for accidents or pirate attacks – video is important for all of these things.

So these four areas – Big Data, Cloud computing, BYOD and video content – are what Euroconsult believes will drive HTS in the future. Euroconsult expects that this won't just be driven by satellite companies or shipping companies, but by big IT companies who really know how to integrate all of this into one platform. We think that's the future, not in the next two or three years as it will take time for those companies to come into the market, but I think it will happen in five to 10 years. Satellite service providers that want to stay on the growth side of the market might need to invest in that, or make some acquisitions of smaller IT companies that can create these types of solutions. Or they could be purchased by the IT companies themselves, who have the software solutions but not the connectivity part; they might buy a satellite service provider to have their own pipe.

Following the current market trends, VSATs should grow from around 12,000 terminals in 2014 to around 39,000 terminals in 2023, with a CAGR over the 10-year period of 13%.

**Wei Li** is a Senior Consultant of Euroconsult based in Paris, France. For over 8 years, Wei has regularly contributed to Euroconsult's clients missions, mainly focusing on mobile satellite communications, and analysis of FSS satellite operators. He is the Editor of Maritime Telecom Solutions by Satellite, Mobile Satellite Communications Market Survey, Prospects for Inflight Entertainment and Connectivity, Aeronautical Telecom Solutions by Satellite and Company profiles: Analysis of FSS operators. He is also the main contributor to Satellite Communications & Broadcasting Market Survey.

Wei's past experience includes working at Vizada (formerly known as France Telecom Mobile Satellite Communication), where he analyzed opportunities in specific vertical and geographic markets for new generation Inmarsat services and managed pilot projects for new products. He holds a Masters of Business Management from ESCP-EAP in Paris with a specialization in Strategic Marketing and a Bachelors of Economics from Capital University of Economics and Commerce in Beijing.

# Intelsat Delivers the Performance, Economics and Accessibility that the Maritime Sector Craves

James Collett, Head, Mobility & Energy Services Product Management, Intelsat

The socio-economic importance of the maritime sector to the Asia-Pacific region cannot be overstated. The region's maritime features and resources support maritime sectors such as merchant shipping, passenger vessels, offshore energy production and fishing. The Chinese government has proposed the creation of the 21st Century Maritime Silk Road with Southeast Asian Nations (ASEAN) that would improve cooperation among China and the 10 ASEAN nations – along with boosting economic and trade relations. The potential maritime silk trade road is forecasted to contribute to a growth in the trade volume between the two sides that should reach $500 billion in 2015 and $1 trillion in 2020.

Delivering the bandwidth that can support all of a maritime vessel's burgeoning broadband demands – regardless of vessel location and capacity requirements – can only be handled via robust satellite connectivity. Satellites have served maritime vessels for decades, and the projected growth in operations, combined with growth in demand per vessel, indicates that maritime customers will expect even more from the satellite sector as they seek to leverage technology to advance their operations. Shipping companies are increasingly relying on broadband satellite access to receive support from onshore staff for important business and operational tasks as well as offer value-added services to customers, such as cargo tracking and condition monitoring. Oil rigs are using broadband to operate more complex and bandwidth-intensive applications that improve day-to-day operations and profitability as well as providing crew entertainment and welfare services. And cruise ships are responding to the growing number of passengers that are no longer looking to disconnect but instead are boarding the ship with numerous personal devices that require connectivity.

According to NSR, Asia will remain the largest market for maritime satellite services, with the number of in-service units that use satellite connectivity across the merchant, fishing, and oil and gas portions of the sector will grow from more than 60,000 units at the end of 2014 to nearly 155,000 by the end of 2024.

In order to meet the capacity and service demands of the maritime sector, Intelsat's service provider customers have told us they want high-performance capacity that is efficient, tailored to meet their needs and able

to be implemented rapidly. Intelsat is responding with our high-throughput satellite (HTS) platform – Intelsat Epic[NG®] – that that will deliver high performance bandwidth when and where it is needed most. Combining technological innovation with a network that can deliver services anywhere around the globe, means that satellite will continue to meet needs of the maritime sector well into the future.

## Intelsat's Global Network Enables Broadband Connectivity Today

To support existing demand, there is the Intelsat Global Broadband Mobility Network, currently the world's only global broadband mobility offering. This network of 13 customized beams on 10 satellites is fully integrated with our existing satellite fleet and the IntelsatOne® terrestrial infrastructure, providing end-users with always-on, true broadband access.

To serve the evolving demands of the overall maritime sector, where end users have vast differences in their communications needs, service providers soon will need even more capacity, more coverage, more performance and more flexibility. They must also have the ability to scale networks to quickly meet demand. Intelsat will deliver these capabilities to our customers with the launch of the Intelsat Epic[NG] platform, which is fully integrated with the existing Intelsat satellite-terrestrial network.


*IS 29e*


*Intelsat-33e*

The first two Intelsat Epic[NG] satellites will be placed into service in 2016, providing an HTS overlay to our current Ku-band wideband services. The high-performance platform is designed to exceed the requirements of leading service providers; enabling throughput in the range of 25-60 Gbps per satellite, about 10 times that of traditional satellites, and triple that of next-generation Ka-band solutions. Intelsat 29e will provide HTS coverage over the Americas and the North Atlantic. Intelsat 33e, scheduled for launch later in 2016, will bring capacity over Asia, Africa and Europe. Launches in subsequent years will ensure bandwidth is available when and where it is needed, laying additional HTS coverage over major maritime operating regions and trade routes.

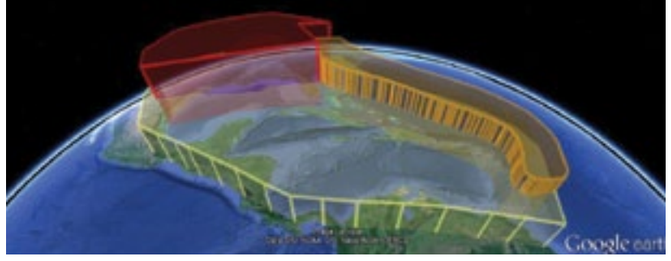
Multiple HTS systems are scheduled to reach orbit in the next several years, but there are clear differences among the platforms. This is where the design philosophy behind Intelsat Epic[NG] has produced a system that delivers clears advantages for our customers. Intelsat Epic[NG] was designed with spot beams and frequency reuse technologies, concentrating the power of the individual transponders over a smaller area. This will allow for higher modulation schemes that dramatically increase the number of bits delivered per MHz, resulting in lower cost per bit for the service provider. Our open-architecture approach, combined with a backwards-compatible design, means companies can incorporate HTS into their networks without having to replace existing hardware, meaning improved return on investment.

The technology that puts Intelsat Epic[NG] further ahead of other HTS options that may be available is the digital payload. Developed by Boeing, the digital payload allows for connectivity in any bandwidth increment and from any beam to any beam. This means uplinks and downlinks can be connected regardless of location within the footprint, eliminating the need for a network to have multiple hubs. This gives our customers a level of control not possible with other platforms, enabling them to configure their network topology to leverage existing ground hardware, reducing the cost of investment, and to operate using multiple spectrum bands. For example, a service provider with a successful C-band business can integrate high-powered Ku-band spot beams from the existing C-band hub into the network to maintain promised service quality for customers operating in areas of high demand.

Boeing developed the digital payload initially for use in the U.S. Department of Defense's Wideband Global SATCOM (WGS) platform and is also manufacturing the Intelsat 29e satellite and subsequent Intelsat Epic[NG] spacecraft. The digital payload technology will be included exclusively on the Intelsat Epic[NG] satellite platform for several years, giving our customers an advantage that will not be available to competitors using alternative HTS satellites.

Leading maritime service providers, including Harris CapRock, MTN and Airbus Defence and Space, have already committed to Intelsat Epic[NG], recognizing the value that it will deliver for their customers. Airbus and Intelsat unveiled a strategic agreement in March 2014 that included a fully managed service and secure access to Intelsat's global hybrid satellite network and the ability for Airbus to bridge its maritime VSAT services to Intelsat Epic[NG]. Earlier this year, Airbus Defence and Space announced that it connected more than 600 vessels with VSAT communications in 2014 alone. This included shipping companies such as Stolt, CMA CGM, Scorpio, and DOF, and represented a doubling of Airbus Defence and Space's maritime VSAT sales over the previous year.

*Distribution Partners can incorporate HTS into their infrastructure with MHz space segment leases to optimally service high traffic density areas.*




## IntelsatOne® Flex and Innovations That Will Address Future Maritime Need

However, there is more to serving the maritime sector than just building high-throughput, high-performance satellites. Along with the explosion in overall bandwidth demand, shipping companies are adjusting trade routes to reflect shifting economic growth, and energy exploration operations are moving to ever more remote places. This means our customers must expand the reach of their networks and quickly respond to customer demand.

To help service providers accelerate the integration of Intelsat Epic[NG] into existing networks, Intelsat has unveiled the IntelsatOne Flex offering, a customizable wholesale Mbps service that aggregates space segment, ground infrastructure and HTS into a unified ecosystem. This allows service providers to adjust their services to provide customers bandwidth when and where it is needed in order to respond to surges and

shifts in geographic demand as well as provide access to bandwidth where needed without having to manage multiple spot beams. IntelsatOne Flex offers enterprise-grade features such as Committed Information Rates along with the continued ability to customize, contend, prioritize and shape bandwidth for end user segments. This means the end user site experiences a consistent, high quality service. That, in turn, builds satisfied customers. IntelsatOne Flex also delivers a predictable cost structure for accessing services, meaning operating costs are aligned with revenue generation activities.

