



SATELLITE MANAGED SERVICES/ MANAGED CAPACITY

INTERVIEW

Dr. Ko Ogasawara, Vice President & General Manager,
Business Development Dept., Space Systems Division,
Mitsubishi Heavy Industries, Ltd.

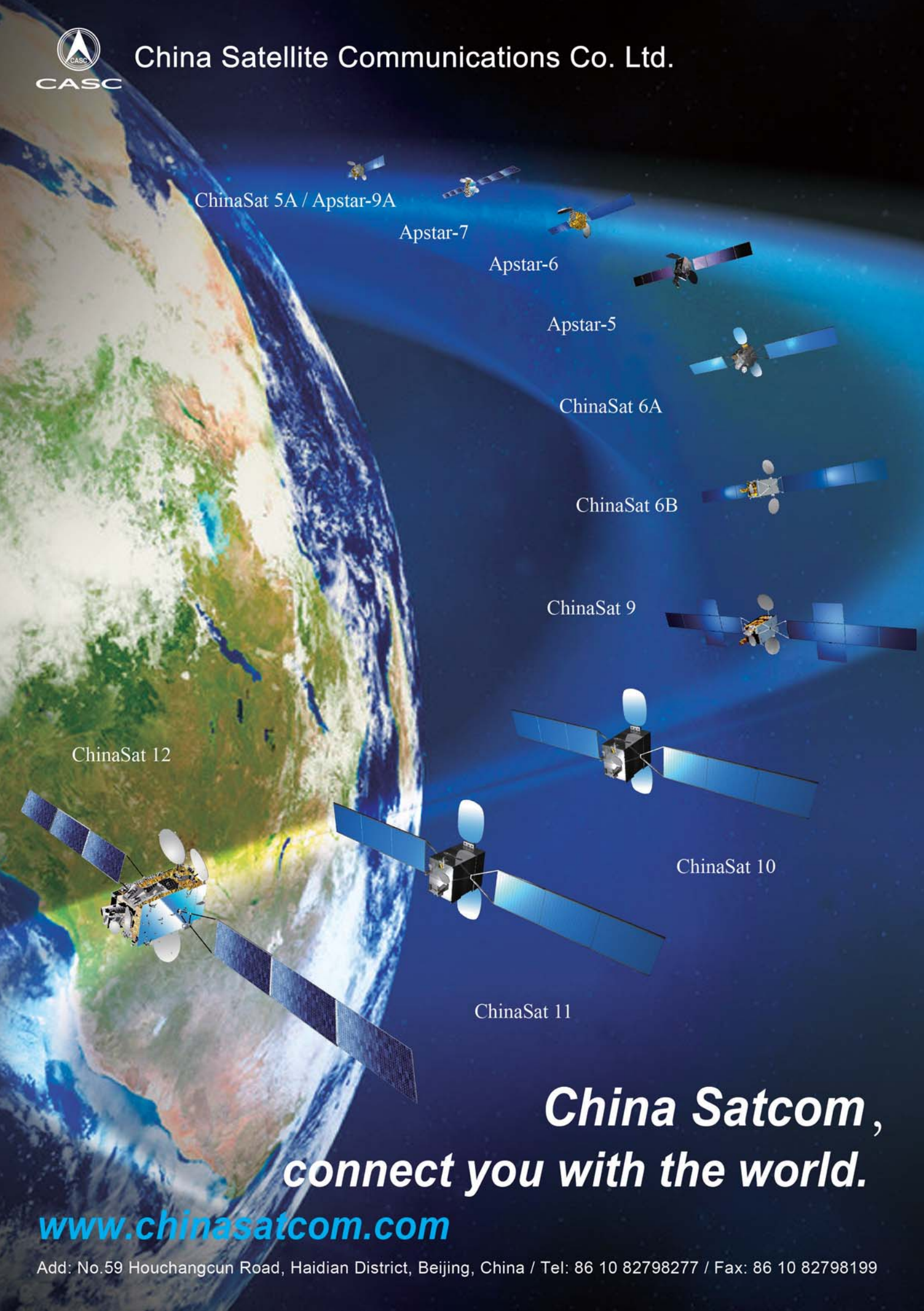
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The Future of M2M/IoT via Satellite in Asia



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MESSAGE FROM THE PRESIDENT

Satellite Managed Services or Managed Capacity is gathering interest in the satellite industry with companies looking to see how new technologies can help them get the most out of available resources and deliver customer content and data as efficiently as possible.

There are a number of questions in Satellite Managed Services or Managed Capacity that apply to both the operator and the customer. What are the options and choices when buying or selling managed services? What is the business model that best suits me? What are the costs, issues, and risks involved? What are the important choices and considerations to be made? The benefits however, are clear. These solutions can provide win-win outcomes by reducing cost and allowing the customer to focus on their core business.

This issue of the APSCC newsletter focuses on Satellite Managed Services or Managed Capacity and takes a closer look at the issues involved. It will be immensely useful for both new and old adopters of managed services solutions for buyers and sellers alike.

Paul Brown-Kenyon
President
APSCC



Hughes Perspective on Managed Capacity / Managed Satellite Services

Vaibhav Magow, Regional Director, Asia/Pacific, Hughes Network Systems

Traditional Satellite service business models are evolving. As a result, Managed Capacity or Managed Satellite Services are generating great interest as a new type of business offering within existing traditional value chains. This article explores the various aspects involved in developing Managed Capacity Service(s), including the essential considerations associated with operating and sustaining such a business offering. Lastly, it looks at scenarios where this business model can provide good commercial value to stakeholders.

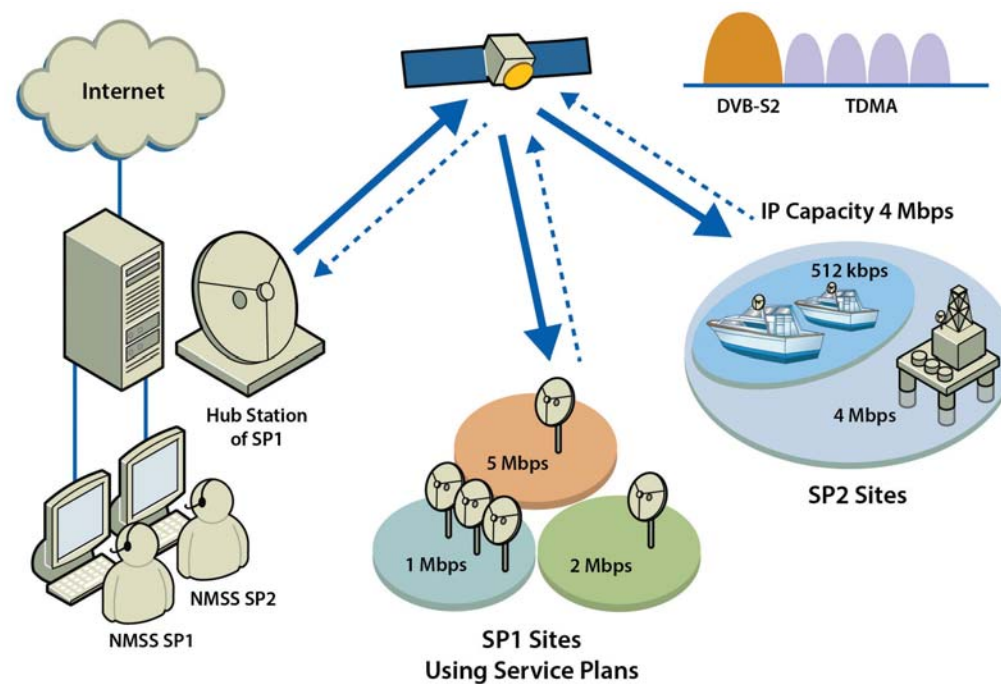


Illustration 1. Service Provider SP2 has saved the cost of setting up a hub station and can leverage the existing contract to get started quickly. Service provider SP1 can use his existing hub station for providing services to Oil & Gas customers. Managed Capacity operations allow both Service Providers to focus on their own set of customers and leverage existing infrastructure and a better MHz contact.



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Managed Capacity as a business model refers to a commercial arrangement in which satellite capacity is purchased as an IP cloud. Under such business models, satellite capacity is sold in the form of Mbps rather than in the traditional MHz model. In this model, the provider packages Satellite Capacity with network infrastructure to make IP capacity available. A Managed Capacity provider purchases capacity in large quantities which allows the aggregation of demand across a greater subset of market segments and sites, supporting a more diverse range of requirements and simplifying the rollout of IP VSAT (Very Small Aperture Terminal) networks.

But is this really a new business model? If so, then why are we talking about Managed Capacity as a service? How does it differ from the traditional Satellite Service model?

In actuality, this model is not all that new; it has existed in the form of outsourced contracts by customers who did not have the ability to operate and maintain a network on their own, but who had large or complex requirements that enabled them to negotiate a turnkey network rollout, as opposed to buying individual circuits. In other instances, telecommunications companies that did not want to operate satellite network infrastructure, have executed satellite managed capacity-type contracts with the added function of remote terminal installation and support. Typically, these models have been limited to large committed contracts and restricted to singular requirements.

The model that is emerging today is a derivative of these earlier models. It allows for more flexibility to address a larger set of market segments, customers, and channels. An additional advantage is that it can allow for rapid expansion of service revenues by resorting to a wholesale model for bandwidth.

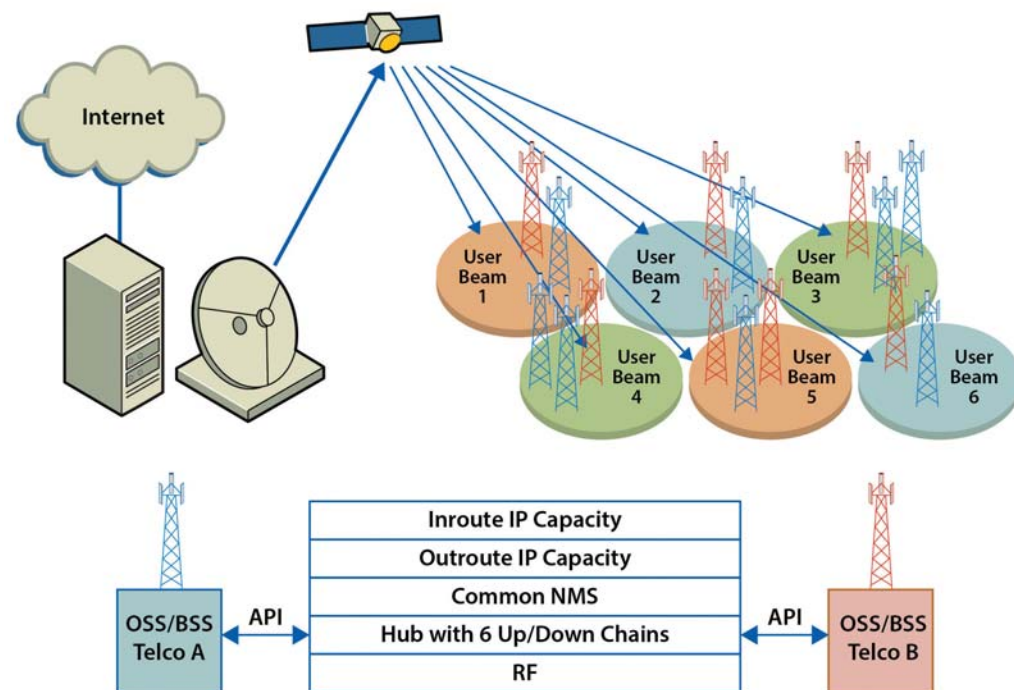


Illustration 2. This illustration shows an HTS gateway site lighting up 6 beams. By offering Managed Capacity Contracts, two Telcos – A and B, are purchasing IP capacity across the beams for 3G/4G backhauling. Both Service Providers can configure their own networks and can integrate independently with their OSS/BSS systems. A managed capacity contract allows the Telcos to use the capacity as needed and allocate it freely with the RAN which frees them from having to create and manage the infrastructure.

FSS or HTS?

There is much discussion within the satellite industry as to whether Managed Capacity contracts (Mbps) will be the way HTS capacity is sold by satellite providers. At Hughes Network Systems (Hughes), we believe this scenario is not limited to satellite providers; service providers, too, could evolve their business models to offer IP VPN-like services, as well as Managed Capacity in order to aggregate greater bandwidth demand. By aggregating demand, service providers would be in a better position to negotiate bandwidth (MHz) pricing. Typically, a Managed Capacity provider offers wholesale amounts of IP capacity and leaves end service offerings, as well as the day-to-day operations of the network and customer interface, to channel partners, systems integrators, and even VPN or MPLS providers.

Hughes also recognizes that the Managed Capacity model is not limited to HTS; going forward, even FSS capacity could be easily available under this model. Let's take a brief look at the factors driving the adoption of these models.

Managed Capacity: Trends Driving the Change

As most industry reports indicate, satellite capacity over the Asia Pacific region and elsewhere is increasing. There is an upward trend and increased need for HTS and FSS bandwidth as more and more data is sent over the Internet and enterprise networks. New players and capacity are also emerging, as traditional players look to expand into new geographies and frequency bands. In general, capacity availability creates pressure on MHz prices. To extract higher value, operators may begin to offer Managed Capacity to change the price from MHz to Mbps, and by providing IP capacity, lower the barrier to entry for customers.

In other market trends, service providers who were once restricted to serving a limited number of customers are forming marketing partnerships where they can offer a Managed Capacity model, leverage their infrastructure, and gain access to market segments otherwise not available to them. As an example, a USO service provider acquires a greater number of sites and, thereby, achieves lower service pricing by bidding directly and by supporting smaller operators who stand a chance of being awarded contracts. This is known as "white labelling" the network service to gain the aggregation needed to achieve a price advantage.

In certain instances, service providers are unable to sell circuits or priced bandwidth models and compete with terrestrial providers. Here, providing Managed Capacity and enabling the enterprise to leverage the larger IP bandwidth cloud can deliver increased value to chief technology officers who can then decide how to allocate bandwidth across their applications and sites.

In essence, a Managed Capacity model offers great advantage when entering a new, highly competitive market; aggregating demand helps achieve economies of scale; and when there is a strategic goal to acquire customers in market segments beyond those associated with traditional service providers (e.g., an enterprise service provider focused on the Financial Services market could enter into a Managed Capacity contract with a service provider targeting small-to-medium retailers or Maritime operations in need of mobility services.)

Regional vs. National Models

One of the challenges of the Managed Capacity model stems from the role that national regulators and telecom policies would play in allowing or limiting the use of IP network infrastructure. Within the Asia Pacific region, governments are increasingly asking that IP traffic lands in-country first, before it is allowed to go

over the Internet. This is becoming a matter of national priority in some instances, where governments want the ability to exercise the right of legal intercept before IP data traffic leaves the country.

In the near term, this may limit the emergence of Regional Managed Capacity; although it does not limit the capacity to aggregate demand within national boundaries. Going forward, these policies are likely to evolve as governments determine how best to adopt a more a flexible approach.