*IntelsatOne Flex Mbps services provide access to pre-defined zones with a guaranteed SLA. Intelsat manages beam selection to meet the Distribution Partner's requirements.*

While satellite does enjoy an inherent advantage of often being the only means of providing connectivity for many maritime operations, Intelsat also is focusing on driving innovation throughout the ecosystem, with the goal of delivering higher performance, improved economics and simpler access to our satellite solutions. For example, in January 2015, Intelsat and Kymeta announced an agreement to design and produce innovative, flat, electronically steerable, Ku-band mTenna™ satellite antenna solutions that are optimized for the Intelsat Epic$^{NG}$ platform.

This combined technology development effort will produce a range of antenna and terminal products that will provide simple access to Intelsat solutions by addressing many of the challenges that come with existing antennas. The Kymeta-produced products will be easier to install, require lower power and have an improved form factor that will make satellite connectivity an option for a wider range of maritime vessels.

Finally, even though Intelsat already has an extensive fleet of geostationary satellites that covers the globe several times over and can reach fixed and mobile users in most regions of the world, we recently announced an investment in the OneWeb low earth orbit satellite constellation. This is consistent with our strategy to enable innovation that can complement and expand the capabilities of our space infrastructure. For Intelsat, this will add polar region coverage for service providers focused on a global business. For those end users operating primarily in the Asia-Pacific region, Intelsat will provide OneWeb with the ability to provision services over equatorial regions, where GEO services have spectral priority, a major operational hurdle for LEO satellites.

The needs of the maritime sector are evolving rapidly, and meeting the needs of the various maritime customers throughout the region cannot be solved through a one-size-fits all approach. Intelsat is responding with a combination of technological improvements and an overall approach to the market that will deliver higher performance, improved economics and easier access to satellite that will enhance maritime operations and continue to play a vital role in supporting the region's economy.

**James Collett** is Head, Mobility & Energy Services Product Management at Intelsat and in this role has responsibility for profitably positioning, developing and growing Intelsat's Mobility Services and Energy product lines, ensuring that Intelsat continues to be a leading provider of managed services and space-only solutions to the maritime, aeronautical and government sectors. Leading a group of product and sector management specialists, his team aims to reinforce and grow Intelsat's strong position in the broadband mobility and energy sectors.

Previously Mr. Collett had a thirteen year career at Inmarsat where he held a number of senior management positions including responsibility for maritime, land, aeronautical and government market development, and for the global sales delivered through Inmarsat's global network of distribution partners (DPs).

# Cyber Security in Satellite Communications with Maritime Industry

Lee Foh Cheong, Chief Engineer, Director of Engineering and Customer Solutions, SingTel Satellite

Satellite network plays an important role in how we communicate globally. The main beneficiaries are maritime operators, broadcasters, oil and gas mining operators and those in disaster relief missions by providing reliable and secure communication which are critical to the nature of the business. It ensures the safety of on-board personnel as well. There is a definite need for compelling solutions to address todays' cyber security threats and crime which would impact the users of satellite communications.

In recent years, cyber security breaches have occurred increasingly and all businesses are vulnerable to it. On the Satellite segment, the unique vulnerabilities seem to be the RF interference or frequency jamming which is equivalent to DoS attack. Today, there are techniques and tools to mitigate or rather minimize these attacks. However, when moving from the RF world to IP world, the entire threat takes on a different dimension. Also, Satellite is in a unique segment and securing it requires skill set and knowledge beyond those in the current known world of terrestrial IT and telecommunications.

These cyber-attacks mainly arises from the action of competing corporations, criminals, disgruntled employees, unsuspecting employees who are targeted by different external groups, thus letting the intruders enter their network (Spear Phishing).

The best form of defence not only involves technology but includes vigilance, training, practice, ownership of the process which are the valuable aspects of a cyber-security assessment and mitigation strategy.

Best practices include:- vulnerability testing, internal specialists, outsourcing to external cyber security services and practising ISO 27000 certifications programmes.

In traditional technology, the common recommendation is to have a firewall as first line of defence along with other security devices in multi-tier line of defences like strong authentication controls, centralized management systems, anti-virus, anti-spam and anti-malware tools to mitigate any threats.

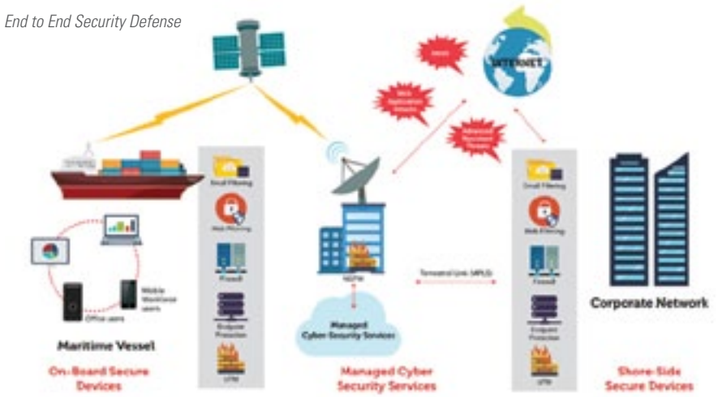
In the current world, there are techniques such as Deep Packet Inspection (DPI) to catch viruses, worms and spyware that are normally missed by the current defence devices in the network.

The major and common risks observed in the Satellite Networks are the Denial of Service (DoS) and current malware, hacking and hybrid versions or a combination of both techniques.

In the maritime industry, the key to success is having a good line of defence against cyber threats and attacks and to protect the Shore Side (where communication servers are placed) and Vessel Side (where captain and crew use the satellite communication for their specific needs like Navigation, Business application, Email, Internet, Voice Over IP etc.). In this digital age, there is a need for personnel to use their own devices (BYOD) like smartphones and smartpads which are often, subjected to cyber-attacks and imminent threats and in turn affects the entire corporation.

We are in the cusp of society where there is a need to embrace the latest technology and smart devices, but at the same time not letting our in-line defence down which impacts our very nature of work.

***Figure 1.*** *End to End Security Defense*




Best practices for effective Cyber Security in Maritime industry:

- **Hardware based** Next Generation Firewall, which is to prevent threats by eliminating unwanted applications to reduce your threat footprint, and apply targeted security policies to block off known vulnerability exploits, viruses, spyware, botnets, and unknown malware.
- **Health Check** such as Vulnerabilities Assessment (VA) and Penetration (pen) Test on regular basis.
- **Secure Devices** like UTM to prevent and unknown threats and attacks.
- **Information dissemination** to train the people in understanding the threats and need of cyber-defence and also making them as part of the ownership in cyber security process such as ISO 27000.
- **Outsource** your security concerns to a trusted partner to enjoy a truly-integrated, one-stop, end-to-end ICT experience. With a proven track record of trusted partner, in helping to protect your businesses, is what truly matters.

**Lee Foh Cheong** is the Chief Engineer, Director of Engineering and Customer Solutions of SingTel Satellite. He is a brainchild behind the World's First 1.5m C-Band stabilized antenna that was innovated in 2007. This antenna is successfully deployed by various Navy operations, Offshore Supply Vessels (OSV) and Rigs platforms. He won Seatrade Asia Technical Innovation Awards in 2008. Before joining SingTel, Foh Cheong worked for Ministry of Defence in Singapore.

INTERVIEW

# Interview with Samer Halawi, CEO, Thuraya Telecommunications Company

Thuraya has delivered sustained double digit growth ever since Samer Halawi, this year's Satellite Executive of the Year, was appointed Chief Executive Officer in 2011. Since taking on the role of CEO, Samer has led Thuraya to achieve consistent double-digit annual growth. Drawing upon his extensive experience in information and communications technology and the global satellite communications industry, Halawi is responsible for leading Thuraya's strategic positioning and driving its growth as a prominent global mobile satellite operator.

We caught up with him ahead of the APSCC 2015 Satellite Conference and Exhibition.

## Q Congratulations on the award. How does it feel to have won?

• Thank you. It's humbling to receive this award. I was delighted, though, because it reflects so well on the very hard work from across the whole team over the last four years. It is rewarding for Thuraya to be recognized for having transformed itself completely in that time. In fact, the team reversed a decline in revenues that was running at a rate of -8% CAGR between 2008 and 2011, turning the performance of the company around, and achieving a CAGR growth rate of 11%  between 2011 and 2014 that has outpaced the industry.

It is important that we have also made a positive contribution to the world at the same time. We want to make a difference, offering a competitive choice of products and services and introducing innovation and disruption in an industry that requires an alternative to the status quo. That's certainly true here in Asia, where there is a real need for competition. The award also demonstrates the value of working with our partners. Ours is a collaborative approach, and we create innovative partnerships, business models, and products and solutions together – to the benefits of our collective customers.

## Q What has Thuraya achieved in 2015, and in particular in Asia?

• Thuraya is doing very well, and we certainly have long term plans for Asia. You may hear silly rumours about us thinking about moving the Thuraya-3 satellite. The only people who want us to do that are the competition, but we will disappoint them. Ours is a strong network, and it will continue to offer excellent service.

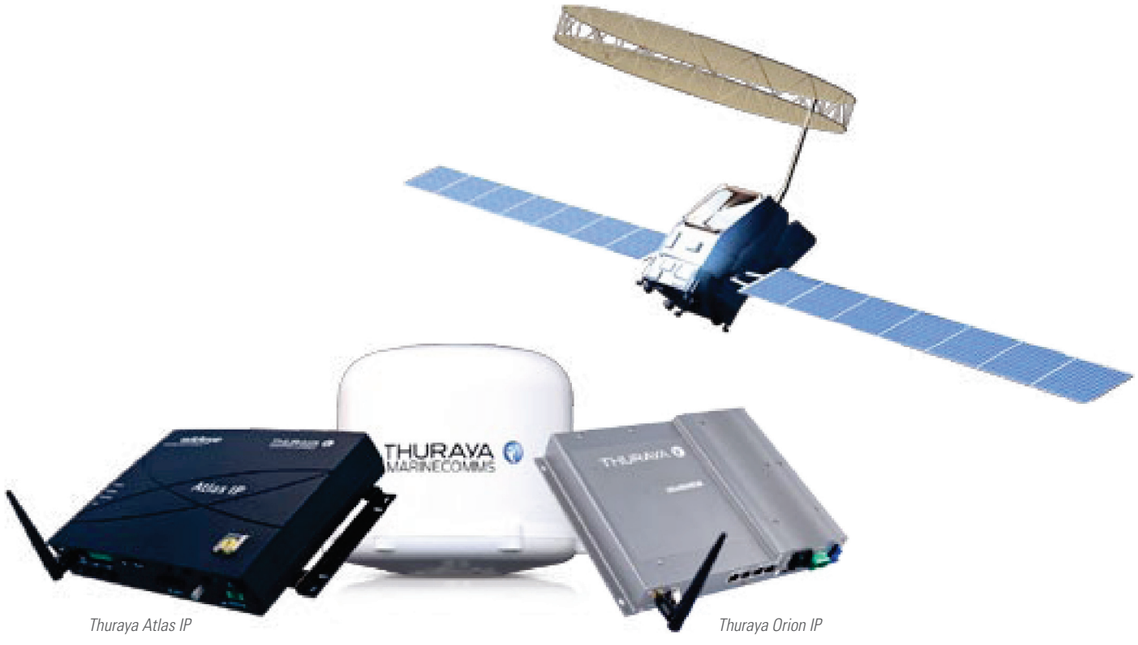
Strong, local partnerships in more Asian countries are key, and there's more to come. Thuraya is still young and ambitious, and there is so much potential in emerging markets, both here and further afield. In Asia, the sheer scale of the opportunity for voice and data services is massive. If we take 2013 versus 2014 as an example, we achieved 44 percent year-on-year growth in APAC across all segments, which perhaps demonstrates the importance of our partnerships and business in Asia.

## Q Tell us how key partnerships in Asia can make a difference

• We want to expand our reach, building strong local partnerships across Asia. Since the APSCC conference is being held in Korea, it is appropriate to talk about the close partnership we have with APSI. Together, we created the most advanced satellite phone on the market today, XT-PRO, and year-on-year sales of our handsets have doubled.

XT-PRO stands up to everything the world can throw at it. It's consistent and reliable, rugged and robust. It resists dust and jet water, and it is shock proof with an uninterrupted signal. It lets you receive call notifications – even in your pocket with your antenna stowed. It's selling quickly too – four times as many units as we had sold of XT after the same period of time on the market.

Alongside that, XT-Lite is the world's most rapidly adopted satellite phone, addressing a new market segment




*Thuraya Atlas IP* *Thuraya Orion IP*


with a potent combination of value and quality. We are seeing minutes of use stand at ten times the levels of our previous flagship product, the XT. There's real demand for these products, and for SatSleeve too, of course.

## Q How is SatSleeve progressing?

• When SatSleeve was launched in 2013, again with APSI, it disrupted the satellite market with the pioneering of the concept of Bring-Your-Own-Device (or BYOD). Two years on, it's still the simplest, fastest way to own a satellite smartphone; but it's just got even better – twice over, in fact. First, with SatSleeve+, you get an even better sound quality routed through the smartphone, and a universal adaptor that lets you switch between iOS or Android smartphone models.

Then there's SatSleeve Hotspot – a portable satellite Wi-Fi hotspot that lets users make calls, send emails and check apps indoors, with the hotspot placed outside or at a window. We're offering innovation and creativity, and an understanding of what our customers need. Users can choose a Thuraya SIM for coverage in 160 countries, or a GSM SIM card from more than 360 Thuraya roaming partners worldwide.

## Q Talking about cards, what does Thuraya Calling Card offer?

• Thuraya Calling Card can be used in 140 countries from fixed and mobile phones, through the Thuraya network. Managers and owners control the quantity of calls being made in total and they can monitor call costs, while each member of the crew or team gets a clear and fair allocation of call time. Different members of the same crew or team share the use of one handset, but they use pre-set credit on their individual, personal cards. This means owners don't have to worry about huge itemized monthly bills, because they already know what the total usage will be. The cards are available in 25, 50 and 100 units, and the connection process to make a call is very simple.

## Q How are you developing your presence in the maritime sector?

• Looking at Asia again, we have seen triple digit growth in the maritime sector alone, for three years in a row. From 2011 to 2014, we achieved 166 percent CAGR for maritime across APAC. This sector will continue to grow because there is so much demand for what we can provide.

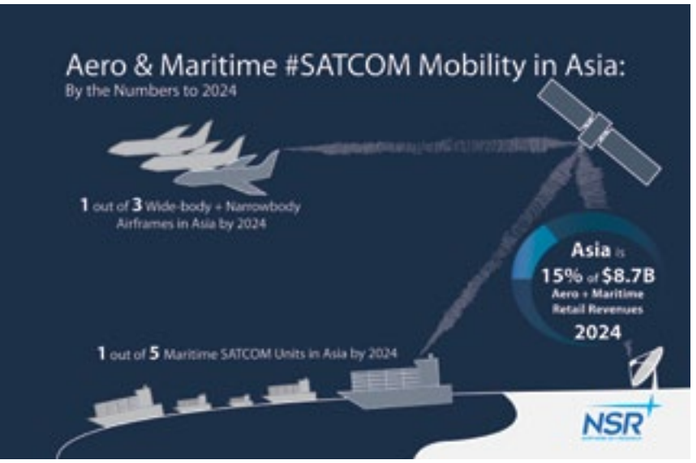
We are already serving thousands of fishing vessels, coastal vessels and small/medium-sized vessels in Asia and we expect this to grow. The key for Thuraya is two-fold. We produce the best products for performance and value, and offer customers a compelling, competitive alternative.

## Q How is your business progressing in other parts of the world?

• We like to do things differently if that gives us a competitive edge. For instance, Thuraya is the only Mobile Satellite Services operator to work with Mobile Network Operators, adding an extra dimension to our approach. This is an inspiring business. We want everyone in the world to be connected at all times, so we're growing our business to make that happen. Besides, being able to communicate anywhere is a basic human right, and then there's the fact our technology can save and improve lives. At Thuraya we take that responsibility very seriously. It shapes us as a team. It's also why it is so important to work with our partners and our customers, so people can be connected at all times.

# Aero & Maritime #SATCOM Mobility in Asia

Brad Glady, Senior Analyst, NSR




With Inmarsat's Global Xpress offering reaching full global coverage in the near future, Intelsat's EPIC-series of satellites launching just around the corner, and other players continuing to get into the HTS-game, mobility will be a key application going forward. Lead by maritime and aeronautical connectivity applications Asia will be a key battleground region in the mobility space – from connecting an emerging fleet of cruise ships new to the region, to providing connectivity to long-haul aeronautical routes across the pacific – the region is poised to be a growth-market for satellite services.

More than one-third of wide-body and narrow-body commercial airframes will be operating within Asia by 2024. Add in general aviation and business jets, and Asia will be a $400 Million dollar retail revenue market by 2024 for satellite communications, and more than $810 Million when you also include the Pacific Ocean region. China alone with be a key market for growth – with traffic to Europe, Africa, and North America - factoring in Asia-North America routes, and growth rates in the Pacific Ocean being the highest for IFC applications over the next ten years. Asia by itself provides the second highest net-gain in total retail revenues (second only to North America). Overall, the entire region is well positioned for growth in the IFC sector.

For maritime, Asia alone will be a $800 Million dollar revenue market for satellite communications services, and including the Pacific will be almost $1.4 Billion dollars, by 2024. With a net gain of almost $600 Million within Asia for retail revenues, it will be a key market for connectivity at sea. Driven by on-going merchant shipping from tankers and container vessels, steady long-term optimism for offshore Oil & Gas activity in the region, and an emerging cruise ship market, Asia checks all of the key factors for growth. With almost one

out of every five in-service maritime SATCOM terminals operating within the region, we continue to see it as a promising region.

At 15% of an $8.7 Billion dollar market for maritime and aeronautical retail revenues, what is driving the steady growth in Asia? For aeronautical, an emerging market for both short-haul and long-haul routes combined with improving household wealth drives the need for airline passengers in the region to remain connected when they are in the air – just as we are seeing in North America and Europe. On the maritime side, Asia is riding the waves of an overall trend – more connections to more locations and ships across the maritime segments are steadily moving into the region and expanding operations.

## Aero Soaring to New Heights in Asia (and the Pacific?)

Both Boeing and Airbus point to Asia as a large source of new orders for airframes, driven in part by the ongoing rise of GDP within the region. In-step with GDP rise, ICAO views Asia as having a similarly strong growth in passenger traffic going forward – for both long haul and domestic routes. Just as growth in passenger traffic continues in Asia and across the globe, the demand for connectivity continues to rise – with NSR projecting upwards of 25 TPEs of FSS capacity and upwards of 5 Gbps of HTS capacity for commercial airlines within Asia by 2024.