An Evolutionary Step Forward

There is debate around selling satellite capacity. While customers would continue to purchase capacity in MHz, Managed Capacity models can play an important role in the market's evolution. Smaller operators do not need to purchase, operate, and maintain their own ground systems. Managed Capacity models can provide a simpler and better cost model for these small network operators. It would, in turn, help them to retain customers in a competitive market, as well as provide the capacity to grow their businesses. By aggregating demand, service operators can benefit from higher economies of scale, increasing their ability to compete with alternative technologies. This is the most likely step in the evolutionary process as operators try to achieve maximum revenue from their infrastructure investments and attempt to remain competitive by acquiring more customers.

Apart from the obvious commercial benefits of aggregating demand, there are also technical benefits. Rather than having multiple forward DVB-S2 channels, aggregating demand into a single forward channel can unlock transponder power allowing the network to squeeze more bits by running a higher modulation or coding or both. Such opportunities can enable a fresh round of demand consolidation and reduce risk for satellite operators. Faster adoption of fresh capacity will likely also prompt a large number of operators to deploy Managed Capacity models as they enter new geographical areas.

Ground Segment Choice for Managed Capacity Providers

It is critical to note that the success of the Managed Capacity model depends largely upon the capabilities of the ground system. As a result, choosing the right system is as important as choosing the marketing model to adopt. Some of the capabilities necessary in a ground system are the following:

- 1) Powerful Network Management System (NMS): It should be possible to support and run all types of VNO (Virtual Network Operator) models from a combined NMS without having to keep re-investing in separate NMS's to separate the networks. A Managed Capacity provider should be able to extend the NMS easily to multiple customers. The NMS needs to be robust and, at the same time, enable the network capability to target a diverse set of networks in a simple and efficient manner. Support for a large number of remotes should also be possible.
- 2) Scalable Architecture: The ground segment should be capable of growing seamlessly without encumbrances of software or throughput licenses. Support of lights out operation is important to enable remote maintenance and allowing the infrastructure to be operated from any physical location.
- 3) Flexible Architecture: To aggregate capacity it is essential that such systems allow the IP capacity to be sold to a mix of end customer requirements (e.g., 3G/4G mobile backhauling, ATM and branch banking, Maritime customers, in-flight broadband, consumer/small-to-medium enterprise broadband, and other

applications).

- 4) Support for Billing: Given that a model can have more than one service provider, it is important that to be able to connect to different OSS/BSS systems or to offer a cloud-based OSS/BSS for those who do not already have their own systems in place.
- 5) FSS or HTS support: In today's world, where HTS is a reality, service providers cannot afford to invest in separate systems for HTS and FSS. Thus, a Managed Capacity provider that deploys a system that can scale to accommodate the increased capacity made available by HTS providers would be better positioned in the marketplace.
- 6) Extensive Support for VNO modelling: A Managed Capacity model would also need to support multiple layers of VNOs. Creating VNO models should be possible without needing to procure multiple NMS systems. All ground system features should be accessible within the VNO and should be able to manage and support the various hierarchies that exist.

Hughes Satellite System Solutions

Hughes has vast experience enabling such models within its own service companies operating in North America, Brazil, Europe and India. Managed Capacity models have been offered across different markets such as Consumer, Enterprise and Telecom. As such, Hughes satellite ground systems have demonstrated their capability to support such models; and as an enterprise, Hughes has already solved the challenges associated with deploying, maintaining, and supporting these business models.

Summary

Managed Capacity models have been around for years. Yet, the evolution of the Satellite Service model and of the marketplace have prompted the emergence of Managed Capacity as a means for delivering greater value than is typically possible from a pure MHz model or CIR circuit-based approach. By offering a Managed IP Pool, customers also gain added flexibility, allowing for faster adoption and more sites within the network. Broadband satellite solutions from Hughes provide operators the ability to implement a mix of business models simultaneously, without the encumbrances of software licenses. Ultimately, this gives operators the opportunity and the means to expand their own business offerings. 🚀



Vaibhav Magow is the regional director for Asia/Pacific in the International Division of Hughes Network Systems, LLC (HUGHES), a wholly owned subsidiary of EchoStar Corporation. A satellite professional with 19 years of experience, Magow has worked in different areas including Enterprise, Product Development, Marketing, Business Planning, Digital Services, Franchising, and Service Retailing. He worked in the Indian satellite market for 11 years with Hughes Communications India, Ltd. (HCIL) assisting HCIL in maintaining its market share and has been leading Hughes efforts in the Asia/Pacific region for the past five years.

Satellite Managed Services, Managed Capacity and How HTS is Affecting Traditional Business Models

Jo De Loor, Market Director, Multiservice, HTS and Enterprise, Newtec

High Throughput Satellite (HTS) has undoubtedly proved its worth as a game-changing innovation in satellite technology.

The ability to provide broadband to previously underserved areas and where nationwide networks are required is an outstanding development. Using HTS to cost-effectively expand cellular backhaul and enterprise networks, for example, will have an immediate impact in countries where terrain and the remote nature of communities hinder the ability to expand terrestrially. In this scenario, operators will be able to expand the reach of the network and ultimately provide a better service to the end-user.

The initial stages of HTS also created an incredible shift in the satellite industry landscape. We have seen equipment manufacturers becoming fully vertically integrated, evolving from vendors to become satellite operators and satellite service providers in their own right, competing with companies which were previously their own customers.

A few years on, and the promise of lower transmission costs and higher transmission capacity has secured HTS' position as a significant element in the future of satellite technology.

Newtec – like many others in the satellite industry – has acknowledged a number of trends and developments across the industry due to the emergence of HTS which will continue to shape the future of satellite.

Perhaps most significantly, HTS is no longer confined to certain areas of the planet or to consumer broadband. Over the last several years, HTS coverage has emerged in all regions and is now targeting applications from consumer/enterprise broadband, cellular backhaul, mobility and government. Even markets like the oil and gas industry, which requires high capacity but also highly reliable services, are adopting the benefits of HTS: lower bandwidth costs combined with high capacity but smaller terminals.



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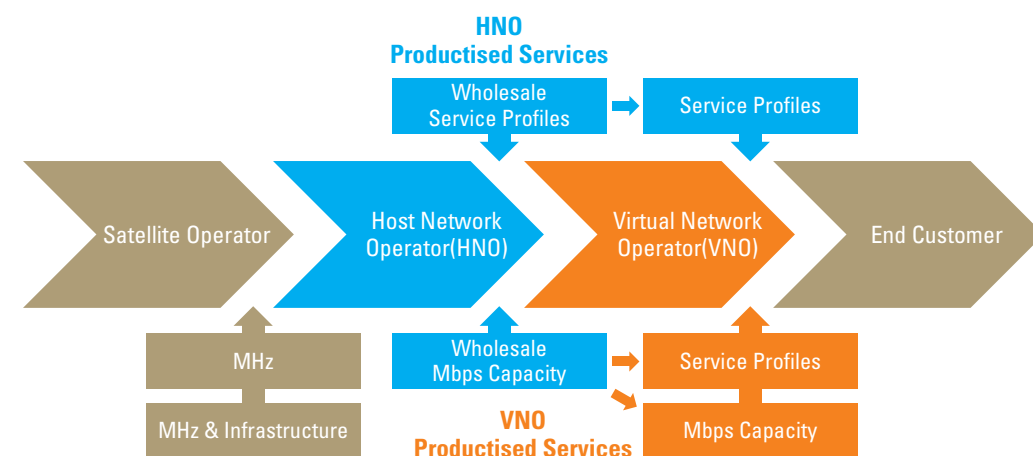


Gone are the days where a satellite platform will be used for one purpose – HTS is truly multiservice. This is another aspect which providers and customers alike have to take into account when deciding which approach to take when using service from a High Throughput Satellite.