Looking at some of the recently announced deals from within the region, and it is clear that not only is demand for connectivity on the rise, but that wide body airframes providing both regional (hub-to-hub traffic patterns) and transpacific routes will the key component of the market going forward. China Eastern Airlines, Garuda Indonesia, JAL, Singapore Airlines, and others are just a few of the key airlines poised to outfit more than 250 wide body airframes in the region.  With wide-body airframes leading the connectivity drive in terms of capacity demand, there still remains a vast untapped potential for the domestic short-haul market in the region.

According to both major aircraft manufacturers, China will be a key market for airframe deliveries going forward. Within China, nearly the entire population is centered inside a 2-hour flight-time radius in the eastern part of the country. With such high population density, the value-proposition for satellite connectivity remains challenged (but not impossible). Purely looking at similar usage patterns in established connectivity markets in North America for example, the short-haul/short-duration flight patterns will lean heavily towards some form of terrestrial offering – or at the very least the conditions appear compelling for the development of an ATG solution across these areas of higher passenger density/shorter flight time.

Given the high concentration of population in the key market, China, ATG commercial In-service Units for Asia will trail behind North America and Europe. Although Asia will provide the highest rates of growth through 2024 at upwards of 80% from 2018 to 2024, average retail revenue per In-service Unit will be some of the lowest in around – a sign that although ATG might be available, it will still have a long way before reaching similar service and take rates as North America or Europe. All that said, an ATG solution for narrow body airframes would be an emerging spot of the market to watch towards the end of this decade.

While it is easy to look at the larger growth factor for airframes – flight duration remains a key metric for IFC adoption rates within Asia going forward. Where satellite will be key is the growing number of flights from China to Europe, North America, and Africa – expected to average 7% growth over the next few years. Even with narrow body deliveries vastly outnumbering wide body deliveries into the region, wide body will be the driver of commercial satellite capacity demand for IFC in Asia.

With passenger traffic continuing to grow within and to/from the region it will be the long-haul routes that are the sweet spot for satellite-based IFC. In addition, even if half of new deliveries projected by Boeing from Airbus occur to Asia-based customers, the region will be a prime market to outfit that connectivity right off the assembly line.

## Full Steam Ahead for Maritime?

While the domestic market for aeronautical connectivity in Asia presents challenges for satellite connectivity – the market for Asia maritime traffic remains strong. As Carnival Cruise Lines explores creating a dedicated Chinese brand (while still moving more vessels into the market), and Royal Caribbean announcing 2 out of 3 of its' Quantum-class vessels will be moving into the region – the demand for connectivity at sea in Asia continues to remain strong. Everything from Fishing to Merchant Shipping will experience strong growth through 2024 as activity within Asia and the Pacific quickens.

Facing the same trends as the rest of the global maritime industry, Asia represents the best prospect for retail revenue growth and is second only to Europe for the number of In-service units. Everything from narrowband fishing vessel monitoring applications to development of Oil & Gas resources in the South China Sea area are on the table – and satellite will be a key component for these greenfield applications.

Looking at the merchant segment, a nearly $3 billion dollar market for retail revenues by 2024, almost $500 Million will be from Asia alone. Combine the Pacific, and the market jumps to over $800 Million in retail revenues for the merchant segment by 2024. Viewed another way, by 2024 for merchant maritime revenues Asia will be nearly on-par with the current market leader, Europe. Driven in part by industry initiatives to provide better connectivity to seafarers, the market for merchant vessel connectivity remains on a growth path, with Asia one of the key regions to target for connectivity. Although the demand from seafarers for connectivity, within Asia and around the world, continue to rise, the willingness to pay still remains challenged. Those pricing pressures will help be a key enabler to the shift to HTS-based offerings throughout the region, and within Asia and merchant shipping GEO-HTS Ka-band offerings from the likes of Inmarsat's Global Xpress are likely to do well. Amongst the VSAT based offerings, by 2024 GEO-HTS Ka-band will be a significant source of retail revenues from merchant vessels within Asia. Overall, Asia's gain in market share does come at the expense of other regions when factoring out overall revenue growth.

For Fishing, as regional population rates continue to rise fish continues to become an even more critical source of protein in the region. That importance drives the need for monitoring applications for fishing fleets, which will become an even greater source of revenue and in-service unit growth over the next ten years. As these fishing fleets continue to expand, expect narrowband MSS offerings to be a key service. Although in retail revenue terms the fishing market will remain relatively consistent across the globe, strong growth for these narrowband applications in Asia for fishing vessels will provide the second best growth market (following Europe.) Moreover, one can expect that the on-going push to provide aquatic food to Asian Markets will drive Asia-based fishing vessels to venture further and further outside the region into other fisheries.

Offshore might be one market where Asia could face challenges, as the current oil prices and geopolitical challenges have affected wider exploration and development of deposits in the region. Only providing middle-of-the-pack gains in retail revenues over the next ten years ($200 Million out of $900 Million that NSR projects between 2014 and 2024), offshore oil and gas remain a challenging market in the near-term regardless of region. Existing activity off the coasts of Australia, Indonesia, Malaysia and Vietnam will likely remain the hot-

ter areas of activity, and greenfield opportunities will fall back into the planning stage or slowdown their development timelines. Yet, with the ever increasing need for 'clean' natural gas from key markets such as China (to offset coal-powered electricity), there are significant positive signs that once the dust settles, activity could ramp up quickly. All told, and unlike markets in North America or Europe which are in the middle to end of their production life, activity will continue to expand within Asia (and the Pacific) across all segments of the oil and gas sector – just as soon as the industry adjusts to the 'new normal' of crude prices.

Although offshore might provide some challenges, passenger markets will definitely be a driver of growth for high-end maritime applications. Driven by the changing population and wealth dynamics in the region, just as in the commercial airline industry, China will be a key market for Asia passenger vessel maritime connectivity. Not only cruise ships, but also across the entire passenger segment, Chinese ownership rates continue to rise as household wealth increases for super yachts, and smaller leisure yachts. Meanwhile, the stigma associated with showing wealth continues to decrease, bolstering the cruise industry in the region.

By 2020, NSR projects that the market for maritime passenger vessel satellite connectivity in Asia will surpass North America. With the market in Asia providing the second best net-gain in retail revenues (trailing only Latin America, which includes destinations in the Caribbean) at just over $100 Million out of $650 Million, the demand for connectivity at sea will gain strength in Asia. Not only from existing offerings in FSS, but as larger passenger vessels move into the region and Non-GEO HTS capacity continues to expand beyond just MEO – expect Asia to be one of the top 3 markets for high-end passenger maritime connectivity. Overall, increased activity in the region as well as steadily increasing demand from seafarers and passengers continue to drive the maritime market in Asia.

## Bottom Line

What does it all mean for the satellite industry? Expect an on-going focus towards bringing resources into Asia. Satellite operators are bringing more capacity in both FSS and HTS into the region to capture the growing market for mobility. Service providers continue to expand both within and outside the region – increasingly able to capture larger international fleets of maritime end-users or providing long-haul airline routes connectivity. Although the US Government continues to talk about a 'pivot to Asia' which will no doubt require satellite connectivity to ships, planes and UAS assets– the commercial mobility markets are leading this dance.

**Brad Grady** has been involved in the Satellite Communications industry since 2005, joining NSR in 2010. He is NSR's Energy market subject matter expert, and a core member of NSR's mobility research practice for both civil and government markets. He regularly provides his insights and analysis to NSR's single-client consulting practice, and is also a regular contributor to leading industry publications and forums.

Before joining NSR, Mr. Grady served as the Sustainable Development Projects Coordinator Intern with the Global VSAT Forum where he worked regularly with the GVF Secretariat and the Regulatory Working Group on many of the forum's initiatives. Working with the Regulatory Working Group, Mr. Grady helped develop and implement various RWG initiatives aimed at protecting satellite spectrum, increasing awareness of satellite services, and working to promote regulatory reforms across the globe.

Mr. Grady holds a Bachelor's degree in Economics from the University of Maryland, College Park where his research focused on renewable/alternative energies, Information Communication Technologies and the Satellite Communications Industry. He works in NSR's Washington DC office.

# 10th Anniversary of HTS

Tony Colucci, Vice President, Business Development, SSL
Daryl Mossman, Vice President, Sales and Marketing, SSL

The world's first High Throughput Satellite (HTS) was built by SSL for Thaicom Public Company Limited (Thaicom) and launched in 2005. Now ten years later, shortly before the launch of a new generation of HTS for Australia's new nbn™ broadband network, we are celebrating the success of Thaicom's vision and the importance of the high capacity satellites that connect people and businesses around the world to the Internet, and help make the world a better place.

With the exponential growth in digital communications, the demand for satellites that can provide broadband service continues to increase. In a 2014 report, industry research firm Northern Sky Research (NSR) forecast that the satellite broadband subscriber base will nearly quadruple to almost 6 million users by 2022[1].