The Effect on Business Models

HTS has significantly impacted the way infrastructures are managed all the way through to the relationship with the customer. The business models for managed satellite services are also adapting in order to address the individual needs of each customer.

There has been much debate over the effectiveness of the so-called ‘closed’ and ‘open’ business models – and rightly so, considering the gradual globalization of HTS.



Closed Model

The closed model allows satellite operators to have complete control over the entire service chain, bypassing the sale of bulk space segment to Host Network Operators and instead selling services almost directly to the end-customer. In other words, satellite operators provide wholesale service profiles to a reseller which then does very little with this service before passing it on to the end-customer.

The primary objective of the closed model is to achieve the lowest possible operational cost of the satellite. By creating a vertically integrated infrastructure, where the roles of the satellite operator and both host and virtual network operator are fulfilled by a single entity, OPEX is kept to a minimum and the overall process is streamlined.

One drawback of such a model is that it cuts service providers out of the value chain entirely. Traditional service providers are competing directly against the closed model adopted by HTS providers to provide value and quality with little success. At best, a provider can ‘compete’ by reselling a pre-defined service with pre-defined terminal equipment in the area they serve.

Open Model

The more traditional open model is generally favored by wholesale FSS satellite operators and service providers. This is being used extensively by VSAT providers to purchase bulk space – often in MHz – from HTS satellite capacity providers.

Additionally, the open model provides a greater degree of personalization and flexibility for the end-customer, as the VSAT provider can package the space segment with the terminal hub and equipment of their choice. By doing this, they have the opportunity to create a bespoke system that best caters for the needs of their end-users and customers.

The increased flexibility of the open model has led to most major and regional satellite operators going back to this ‘traditional VSAT value chain’ by offering capacity, typically in MHz.

The open model, however, creates a further challenge for HTS service deployments. Operating services on spot beams requires a higher complexity infrastructure compared to traditional wide beam services. It requires one or more RF gateways, often located in a specific coverage area, and a higher complexity hub to activate the multiple spot beams is needed. The initial investment that comes with HTS services can be a burden for service providers in the start-up phase.

As a result, the satellite services value chain has seen an additional level of innovation, enabling the different players in a HTS environment to bring their own value-adds and create optimized services for end-customers.

Managed Services as Virtual Network Operator (VNO)

Service providers can operate as a VNO on a shared platform, avoiding the need to invest in the network infrastructure. The service provider can buy wholesale Mbps-based capacity from the platform operator and use this to define and productize its own services, fulfilling demand from end-customers in an efficient way.

A New Hybrid Offering

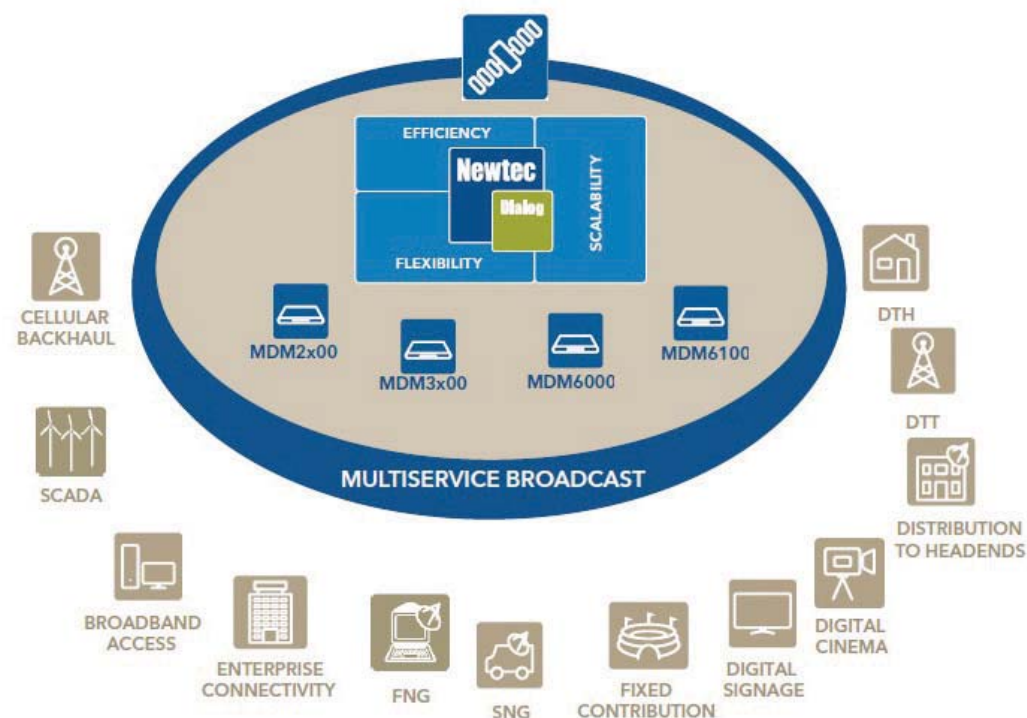
There is, however, a new offering emerging. This ‘semi-open’ platform offers the option of buying wholesale space (MHz), while the satellite operator takes care of the majority of the infrastructure, such as the hosting, hub and RF.

Keeping an element of the vertical integration seen in the closed model allows the service provider to operate the hub for its own services without having to provide the equipment and platform. This allows the service provider greater independence and the advantage of being able to differentiate itself from its competitors.

Service providers, then, have all the operational flexibility, as well as benefiting from a smaller capital outlay.

Broadcast Managed Services

Media companies are under increasing pressure to meet the demands of a TV Everywhere and increasingly Over-the-Top (OTT) society. However, delivering content in new ways to multiple devices and in different formats is incredibly complex and upgrading legacy network systems could be a costly undertaking.



Example of a Multiservice Broadcast Network

In addition, media companies are challenged by the growing complexity of workflow management and ever shorter time frames to bring live coverage of events. Such developments require these companies to take a more holistic approach when finding the ideal model for their operations.

This is where the development of a next-generation, fully automated and converged-IP multiservice broadcast solution comes into play. It allows media companies to conduct multiple content transmissions, including linear video, file transfer, VoIP, Internet access and data exchange, via one platform, as well as enabling them to seamlessly implement digital media networking using their legacy assets, improve bandwidth management with minimal investment and simplify overall content delivery and operational network.

Automation of broadcast workflows and effective use of available resources are key capabilities to optimize overall network costs and, at the same time, allow media companies to rapidly enable new services as the market evolves.

These evolutions also create opportunities for service providers to expand their media services offering. The VSAT hub can be expanded with equipment dedicated to typical broadcast workflows, for example, high speed modems and codecs, an umbrella management monitoring and control system and specific tools to optimize satellite bandwidth and session management, as well as file exchange.

By offering a managed shared-hub solution, the service provider can assist its customer with quick deployment of services, while up-front CAPEX is minimized. OPEX savings can be realized through satellite bandwidth management for both full-time and occasional-use content delivery, shared by multiple customers according to Quality of Service (QoS) configurations and Service Level Agreements (SLA) and enabled by a breadth of pre-defined or customized automated workflows. The service provider may include end-to-end workflows, potentially spanning its entire hybrid satellite/terrestrial network.

What Does the Future Hold for Managed Services and Managed Capacity?

At Newtec, we predict satellite solutions will become even more flexible, scalable and efficient. Essentially, the industry needs to provide future-proof technology to ensure that HTS continues to function to its utmost potential and provide the best service at every part of the operator/customer chain.