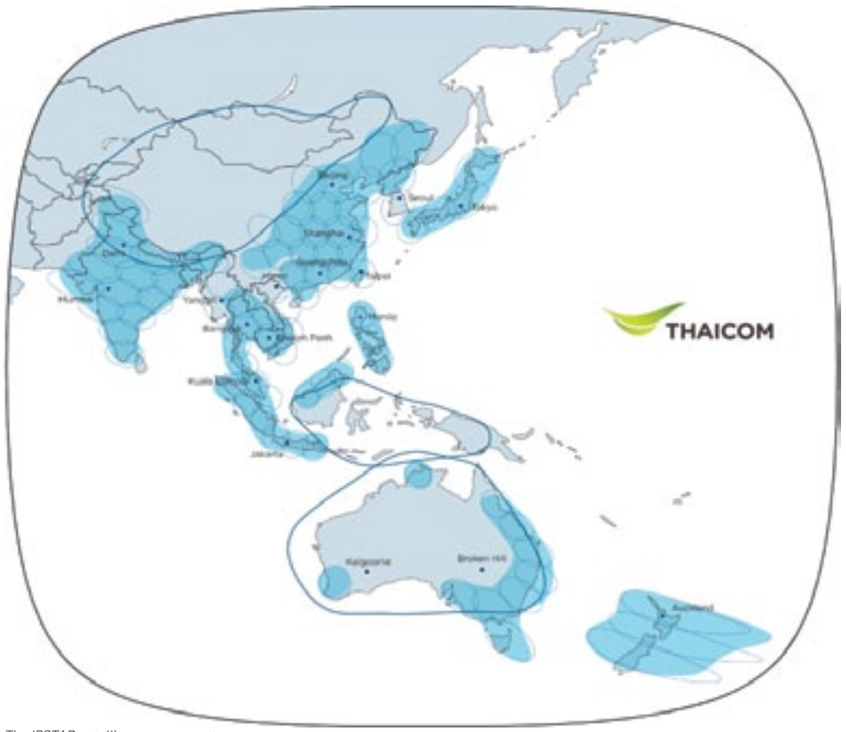
*Arianespace workers prepare the IPSTAR satellite for launch. Photo by Arianespace.*

On August 11, 2015 SSL and Thaicom celebrated the tenth anniversary of the launch of IPSTAR, also known as THAICOM-4, which is the world's first HTS and is capable of providing service to up to two million broadband users or nearly 30 million mobile phone subscribers in the Asia Pacific region. Compared to the one or two gigabit per second (Gbps) capacity of a typical satellite designed for Fixed Satellite Services (FSS), IPSTAR was designed to provide broadband Internet service and required much higher data transfer rates. Its maximum 45 Gbps of capacity had never been achieved on a satellite before. That capacity enables IPSTAR to provide up to 5 Mbps user download and 1 Mbps upload speeds simultaneously with IPSTAR user terminals or 100Mbps/10Mbps with the latest third party ground system equipment for a variety of applications and services.

## Demand for HTS

With the ability to provide higher throughput, lower cost per bit, and more highly tailored coverage than a typical FSS satellite, HTS has forever changed the satellite landscape. It

[1] http://www.nsr.com/news-resources/the-bottom-line/2013-a-turning-point-for-broadband-satellite-access/




*The IPSTAR satellite coverage pattern.*

is a cost effective way to provide instant infrastructure over regions that have little existing terrestrial development, such as in parts of Asia and Africa, and also has the ability to provide service to areas where the geography and population density makes cable and wireless cost-prohibitive, such as the Australian out-back. High Throughput Satellites can deliver broadband Internet access to underserved users regardless where they're located.

Thaicom had the vision that it could reach into areas where there was no existing broadband connectivity to satisfy latent demand and help bridge the digital divide. Access to the Internet helps underserved populations with medical, educational, and emergency services, and can improve quality of life and economic development. The importance of HTS as a vital link for the underserved is expected to continue to grow as is its use for private networks, mobile applications, and cellular backhaul.

Thaicom was forward-looking when it conceived of the IPSTAR satellite and service, and it provided an exciting challenge for SSL to help turn this vision into reality by integrating numerous technological advances into one satellite. These advances paved the way for a new generation of satellites that were later named HTS, a term coined by NSR to refer to the vast leap in capacity.

David Bernstein, SSL's program manager for IPSTAR, who is now Senior Vice President of Program Management at SSL said, "To develop IPSTAR, SSL pushed the envelope of satellite technology, working through challenges step-by-step until we refined the technology to a point where it could support our customer's vision."

*The IPSTAR satellite was one of the most innovative satellites of its time.*

## HTS Technology

The era of HTS began with the launch of IPSTAR, well before the term "HTS" was first used. To help deliver on Thaicom's concept, SSL took a careful, methodical approach to technology insertion for the satellite. The goal was to maximize capacity while managing the inherent risks of space technology advancement so as to ensure performance and reliability.

In order to provide the highest capacity ever delivered, IPSTAR included a number of features and technologies that made it the most advanced satellite of its time. It was built on the world's most popular platform, the highly reliable SSL 1300, which has the flexibility to serve an extensive range of applications, including broadband. An important feature of the SSL 1300 is that it easily accommodates advancing technology, and has evolved incrementally to the modern, highly capable platform that it is today.

## Spot Beams and Frequency Reuse

The IPSTAR satellite was designed with a complex coverage pattern implemented in 112 spot and regional beams – more than any satellite previously built. It combines smaller spot beams that concentrate power and sensitivity for more densely populated areas, and larger regional beams for service to more expansively spread populations in rural and remote areas where less capacity is required. This advanced architecture and the attendant scheme for frequency reuse differed dramatically from other satellites being built at the time. FSS, broadcast, and video distribution satellites typically employed a small number of large beams providing coverage over broad areas.

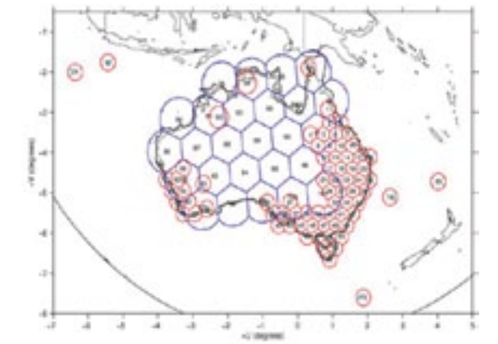
In IPSTAR's Southeast Asian service area heavy rainfall was a significant concern. This required a unique design to combat "rain fade," which refers to satellite signal degradation that can occur in heavy rain. To mitigate this effect, the IPSTAR system utilized Ku-band user links which were essential for performance during rain storms, and Ka-band for additional bandwidth for the gateway links. Larger antennas and more power at the gateways on the ground help drive throughput even during rainstorms.

## Mass Driven Advances

SSL had to find innovative ways to expand the design envelope to fit all of the equipment that IPSTAR required. For example, it required more than 3,200 pieces of waveguide, which are components that carry radio frequency signals inside the satellite. This is approximately ten times more waveguide than in typical FSS satellites (although it is substantially less than the piece count of today's next generation broadband satellites, which can use 4,500 pieces of waveguide or more).

The IPSTAR satellite benefitted from advances that were developed to reduce satellite mass, and it was a trailblazer for technologies that are commonplace on satellites today. Even so, when it was launched, IPSTAR was the heaviest commercial GEO satellite ever orbited. With a launch mass of nearly 6,500 kg, it was the first satellite to require a dedicated Ariane 5G+ launch vehicle to lift-off.

SSL achieved significant mass reduction through its first use of Lithium Ion (Li-Ion) batteries on IPSTAR. Li-Ion batteries are much smaller and lighter than the Nickel-Hydrogen (NiH2) batteries that were previously used on satellites. Use of Li-Ion batteries and a new power electronics system on IPSTAR meant more power was available for the payload. The 100Ah cell batteries used the largest capacity cell developed for space-use. The advanced power subsystem deployed on IPSTAR was one of the key technology upgrades that enabled



*The nbn Sky Muster satellite coverage pattern.*

*The nbn Sky Muster satellite in the Compact Antenna Test Range at SSL's Palo Alto Facility.*

SSL's evolution to satellite power levels of 20-kW and higher, and Li-Ion batteries are standard on all of SSL"s commercial spacecraft today.

## Electric Propulsion

IPSTAR was also a trailblazer as one of the first commercial satellites to use electric propulsion. Stationary Plasma Thrusters (SPTs), a type of ion thruster, were used to replace the traditional bipropellant system for station keeping and momentum management allowing several hundred kilograms more payload mass.

Previously these thrusters had been used on Russian satellite missions and they were adapted for SSL use after an extensive qualification and test program. The testing verified operational life and power electronics interfaces, and included a thorough analysis and assessment of plume impingement effects. IPSTAR was the second SSL satellite to use SPTs, which are now standard on the 1300 satellite and are regularly implemented in new satellite programs as required. Including IPSTAR, there are 17 SSL 1300 satellites with electric propulsion on orbit today, and they have logged more than 45,000 hours of successful operation.

## The Next Generation

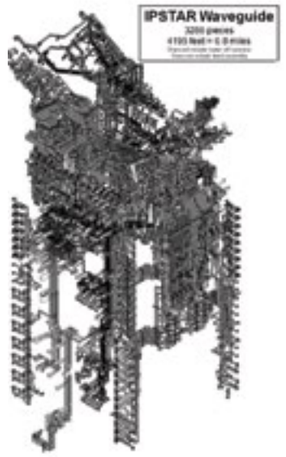
Since IPSTAR, three more SSL-built dedicated broadband satellites have been launched, as have several multi-mission satellites with smaller HTS payloads. SSL also has three dedicated broadband satellites in its backlog, including two for Australia's nbn, the first of which is expected to launch this fall.

SSL built the two highest capacity broadband satellites in orbit today, which are providing service for more than one million subscribers in North America. The company is also building a next generation HTS for EchoStar's Hughes Network Systems, which will provide well over 150 Gbps throughput. For nbn, SSL is providing a unique capacity distribution solution that will serve the entire continent of Australia. Now, ten years after the launch of IPSTAR, roughly half of the satellites in SSL's 21 satellite backlog have some sort of HTS payload.

Dedicated broadband satellites built by SSL include:

- IPSTAR, launched in 2005
- Wildblue 1, launched in 2006
- ViaSat-1, launched Oct. 2011
- EchoStar XVII/Jupiter-1, launched July 2012
- NBN Co 1A (renamed Sky Muster), scheduled for launch in 2015
- NBN Co 1B, for launch in 2016
- EchoStar XIX/Jupiter-2, for launch in 2016

Slated for launch this fall, the first of the nbn™ satellites, which was named "Sky Muster" by the six-year-old winner of a country-wide naming contest, will be SSL's 100th 1300 platform satellite. The satellite boasts highly tailored capacity distributed over 101 spot beams to match the widely varied Australian population distribution. It is one of the most complex satellites ever built, and will provide underserved Australians with Internet connectivity on par with terrestrial connectivity.




*The IPSTAR satellite used more than 3,200 pieces of waveguide, a component that carries RF signals through the satellite.*

For its Interim Satellite Service, prior to the launch of service on its new satellites, nbn has been leasing capacity on IPSTAR, and is bringing service to areas that were previously relegated to dial-up or had no service at all. This flexibility of service demonstrates one of the unique advantages that satellite services have over terrestrial services.

"SSL keeps pushing the boundaries of technologies to new levels," said David Bernstein. "Just as with IPSTAR, SSL's technology development process continues to be driven by the visionaries that understand how satellite service can be used to make the world a better place."

As SSL continues to combine heritage with innovation, HTS technology will continue to evolve. In just 10 years since the launch of IPSTAR we have seen a quadrupling of the throughput capacity of HTS. New technologies such as the miniaturization of electronics and more efficient antennas will continue to drive improvements.

It is remarkable to think about the world as it was 10 years ago, before we had smart phones or Twitter and before posting videos on Facebook became commonplace. The world is increasingly connected and trends like "the internet of things" and the high capacity and lower cost per bit of HTS mean that a wealth of new applications that rely on satellites are likely to emerge. Most individuals and businesses don't care whether they are getting information through cable, fiber, wireless, or satellite, they just want ubiquitous, reliable connectivity, any time and on any device. The visionaries at companies like Thaicom and nbn know that in this digital age there will always be demand for higher throughput and more capacity, and SSL will continue to build satellites to enable the creative thinkers to deliver next generation applications.


**Anthony J. Colucci** is a vice president of marketing and sales at SSL. With over 25 years' experience, he represents SSL in Asia, the Pacific, and the Middle East, and assists customers in starting and building satellite businesses.
Mr. Colucci earned his bachelor of science in astrophysics from the University of New Mexico, and his master's in business administration from the Wharton School, University of Pennsylvania.

**Daryl Mossman** is a vice president of marketing and sales for SSL, where he leads the teams that develop satellite solutions for the Asia-Pacific marketplace. Mr. Mossman has been at SSL for more than eight years and has also worked in business development for a variety of other telecom industry companies.
Mr. Mossman earned a BS degree in Engineering from the University of Michigan and holds a MBA degree from Pepperdine University.

# APSCC MEMBERS

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SK telecom

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Newtec

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RSCC Russian Satellite Communications Company

SES your satellite company

SKY Perfect JSAT Corporation

SPI

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Thailand

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AETHERIC ENGINEERING

APSTAR by APT Satellite

ASAT Co.,LTD. Ace of Satellite Communication Systems

APSI Asia Pacific Satellite Industries Co., Ltd.

AsiaSat

BOEING

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中華電信 Chunghwa Telecom

COMTECH EF DATA

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Gilat Gilat Satellite Networks

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Korea Aerospace Industries, Ltd.

KACIFIC BROADBAND SATELLITE

KAI KOREA AEROSPACE INDUSTRIES, LTD.

KARI

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MARSH

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Telkom Indonesia

SAMSUNG FIRE & MARINE INSURANCE

satellite evolution asia

SEA LAUNCH

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THURAYA

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ZODIAC DATA SYSTEMS

# APSCC Welcomes a New Regular Member

## Asat Satellite Communication Co., Ltd

*Enterprise modem Open-RCS 4800*

*Hub demodulator chassis Open-RCS 10000*

Asat Satellite Communication Co., Ltd finished recently in July 2015 a VSAT project "e-Government infrastructure" contracted with the government of Mali Republic in West Africa, providing a Hub (6.4m RF with redundant baseband) and 1.2m terminals installed for 59 government offices in remote and isolated areas on Eutelsat 21B.

This project showed a proof of evidence with good features of VSAT in many ways as below.

- Ministries in capital city of Bamako are connected well with fiber optic but e-Government software program in regional and remote offices cannot be implemented due to lack of such communication infrastructure of fiber optic due to limited budget. With our VSAT project, the isolated people in remote area of Mali Republic can now benefit the e-Government.

- Governments especially in developing countries should care such disregarded, which can encourage the really-needed in remote areas, more than the people in cities.

- Effects shown are Enhanced quality of life, Leveraged development with rural, Mitigate regional conflict, Consideration for Have-NOTs, Mitigating Digital Divide, Basis for sustainable growth for the grassroots, Appreciation for federal government etc ultimately leading to Political Stability in the long run.

- One more thing is that, all these effects could be happen with min budget for a nationwide coverage, showing highest efficiency in investment.

As such, Asat plans to penetrate other markets including developing countries of Asia and Africa, on G2G basis.

Asat Satellite Communication Co., Ltd is a total solution provider/manufacturer of turn-key VSAT project, in Korea. Asat shows a broad range of market offerings ranging from managed networks to high-speed Internet access. With TDMA/FDMA/SCPC solutions, Asat will be able to expand its offerings beyond broadband Internet access to include VPN, VoIP, multicasting services to the corporate and enterprise, especially in governmental sector.

Asat technology is based on experiences of about 20 VSAT projects mostly out of Korea, shipping out about 5,000 units so far mainly to Europe and ME. Asat finished or contracted 8 VSAT projects in the short period during the last 12 months only.


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# Satellite Summit: Asia's Satellite Industry - The Next Decade


The CommunicAsia2015 Summit, the region's largest meeting place for ICT industry, featured more exciting learning and networking opportunities for satellite industry players this year. At the Satellite Summit during the CommunicAsia2015 Summit, new panel discussions and end-user case studies were included for the first time to give audiences the latest trends and updates on techno-commercial opportunities.

The Summit brought three tracks focusing on the Road and Competition ahead in Asia, High Throughput Satellite (HTS), and Launch Efficiencies and Technology Innovations jointly by the Asia-Pacific Satellite Communications Council (APSCC), talk Satellite, and Singapore Exhibition Services on June 3, 2015.

## The Road and Competition Ahead

After the welcome speech by Paul Brown-Kenyon (President, APSCC) and Kevin French (Publisher, talk Satellit), the Satellite summit presented a keynote address by Deepak Mathur (SVP, Commercial, Asia-Pacific and the Middle East, SES) on the potential of the satellite industry in Asia. Moderated by Kevin French, the Satellite Operators' Panel, Handling Competition and Challenges from all Fronts, threw questions to the panelists on how the value propositions of the operators are changing and how can the industry benefit from the fierce competition and offerings. Paul Brown-Kenyon (President, APSCC; CEO, MEASAT), Mohamed Youssif (COO, ABS), Ken Loke (CEO, Eutelsat Asia), Deepak Mathur (SVP, SES), Philip Balaam (VP, Business Development, AsiaSat) and Terry Bleakley (Regional VP, Asia-Pacific Sales, Intelsat) joined this session to share their own unique strategy and proposition to the market help.

## High Throughput Satellites: Where is the Demand and What are the Business Models?

Hagay Katz (AVP, Head of VSATs Line of Business, Gilat Satellite Networks) started the afternoon session with a case study presentation on how to create differentiated business offerings through HTS. His presentation examined not only HTS's role in the satellite business but also emerging applications for HTS and current policies promoting HTS as an industry. With a question regarding the current status of HTS in Asia from Stephane Chenard (Senior Associate Consultant, Euroconsult), John Meyers (Senior Director, Gilat Satellite Networks Thailand), Robin Salem (VP, Business Development, ViaSat), Chen Xun (EVP, APT Satellite), Rash Jhanjee (Head, GX Business Development and Strategy, Inmarsat), Parisuthi Jinamornphongs (Head of Business Development, Thaicom), Vaibhav Magow (Senior Regional Director, Asia-Pacific, Hughes) also discussed on the current offerings such as HTS/GX/EPIC and on the HTS affection to the VSAT markets. After that panel discussion, Imran Malik (VP, Asia-Pacific, O3b Networks) and Syed Hasnain Raza (Manager, Transport Access Networks, Telenor Pakistan) presented a case study on the efficient use of HTS in rural 3G/4G deployments.

## Launch Efficiencies and Technology Innovations

There was a panel on the New developments in Antenna Technologies joined by Leslie Klein (CEO, C-COM Satellite Systems), Darin Anderson (Director, International Business Development, Thinkom), Martin Jarrold (Chief, International Program Development, GVF), Thomas Lohrey (Head of System Integration, Eutelsat) with Jose Del Rosario (Senior Research Director, NSR) as the moderator. The panelists discussed on the evolution of key requirements from systems integrators and end users.

The panel discussion on making the satellite industry more efficient – examining the new innovations was followed by with panelists Stefan Jucken (Director, ViaSat), Dani Indra (EVP, PSN) and Anthony Colucci (VP of Marketing and Sales, SSL). During the panel, they discussed on the key trends for next decade in multiple launches, reusable vehicles, and long life span satellites.