Newtec has already made significant steps towards this with the creation of the Newtec Dialog multiservice platform which allows operators to offer a variety of services on a single platform and can easily be scaled up as an operator's business grows and the satellite market changes.

The platform also features software components designed specifically for supporting automated broadcast workflows running over a hybrid satellite/terrestrial network. The scalability and flexibility of the platform meets the needs of broadcasters of all sizes, while delivering a high level of efficiency. Integration into existing ECO-systems is at the core of the solution.

As the demand for HTS continues to grow, Newtec will continue to lead the way in developing and applying future-proof technologies that provide the best possible results in terms of performance and efficiency, all the way through the chain from the satellite operator to the end-customer. 🇳🇱



Currently **Jo De Loor** holds the position of Market Director for Multiservice, HTS and Enterprise at Newtec. Next to developing the HTS and enterprise markets and assisting to large project sales, he shares his expertise in broadband and VSAT within the Newtec organization. Jo has almost 20 years of experience in the industry. He began his career at Newtec in 1996 with different assignments within the Newtec organization. In 2005 he became systems architect for Newtec's DVB-RCS system and further evolved to product manager and later Product Line Director of the Sat3Play Broadband Platform.

Managed Capacity/ Satellite Managed Services

Matine Bouraima, Director, Product Marketing, Comtech EF Data

In today's world, companies across many industries face similar challenges, including how to reduce up-front CAPEX, how to ensure that daily network operations are as efficient as possible, how to overcome the lack of resources or in-house expertise to support mission critical networks, and how to keep pace with new technologies.

A managed services model requires service providers to manage customers' networks end-to-end by offering proactive monitoring and network restoration. This model, if carefully thought-through, may be attractive as the pricing model is more OPEX based, using monthly recurring fees built around service level agreements (SLAs) than in a wholly owned network. It also provides more accurate budgeting and forecasting.



"Satellite Managed Services" refers to proactive end-to-end management of customers' satellite networks on an ongoing basis as defined in an SLA agreed upon by both parties. This entails managing the satellite capacity, teleport, backhaul services, network operations and maintenance services, around-the-clock customer support, as well as training and consultancy services. They demand a certain level of trust and collaboration from both parties but more and more companies recognize the value of utilizing managed services providers to handle routine operations. This approach lets them focus on their core business rather than getting distracted by issues associated with operating their own network.

However, opting for managed services can present a unique set of challenges. Some companies, especially smaller ones, may lack the budget, resources or expertise to cover business critical functions. Other companies, especially large ones, may be fearful of sharing data with suppliers that work closely with their competitors. Each company takes a different view on how it chooses to exchange data based upon the security poli-

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The Business Case for Satellite Managed Services

Companies are confronted with a choice as to which service model makes sense for its business. Do they keep buying bulk satellite capacity or outsource their network to a managed services provider that will offer full, end-to-end satellite network services, with tailored solutions and SLAs to meet their requirements?

Even though there is a multitude of reasons why it can be the best choice to outsource the satellite network to a service provider, let's focus on the top four:

- **Maintain focus on core business** – Companies that leverage a managed services provider can focus on its core business, and leave the technology complexities to the networking experts.
- **Predictable and optimized costs** – Using managed services allows companies to budget costs and to create a technology road map for the future
- **Reduce capital investment and technology risk** – Managed services relieves CAPEX burdens and eliminates the need for companies to hire technical experts to build and manage its own network.
- **Around-the-clock network support and advanced network management** – 24x7x365 proactive monitoring and engineering support to resolve network issues. One of the key benefits with proactive monitoring is that it helps prevent problems before they have a chance to negatively impact the business.

Before selecting a satellite managed services provider, companies must understand their goals, to determine what type of services they require. The services provider must convince them that they meet these key criteria:

- Ability to provide end-to-end solutions with well-defined, automated escalation procedures and well-defined SLAs on availability, response time, mean-time-to-repair, for example.
- Single point of contact for program management, problem ownership and resolution.
- 24x7 support coverage and tier-level help desk.
- Experience deploying and supporting similar networks.
- Ability to work with the company to deploy custom applications or specialized solutions.
- Ability to provide operational continuity or an alternate network path in case of disaster.

With these criteria in mind, companies will be better empowered to select the right and trusted technology partner for their services.

Satellite Managed Services have evolved to also include components of the end-to-end connectivity such as hosting, content management and unified communications. The cloud services market offers many opportunities for companies to reduce costs and grow their business. This is undoubtedly an area where managed services providers will increasingly play a strategic role.

Managed Services Model with High Throughput Satellites (HTS)

As satellite networks become more complex, the launch of HTS will make them even more so. The value proposition of managed services will become even more compelling as greater levels of expertise are required from users to manage these networks. It will make business sense to contract the end-to-end satellite network solutions to a company with high expertise in managing these networks.

One of the key aspects of HTS is the likely greater integration with terrestrial networks, ultimately allowing service providers to provide true managed end-to-end services to their users. This is an area where the satellite operator will be relying on service providers and partners to deliver the services.

The open architecture of HTS is also changing the business model for satellite operators and service providers alike. For example, in a closed architecture network, a single company operates the satellite and the ground system, and owns the distribution network to sell services directly to end users. In this “Mbps model,” the operator is selling Mbps through different service plans and the possibility for an independent services provider to purchase exactly the required satellite bandwidth to package it with its own services is very limited.

There will still be a market for selling bulk capacity because satellite operators want to reduce the risk of a service business. But in an open HTS architecture, most satellite operators will transform their business models from selling bandwidth by the MHz (“the MHz model”) to selling fully managed IP services by the Mbps, delivering business outcome SLAs.

With the onset of HTS and the increase in available satellite capacity from the launch of these satellites, service providers will need a service delivery infrastructure to meet user experience expectations and to monetize differentiated service offerings. They will have to adjust to the new value chain and develop new business models to bring HTS capacity into market.

The trend for Satellite Managed Services is not only observed in commercial satellite communications, but also in military satellite communications. Government and military agencies are now focusing more on satellite managed services that offer secure, true “military-grade” services with ease of deployment and support to help meet their mission critical requirements.

Bandwidth/Capacity Management

Satellite bandwidth is not an infinite resource, but the demand for bandwidth-hungry applications continues to increase across all verticals. Over the last decade, the expectation in satellite bandwidth has completely changed the market, even more so with the advent of HTS, which will accelerate that demand.

A good example of this is with the cruise and cargo industries. Passengers are no longer satisfied with limited bandwidth/applications, but want to feel at home by logging into their social media apps, sharing their experience with friends and family through Skype, Facetime and the like, or stream video on their mobile devices. In addition, the ability to meet demands of Wi-Fi enabled crew is key to improving morale, welfare, and recreation for a high retention rate. It is also necessary to improve and

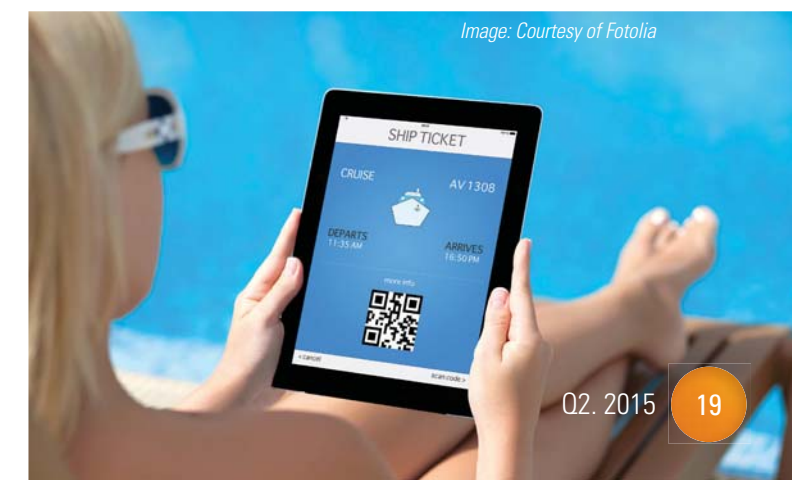


Image: Courtesy of Fotolia

enhance connectivity due to bandwidth-rich applications, improve and expand voice and data quality onboard the ships and vessels, support new enterprise applications (VPN, intranet to access corporate, etc.) that require high bandwidth, increase connectivity for constant crew training and accessing content from their headquarters. All of this while being bandwidth and cost-efficient.

As such, a key issue for satellite operators and service providers is to optimize their satellite resources and appropriately manage their capacity while maintaining contracted SLAs. Operators must constantly strive to manage this through state-of-the-art Network Management Systems (NMS) and various advanced technologies – modulation, coding gain, fade adaptation, carrier canceling technologies (such as Comtech EF Data DoubleTalk® Carrier-in-Carrier®) and group QoS.

Network Management System (NMS): Vital Tool for Service Providers

How can operators support multiple business models in a cost-effective manner and create service differentiation and unique value propositions that resonate from a business standpoint with customers? An intelligent NMS is critical to achieving this, as it touches multiple aspects of a business from network growth, operational efficiency, service delivery and profitability to understanding customers' networks and reallocation of unused capacity to turn every bit of bandwidth into revenue.



The key for service providers is to quickly adapt to changing business requirements and have the ability to manage the network components as part of a complex network management system. At the same time, providing full end-to-end class-based monitoring will create opportunities for automation, user satisfaction, and additional business revenue opportunities.

Another vital requirement within the managed service environment is an open API architecture to allow service providers to easily integrate third-party applications and processes for provisioning, accurate billing and inventory with the NMS for improved network efficiency.

An example of a robust NMS that provides this level of management and integration is Comtech EF Data's NetVue™ Integrated Management System, which features dynamic bandwidth management¹. It provides the network insight required to manage regional or global networks.

NetVue is a comprehensive network management and analytics engine that allows users to intelligently maximize resources and ensure network uptime. Integrated with dynamic bandwidth management, it provides scalable, dynamic capacity management that facilitates bandwidth-sharing, automates space segment allocation and manages "pools" of available bandwidth. This system empowers service providers to manage their capacity themselves, within the appropriate amount of leased satellite capacity without having to contact satellite operators or manually adjust carriers' parameters.

Besides network monitoring, network provisioning and control features, NetVue includes Virtual Network

¹ <http://www.comtechefdata.com/files/datasheets/ds-NetVue.pdf>

Operator (VNO) capabilities, unique to create virtual customer networks based on secured access policies. It provides tiered access levels required to operate as both Host Network Operator (HNO) and VNO where the HNO can define bandwidth management domains with appropriate access levels and privileges.

Increase Customer Satisfaction

Recognized in the industry as a pioneer for satellite bandwidth efficiency and dynamic bandwidth management, Comtech EF Data has implemented various technologies that optimize satellite communications and ultimately improve end-users' experience. Some of the technologies worth mentioning are:

- **Bi-directional Adaptive Coding & Modulation (ACM)** – Satellite users have traditionally relied on worst-case link margin to overcome rain fade and other impairments, which leads to significant inefficiencies. Comtech EF Data has implemented bi-directional Adaptive Coding and Modulation (ACM), an important and unique feature which provides a significant increase in throughput and availability as it converts fade margin into increased capacity in both the inbound and outbound links.
- **Advanced multi-level QoS** – Combined with ACM, group QoS for the outbound (hub to remote sites) and inbound (remote sites to hub) is an important feature to improve bandwidth management while meeting and maintaining desired SLAs. It enables service providers to seamlessly share the outbound and inbound among multiple customers for differentiated services. QoS is without any doubt an important network optimization technique but is inward-looking as it is a network-level measurement of a service. Focus must also be placed on Quality of Experience (QoE), a necessary benchmark for service providers as it is more customer-focused and provides a true end-to-end view of offered services, even though subjective and based on perceptual end-users' feedback.

Conclusion

It is clear that there is a paradigm shift in the satellite industry. The traditional business model has always been for satellite operators to sell "raw" capacity to service providers and let them provide and monetize their own differentiated services to end users. Today, Satellite Managed Services are becoming less of a "convenience" and more of a necessity, as factors such as network security, availability, business continuity and "intelligent" NMS become critical to successful network implementation. 🚀



Matine Bouraima is Director, Product Marketing for Comtech EF Data where he is responsible for product marketing and market development. Previously, he led bid/proposal activities at Harris CapRock, managed technical marketing & sales engineering at Spacenet and Intelsat. Bouraima holds an MSc from Ecole Spéciale de Mécanique et Électricité, France and an MBA from Johns Hopkins University Carey Business School.

**Interview with
Dr. Ko Ogasawara,
Vice President & General
Manager, Business
Development Dept., Space
Systems Division, Mitsubishi
Heavy Industries, Ltd.**



Q Please tell us about your previous experience and how your career in the business of space came to be.

• I did my graduate degree in aerospace engineering at the Kyoto University aerospace engineering course and then took job in Mitsubishi Heavy Industries, where I stayed for roughly 30 years.

At the beginning of my career I worked as a structural designer of the first launch vehicle developed domestically in Japan, the H-II. I then helped develop several new space system architectures, for example the Japanese Experimental Module "Kibo" and multiple precursors of the Japanese mini Space Shuttle "HOPE". I was also technical leader for aero & aerothermodynamic design of hypersonic flight experiment lifting body vehicle which flew Mach 15 successfully.

In 2000 I was given a managerial job leading the technical staff supporting the president of aerospace systems. Then I moved back to the engineering side as the deputy director of space systems engineering.

My technical background is very helpful when I brief our launch services to customers all over the world — something I really look forward to — about our vehicle performance, reliable launch record, and superb quality of service.



Launching the "Future" becomes reality





MHI Total support services from the launch vehicle manufacturing to launch campaign

Q What do you think your most important contribution to MHI's space activities has been?

- I like to think I've made and will make important contributions on both the engineering and business sides.

As an engineer, I successfully integrated the hypersonic flying vehicle, an aircraft that will surely become a trailblazer for the next generation of winged, reusable launch vehicles. I believe firmly that future space transportation systems should be fully reusable, which will drastically reduce the cost of going to space and so make space travel more affordable for the general public.

As a director for business development I will be using my engineering knowledge to convey important messages to our customers about our launch vehicles and launch services. Today's commercial launch market is very competitive, and our customers are well informed. So when I talk to current and future valued customers, I am able to back up information about the business side with reliable technical commentary. That's a hugely important contribution at this juncture in our business development.

Q MHI plans to provide the launch for Telesat in 2015, the first time the company has launched a commercial satellite launch. What is the present status of the project and makes MHI so ideal for this kind of launch services?

- The TELSTAR 12V launch is on schedule and in a very active stage. We are now manufacturing the vehicle, analyzing such interface activities as the final coupled load and preparing to test preparations for the final separation.