The Satellite Summit came to an end with the closing panel discussion; WRC 15 and Beyond – The Road Ahead for Stakeholders. Moderated by Gregg Daffner (CEO, GAPSAT), Kevin Seow (VP, Spectrum Management & Development, Asia-Pacific, SES), Heru Sutadi (Executive Director, Indonesia ICT Institute), Alan Hadden (Vice President, Research, GSA), Marie-Amandine Coydon (Assistant General Counsel, Intelsat) joined the panel and discussed on the harmonized spectrum in Asia and trends in technology integration.

# SATELLITE INDUSTRY NEWS

## Lockheed Martin Awarded Commercial Atlas Launch Contract for EchoStar XIX Communications Satellite

August 5, 2015 - Lockheed Martin Commercial Launch Services has been selected by EchoStar Corporation to provide commercial launch services for the EchoStar XIX communications satellite. The satellite is scheduled to launch in late 2016 on a United Launch Alliance Atlas V rocket from Cape Canaveral Air Force Station, Florida. EchoStar XIX, also known as JUPITER 2, is a large, multi-spot beam Ka-band satellite that will help meet the growing demand for HughesNet® high-speed satellite internet service in North America. The satellite, built by SSL in Palo Alto, California, is designed to provide service for 15 years or longer.

## Kratos Reduces Complexity of Ground Systems for Small Satellites with quantumGND

August 6, 2015 - Kratos Defense & Security Solutions today introduced quantumGND, the first complete C2 to RF ground systems package specifically designed to meet the unique requirements of the small sat community. Pre-integrated, affordable and easy-to-use, quantumGND is a full-function, out-of-the box ground system solution for small satellites. Including everything from the C2 system through the ground network and ground modem, quantumGND lets operators focus on their mission and payload instead of building their own C2 and RF signal processing capabilities. quantumGND is comprised of three pre-integrated components. quantumCMD provides C2 for a single small satellite up to a small satellite fleet. qFEP and qRADIO (manufactured by Kratos subsidiary RT Logic) provide the baseband processing functions required between the C2 system and the antenna. Together, these components deliver a virtual machine architecture that features plug-and-play design for simplified setup, automation tools for lights-out operation and complete situational awareness in one dashboard.

## Ariane 6 and Vega C Begin Development

August 12, 2015 - European Space Agency (ESA) signed contracts for the development of the Ariane 6 new-generation launcher, its launch base and the Vega C evolution of the current ESA small launcher. The contracts, signed at ESA's Paris Head Office with Airbus Safran Launchers (ASL), France's CNES space agency and ELV, respectively, cover all development work on Ariane 6 and its launch base for a maiden flight in 2020, and on Vega C for its 2018 debut. ESA is overseeing procurement and the architecture of the overall launch systems, while industry is developing the rockets, with ASL as prime contractor and design authority for Ariane 6, and ELV for Vega C. ASL and ELV are working closely together on the P120C solid-propellant motor that will form Vega C's first stage and Ariane's strap-on boosters. Ariane's modular approach will offer either two boosters (Ariane 62) or four boosters (Ariane 64), depending on the required performance. The site of the launch pad for Ariane 6 at Europe's Spaceport in Kourou, French Guiana has been chosen, and prime contractor CNES is already excavating the site. The new complex will also include facilities for preparing the launcher. The three contracts follow the decision taken at the ESA Council meeting at Ministerial level held in Luxemburg in December 2014 to maintain Europe's leadership in the fast-changing commercial launch service market while responding to the needs of European institutional missions.

## Yahsat and Orbital ATK Successfully Complete the Critical Design Review of Al Yah 3 Satellite

August 10, 2015 - Yahsat, the UAE-based satellite operator, and Orbital ATK announced that they have completed the Critical Design Review (CDR) for the Al Yah 3 spacecraft and payload. Yahsat senior management were in Virginia, USA with its partner Orbital ATK, and Yahsat's team of engineers embedded at the facilities for this project, to complete the review and oversee this critical moment that represented the final stage before assembling all components of the satellite together. Al Yah 3, which is based on Orbital's GEOStar-3™ platform, is an all Ka-band High Throughput Satellite being designed, manufactured and tested at Orbital ATK's satellite manufacturing facility in Dulles, VA. The CDR is conducted during the Engineering and Manufacturing Development phase, and completion of this indicates that all specifications and requirements have been captured into the overall final design of the satellite.

## Thaicom Celebrates a Decade of IPSTAR – the World's First High Throughput Satellite

August 11, 2015 - Thaicom is marking the tenth anniversary of IPSTAR – the world's first High Throughput Satellite (HTS) and one of the catalysts of the huge shift the satellite industry has undergone over the past decade. When it was launched in 2005, IPSTAR was the heaviest commercial GEO satellite ever orbited with a launch mass of nearly 6,500 kg. It was also the first satellite to achieve a maximum 45 Gbps of capacity and was one of the first commercial satellites to use electric propulsion. Designed for high-speed, two-way broadband communication over an IP platform, IPSTAR provides coverage over most of Asia-Pacific via multiple narrowly focused spot beams. As is typical of HTS, IPSTAR is capable of maximizing the available frequency for transmission and increases bandwidth by a factor of twenty when compared to traditional Ku-band satellites, resulting in more efficient operations.

## Gilat Partners with Chinese Satcoms Companies for Ka HTS Multi-Spot-Beam Satellite

August 12, 2015 - Gilat Satellite Networks is entering into a unique partnership with Space Star Technology Co Ltd (SSTC), in which SSTC and Gilat will jointly provide the satellite communications network for ChinaSat 16, the first Ka HTS multi-spot-beam satellite in China. SSTC, a subsidiary of China Aerospace Science and Technology Corporation, is a leading designer, manufacturer and supplier of satellite communications antenna equipment and microwave components in China. The partnership agreement stipulates that multiple network segments and VSAT terminals will be delivered using Gilat's SkyEdge II-c technology. The SkyEdge II-c network will enable high speed fixed and mobile services to be delivered over satellite, including airborne, maritime, train and land mobility throughout China. Additionally, Gilat will share its expertise and experience with SSTC to develop satellite-enabled applications to improve the quality of life for citizens in the country's remote locations.

## Airbus Safran Launchers Awarded Ariane 6 Development Contract by European Space Agency

August 12, 2015 - The European Space Agency (ESA) and Airbus Safran Launchers today signed a €2.4 billion contract covering the development of the Ariane 6 launcher in its two versions, Ariane 62 and 64. This contract includes, notably, a firm commitment of some €680 million for initial development activities (phases A & B) up to the Preliminary Design Review scheduled for mid-2016. Beyond the contract signed today the total amount for the development of the launcher will be approximately €3 billion, including boosters to be shared by Ariane and Vega, as well as €400 million of industrial investment. The Airbus Safran

Launchers teams will now finalize the design of the two versions of the Ariane 6 launcher and the accompanying industrialisation process as part of a new industrial structure established within Europe to improve efficiency.

## NOAA Signs First U.S. Government Deal with SES for O3b High Throughput Solution

August 17, 2015 - SES Government Solutions (SES GS) has agreed to a one year contract with the National Oceanic and Atmospheric Agency (NOAA) to provide O3b Networks' services and ground equipment to the National Weather Service Office (WSO) in Pago Pago, American Samoa. NOAA's WSO supports the National Weather Service (NWS) mission to provide weather, water, and climate data, forecasts and warnings for the protection of life and property. The WSO also provides critically important tropical cyclone warning information to portions of the Pacific. The contract allows NOAA to expand their broadband connectivity outside the continental U.S. to facilitate the wider dissemination of weather and data forecasting. The O3b ground equipment and services at WSO Pago Pago will be key elements of NOAA's communications link to meet these mission requirements. This particular implementation will enhance NOAA's existing terrestrial connectivity with the use of O3b's high throughput and low latency bandwidth.

## ISS-Reshetnev Celebrates Milestone Launch

August 18, 2015 - On August 18, 2015 Information Satellite Systems – Reshetnev Company is celebrating the 51st anniversary of the day when a Cosmos-3 launch vehicle with three experimental communications satellites was launched into orbit. That rocket was the first product developed by the company on its own. ISS-Reshetnev Company traditionally held a series of events to commemorate this significant date. The celebrations included a public meeting at the Mikhail Reshetnev Square which was attended by ISS-Reshetnev's management, employees, veterans and retirees. Nikolay Testoyedov, General Director of the company, while addressing to the people gathered at the square spoke on ISS-Reshetnev's long history full of noteworthy events and stressed the utmost importance the successful implementation of the Cosmos-3 project had for the fledgling Siberian satellite company.

## Launch Success of H-II Transfer Vehicle "KOUNOTORI5" (HTV5) by H-IIB Launch Vehicle No. 5

August 19, 2015 - Mitsubishi Heavy Industries, Ltd. and the Japan Aerospace Exploration Agency launched the H-IIB Launch Vehicle No.5 (H-IIB F5) with the KOUNOTORI5 (HTV5, a cargo transfer vehicle to the International Space Station) onboard at 8:50:49 p.m. on August 19 (Wed.) 2015 (Japan Standard Time, JST) from the Tanegashima Space Center. The launch vehicle flew smoothly, and, at about 14 minutes and 54 seconds after liftoff, the separation of the KOUNOTORI5 was confirmed.