On this mission, MHI will apply a newly developed 2nd stage rocket named "KOHDO-KA," a performance-

improved version of our current model. With the improved "KOHDO-KA," MHI can inject satellite into a much lower inclination than ever to relieve the satellites' acceleration burden at apogee. We ran this new "KOHDO-KA" repeatedly through step-by-step tests with the cumulative flight results of the current standard H2A flights. We have given Telesat full access to our results, and they are pleased.

Q The current satellite launch market is dominated by limited number of powerful players. What is MHI's strategy to position itself to be more competitive?

- MHI is one of the most reliable launch services in the world, and our greatest strengths balance reliability, on-time launches, and superior customer service and coordination on the ground. These qualities offer superior value to our customers and will continue to do so.

We have a record of 26 consecutive launch successes with our H-IIA/H-IIB, with high accuracy of placement that exceeds the requirements defined by our customers. 9 out of our last 10 launches were on time, and the one that was delayed was caused by bad weather.

As to service and coordination, MHI has close connections in all the local governments near our Tanegashima launch site, and as a result these entities have been extremely cooperative when it comes to our international launch services' customers. I will give you an example. In 2014, the NASA Global Precipitation Measurement (GPM) was launched by H2A Flight 23. GPM staff were welcomed, of course, with local food and drink, but they were guests at a number of activities, including a concert of traditional Japanese music, a tea ceremony, and calligraphy and kimono demonstration. GPM staff were unanimously delighted by their welcome from MHI staff and the local people.

Lift off the H2A202 for ALOS-2 (Advanced Land Observing Satellite) mission (Photo: MHI)



The H2A202 for Himawari-8 (Japanese Geostationary Meteorological Satellite) mission at the launch pad (Photo: MHI)





Lift off the H2A202 for HAYABUSA-2 (the Asteroid Explorer) mission
(Photo: MHI)

Q There is a growing demand for satellite communications in Asia, and as a result, MHI is becoming more and more important in the region. In the next ten years, what do you think are the main challenges in this satellite market?

- The Asian market for satellite services is very active, and new ideas and satellite operators are continuously emerging. These regional operators often have very specific requirements, and to understand these, we have to understand not only their business needs but also the cultural context-background, way of thinking, and even life style.

Fortunately for our regional business, MHI is to be in almost same time zone with other Asian countries, so we share the same business hours. Moreover, because MHI is such a leading industrial manufacturer in the world, we have for many years supported the day-to-day needs of Asian peoples with a variety of products, including Light Railway Transit, traffic control systems, electric power plants, and even Ferris wheels for amusement parks. By doing so, much business with Asian customers, I believe MHI is able to collaborate more comprehensively with Asian customers than others can.

Q What are your ideas about expanding your space business beyond launch services?

- Because we believe space utilization is a most promising market ripe for expansion, we are keen to expand our space business beyond our main launch services business. Currently, we are developing the "H-X," a new national flagship launch vehicle we believe could expand our presence in the launch market by 2020 or perhaps later.

In addition to launch service, as a leading space-system supplier in the world, so we are also trying to expand space utilization. For example, we want to pioneer the next generation procedures for the International Space Station, for which we already conduct operational support. We are planning to remodel our HTV logistic carrier for the ISS so it can support future international collaborative space exploration. We plan to go into satellite data utilization field using our small satellites products and their related architectures. 🚀

Dr. Ko Ogasawara obtained a Master of Engineering degree from Kyoto Univ. in 1988, and started to work at Mitsubishi Heavy Industries, Ltd. (MHI), as a structure engineer for Japanese main launch vehicles. Since 1990, he had been engaged in Japanese mini Space Shuttle, the HOPE-X program for 10years. Then, he was assigned to manager of launch vehicle performance analysis section from 2008. In 2011, as deputy director of Systems Engineering Department, he directed all MHI's space programs from engineering point of view. Since 2014 he has been in the current position.



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The Future of M2M/IoT via Satellite in Asia

Alan Crisp, Analyst, NSR Hong Kong

Despite the huge increases in data speeds in the communications sector, the underlying requirements for M2M haven't changed – typically they remain location tracking and meter readings with low bandwidth requirements. With the advent of big data and new applications, this is slowly beginning to see the first major shift for some time.

Satellite operators continue to debate the best way to tap into the huge growth of the Internet of Things, and as such it is a useful exercise to ask ourselves, what will the M2M and IoT network of the future look like? Will every car eventually become connected, and along with other applications be tethered to a satellite terminal drawing gigabytes of data in entertainment and tracking? Or will this be left almost wholly to terrestrial networks with satellite purely used for navigation and backup? The most likely future is one somewhere in between.

Why Satellite

The M2M and IoT via Satellite market has continued to find niche markets despite apparent inefficiencies in the architecture or generally being not as cost-competitive as terrestrial. With that said, M2M and IoT via satellite continues to quietly grow and flourish. It is worth examining these reasons, as not only is it fundamental to growth of the sector, but it is the very specific advantages of satellite based M2M that is key to the sector's growth – a sector where over 90% of connections are over terrestrial networks, and likely to remain so for the foreseeable future.

In spite of some challenges, satellite-based M2M can count several strengths for its service offering. For customers of M2M services in Asia, the value derived from real-time data on their assets, whatever those may be, anywhere at anytime without coverage gaps is simply enormous, across all applications. This provides justification to pay the higher costs associated with satellite-based connections over terrestrial networks, which itself charge orders of magnitude more for M2M data than they do for the same data which is sold as consumer broadband or smartphone data plans. The cost of losing connectivity to a military vehicle, or a Oil &

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Gas safety tracking system is too great to risk a wireless terrestrial system – so a satellite or fibre based system, despite the cost, is in fact the most cost effective solution for the business.

Worldwide coverage such that every corner of the large Asian geographic footprint is clearly the main driver of the satellite based M2M connections, however what is interesting is that many applications also lie within terrestrial footprints – and often do so for 100% of the time where the terminal is located, indicating a number of strong reasons for a satellite preference beyond simply “it’s the only option because there is no terrestrial networks”.

For mission-critical transportation and military sectors in particular as well as the energy, usage on a single satellite platform has advantages compared to a patchwork of terrestrial networks, with reduced points of failure, and less complications when roaming across multiple sub-regions and various countries across Asia. Although this is slowly beginning to change with a number of cellular M2M alliances formed to create a single platform worldwide without any technical issues whilst roaming and to reduce the cost when roaming onto non-home networks, progress has been slow. Overall, for the foreseeable future, satellite has the advantage here.

This is not to mention that satellite based M2M services in general have higher levels of reliability and consistency compared to their terrestrial counterpart, and battery life of terminals sees significant improvement to typical GSM or CDMA terminals.

The Asian Market

With all of the strengths propelling growth for satellite based M2M services, Asia-Pacific has proven to be no exception, and rather has been a key driver. NSR is forecasting M2M/IoT via Satellite to reach almost 1 million units in the APAC region alone by 2023, up from just under 400,000 units in 2013. Corresponding revenues are likewise expected to increase from \$100 million to \$300 million by 2023. This represents the fastest growth of any region, and consists of the largest amount of in-service terminals outside of North America. In many sub-regions in Asia, terrestrial networks are less likely to be able to support the high SLA requirements which are mandatory for many users, and this is driving a push to satellite networks. The vast majority of this traffic is driven over L-band networks, due to lower cost and low bandwidth requirements.

The largest driver of this is coming from the transportation sector – in-cab units, trucks and vehicle rental. The most common use cases in these verticals are fuel management, dispatch optimisation, emergency response and asset tracking. A strong economic area and increased trade both to and from Asia is expected to continue to drive both increasing revenues and terminal numbers.