## Aircom Pacific Leases Multiple Transponders across AsiaSat Fleet for In-flight Services

August 19, 2015 - Asia Satellite Telecommunications Co. Ltd. (AsiaSat) has reached an agreement with in-flight entertainment and connectivity service provider Aircom Pacific, Inc. (Aircom Pacific) for using AsiaSat's transponder capacity and uplinking services. Under the agreement, Aircom Pacific will use Ka-band and Ku-band capacity on AsiaSat 7 and AsiaSat 8 to deliver its in-flight entertainment and connectivity services for airlines flying routes over Asia. These services include Wifi broadband Internet, streaming TV and videos, streaming gaming, cellular connectivity, and real-time Duty Free shopping and travel services, enabling passengers to enjoy more comprehensive entertainment options during their flight while staying connected to their work and social networks at all times.

## ViaSat Wants to Bring Wi-Fi to Australian Skies

August 19, 2015 - US satellite group ViaSat is eyeing a bigger role in the Australian market, including potentially offering its own retail services in-country and working with NBN to offer satellite-based services to aircraft. CEO Mark Dankberg told CommsDay that the company would look to make permanent its Melbourne office, which was set up to oversee its A$280 million contract for the supply of ground station infrastructure for NBN's long term satellites. NBN's satellite ground infrastructure is now complete, with just some final testing taking place. However, Dankberg said that ViaSat was now looking to increase its activities in Australia in a range of other areas as well as providing technical support for the ground network. ViaSat is currently working with NBN on the best way to make use of its available bandwidth, but he said with an expected total of 135Gbps satellite capacity, there were a lot of potential applications. One that stands out, he said, was the provision of services to the aviation sector. He said ViaSat would look to work with NBN to provide the technology but would also consider providing the service itself.

## Airbus Defence and Space and Lime Microsystems Partner for the Development of GNSS Products

August 20, 2015 - Lime Microsystems and Airbus Defence and Space, with funding from Innovate UK (formerly the Technology Strategy Board), have announced a joint development of robust GNSS products. Airbus Defence and Space, using Lime's Field Programmable RF (FPRF) transceiver technology, is developing a robust timing receiver that exploits signals from the new Galileo satellite navigation constellation. It is envisaged that a highly integrated Field Programmable RF (FPRF) solution based on Lime's technology and an innovative system implementation of the kind provided by Airbus D&S will provide a high performance GNSS product with the potential for integration with other wireless capabilities.

## Ariane 5 Successfully Launched Satellites for Eutelsat and Intelsat

August 21, 2015 - Arianespace successfully launched EUTELSAT 8 West B and Intelsat 34 satellites on Ariane 5 launcher from the Guiana Space Center in Kourou, French Guiana. EUTELSAT 8 West B will provide high-definition and ultra-high-definition direct TV broadcast services to North Africa and the Middle East, as well as telecommunications services across Africa and in the eastern part of South America. Intelsat 34 will provide C-band telecommunications services for Latin America and Ku-band services in Brazil. In addition, it will offer Ku-band broadband Internet services for maritime and aeronautical operators in the North Atlantic. EUTELSAT 8 West B is the 30th satellite orbited by Arianespace for Eutelsat, the leading satcom operator in Europe, North Africa and the Middle East, and number 3 worldwide in terms of revenues. Arianespace currently has three more satellites in its order book to be launched for Eutelsat. Intelsat 34 is the 55th satellite orbited by Arianespace for Intelsat, the world leader in fixed satellite services in terms of revenues and in-orbit capacity. Arianespace has four more Intelsat satellites in its backlog of launch orders.

## Es'hailSat Awards Contract to Build New Teleport in Doha

August 21, 2015 - Es'hailSat has contracted with Promer Qatar Contracting Company W.L.L to design and build the Es'hailSat Teleport. A dedicated 50,000 m2 site north of Doha has been chosen as the location for the new, state of the art teleport facility which will provide satellite control and communications support (TT&C) and capacity management, together with a wide range of teleport services such as uplink, downlink, contribution, multiplexing, encoding, playout and broadcasting, tailored for our business partners. The high-tech teleport will also provide back-up studios for TV channels and serve as a disaster-recovery facility for broadcasters. The site will be connected with the key media broadcasters in Qatar by means of a redundant, dedicated fiber optic link. Design for the new teleport is expected to be ready by Q1 2016 and the site build and project completed by Q1 2017.

## SpeedCast Announces Landmark Energy Deal

August 24, 2015 - SpeedCast International Limited has been awarded one of its largest ever satellite service agreements in the energy sector. SpeedCast was selected from a field of top global telecommunication and satellite service providers to win a multi-year, multi-million dollar contract, which covers services in over 20 countries for both onshore and offshore in Asia-Pacific and Africa. This award comes from one of the most prestigious global oil and gas service companies in the world and will fully leverage SpeedCast's global scale, network coverage and field support. The contract win further raises SpeedCast's profile in the upstream energy sector and significantly advances its goal to become a leading supplier of satellite communication services to the energy industry worldwide. SpeedCast has designed the solution by leveraging its global network and significant remote operations personnel in its field offices to deliver an exceptional service and uptime commitment for the customer. The initial network design encompasses over 20 countries and hundreds of remotes provided through a fully managed service. A dedicated team of SpeedCast personnel have been assigned to oversee the project, with the principle objective to deliver a superior customer experience throughout the lifecycle of the project.

## Newtec Upgrades the Broadcasting Capabilities of TV Globo's SNG Fleet

August 25, 2015 - Newtec announced it has upgraded the broadcasting capabilities of TV Globo's Satellite News Gathering (SNG) fleet. TV Globo, the leading Brazilian television network, selected the M6100 Broadcast Satellite Modulator for the transition of its news feeds to High Definition (HD). The upgrade fits into an all HD production strategy and includes the entire SNG news fleets of the Rio de Janeiro, São Paulo and Brasilia TV Globo stations. By using the futureproof and flexible design of the M6100 Broadcast Satellite Modulator, TV Globo secures significant bandwidth savings based on open standards. Contribution of news feeds in DVB-S2 standard with the short roll-off factors of Newtec's Clean Channel Technology, provides efficiency gains of up to 15%. Moreover, this new transmission scheme allows reuse of legacy IRDs. The M6100 can be upgraded with a DVB-S2X software license to ensure further performance improvement and bandwidth reduction.

## SSL Awarded DARPA Contract to Study On-orbit Satellite Assembly

August 26, 2015 - Space Systems/Loral (SSL) announced it was awarded a contract from the U.S. Defense Advanced Research Projects Agency (DARPA) to study on-orbit robotic assembly of geostationary communications satellites. Called Dragonfly, the program is designed to enable larger and more powerful satellites that cannot be launched fully assembled, to be packaged in pieces within a standard launch vehicle fairing. As one of the world's most prolific manufacturers of geostationary communications satellites, SSL brings a wealth of expertise to the Dragonfly study including heritage robotics. The Dragonfly concept, which is designed to have both military and commercial applications, is for satellites to self-assemble from an efficiently stowed state while in orbit with a focus on the installation and reconfiguration of large radio frequency (RF) antenna reflectors. The study is scheduled for a five-month first phase during which SSL will seek to demonstrate how assembling satellites on orbit could lower satellite cost and mass, while at the same time enabling higher satellite performance. SSL is planning to further develop on-orbit satellite assembly capability and as part of this effort, has submitted a proposal to NASA for collaboration on taking the concept to a ground demonstration followed by a flight application.





# CALENDAR OF EVENTS

2015

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

### SEPTEMBER

| | |
|---|---|
| 10-15 | **IBC 2015** • Amsterdam, the Netherlands • www.ibc.org |
| 14-18 | **World Satellite Business Week** • Paris, France • www.satellite-business.com |
| 16-18 | **VSAT 2015** • London, U.K. • http://vsatevent.com |
| 22-24 | **APSCC 2015 Satellite Conference and Exhibition** • Seoul, Korea • www.apscc.or.kr |

### OCTOBER

| | |
|---|---|
| 7-8 | **2015 Joint Conference on Satellite Communications (JC-SAT 2015)** • Osaka, Japan • www.kosst.or.kr |
| 8 | **Hosted Payload and Smallsat Summit** • Washington DC, USA • www.hostedpayloadsummit.com |
| 15-17 | **Broadcast India 2015** • Mumbai, India • www.broadcastindiashow.com |
| 26-28 | **CASBAA Convention 2015** • Hong Kong • www.casbaaconvention.com |

### NOVEMBER

| | |
|---|---|
| 3-5 | **Global MilSatCom** • London, UK • www.globalmilsatcom.com/apscc |
| 11-12 | **SATCON 2015** • New York, USA • www.satconexpo.com |
| 12-13 | **GVF Oil & Gas Connectivity 2015** • Kuala Lumpur, Malaysia • https://gvf.org/ |

### DECEMBER

| | |
|---|---|
| 1-4 | **Asia-Pacific Regional Space Agency Forum (APRSAF-22)** • Bali, Indonesia • www.aprsaf.org |


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### 3rd Quarter 2015

| Advertiser | Page |
|---|---|
| ktsat | Inside front cover |
| China Satcom | 02 |
| Kratos ISI | 05 |
| Thaicom | 09 |
| Intelsat | 11 |
| Space News | 15 |
| Satellite Finance | 17 |

| Advertiser | Page |
|---|---|
| Satellite Evolution Asia | 19 |
| PTC'16 | 23 |
| Content Asia | 25 |
| APB | 29 |
| Via Satellite | 31 |
| CASBAA Convention 2015 | 39 |
| Space Partnership International | Inside back cover |

## ADVERTISERS' INDEX

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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