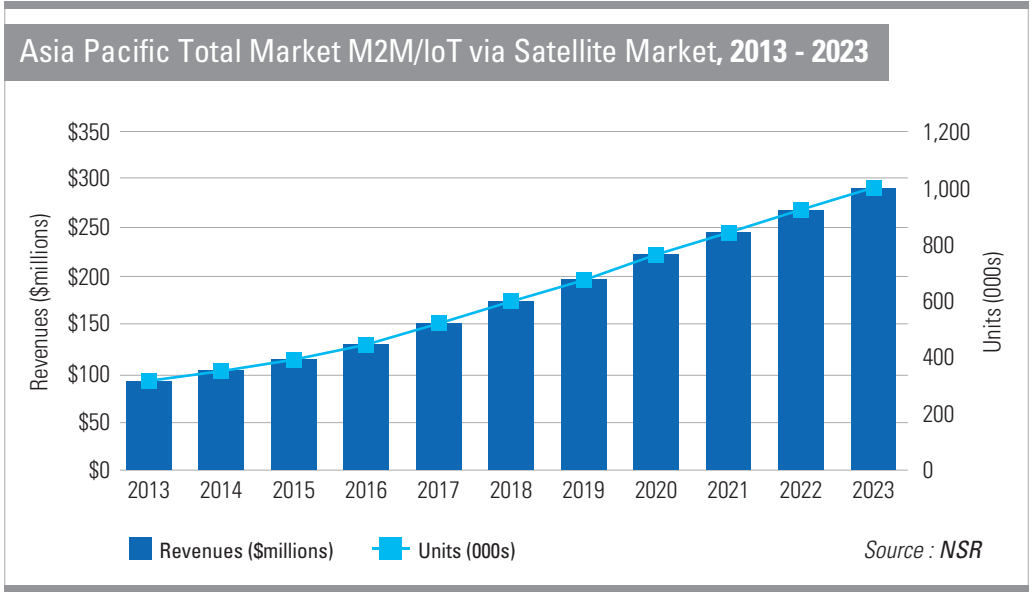
Growth in energy requirements in Asia, especially in China, are expected to increase their share of oil and gas production to keep energy costs under control. With energy prices fluctuating and China and other Asian countries having some of the largest known deposits for shale in the world, Asia could become a lucrative region depending on geopolitical factors.

In the Utilities sector, automation levels are increasing, and this is compounded by population growth producing the largest growth rates for the market, which again is driven primarily by China.

For new industries such as green energy, much of the new development and investment is in Asia, with invest-

ment having increased by 80% throughout 2013 for example. So much has this investment increased, that China now single-handedly invests more than the whole European region, which will flow through to M2M connected facilities. In Central and Southeast Asia, there are higher rates of natural disasters than average, and emergency response teams are being increasingly reliant on handheld devices. When natural disaster strikes, terrestrial networks can be non-functional, with satellite devices being the only connection form available.

With all of these varied applications, and with up and coming major applications such as the connected car, it is clear that in Asia, and indeed worldwide, that the momentum of M2M via Satellite is not only continuing, but growing at an every faster rate.

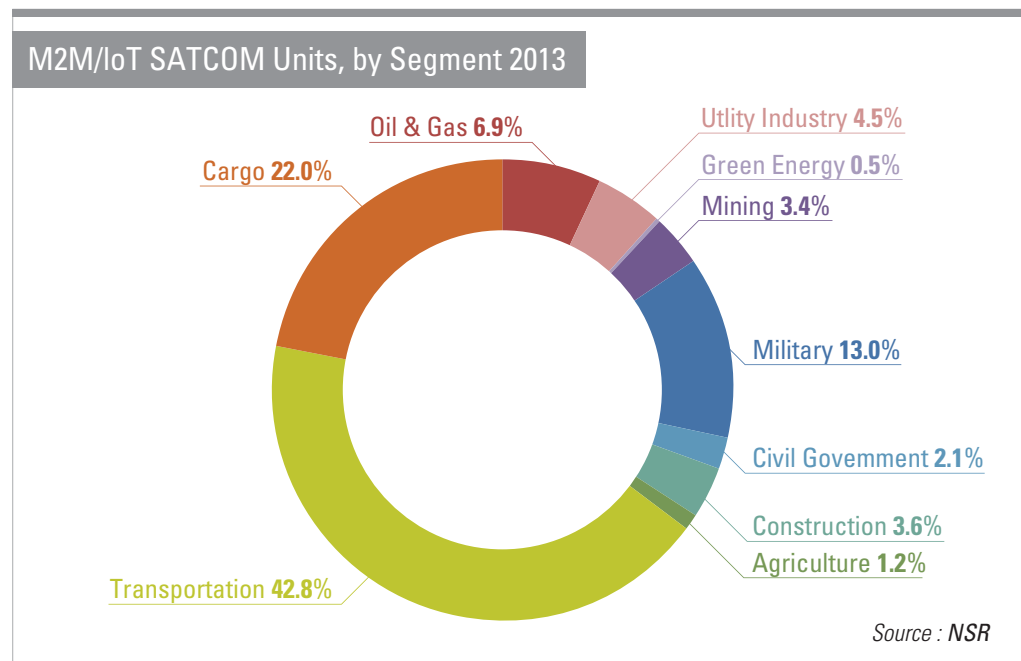


The Road Ahead

Despite this growth, the M2M/IoT via Satellite ecosystem continues to remain fairly fixed in its ways. However, this is surely, but very slowly, beginning to change. Low data rates are set to continue to be the industry norm, and for many applications there is hardly any push for reduced latency, with over 15 minutes being no problem for many use cases, for instance. While many in the industry, and justifiably so, are developing faster and faster networks with ever lower latency, low bitrate throughput is a trend which Airbus Defence & Space is betting on. By partnering with low-cost and very low data rate terrestrial M2M network Sigfox for its recently announced Mustang constellation, ADS will be capitalising on this low bandwidth but high margin space. With bitrates however under 1kbps typical on the Sigfox network, it is clear that there is no rush to move to broadband networks any time soon.


On the other end of the spectrum, automated CCTV systems in remote areas, live telemetry of engine data and the future of the connected car are examples of where high bandwidth capacity is mandatory for effective usage.

However, for the buzz surrounding the connected car, much of the heavy lifting of this data will inevitably be taken by terrestrial networks. Nevertheless, with the connected car holding huge promise for the future, even a small proportion of vehicles will be a boon for the M2M industry. It is not at all difficult to visualise either scenario becoming increasingly common where many devices utilise terrestrial for the majority of its connectivity needs, but also requires some amount of satellite capacity to complete their network.



With competition heating up in the terrestrial sector, this pricing will switch from the current 'value-based pricing' to 'cost-based pricing' representing a sharp reduction in costs. Nevertheless, due to the underlying strengths of satellite based M2M networks, this reduction in terrestrial pricing is not likely to impact satellite M2M pricing substantially. Satellite operators can rest assured that a 'race to the bottom' is not likely to occur, and instead will be focusing on their strengths, even as a percentage of all M2M connections, satellite will be reduced as the ever increasing numbers consumer based Internet of Things devices come online. Satellite M2M operators are expected to focus on these core strengths in the future, to further differentiate themselves from the perpetually lower costs of terrestrial networks, focusing instead on reliability and global coverage.

Bottom Line

Bottom line, the M2M and IoT via satellite market is expected to see sustained growth globally over a number of applications, in particular the transportation and cargo sectors, which together should see increased revenues from \$387 million in 2013 to \$1.1 billion to 2023 globally, with the share of revenues from Asia increasing from 8% to 12% in 2023. Far from being a declining industry, a heightened level of mergers and acquisitions over the last couple of years will continue, led by a string up acquisitions by Orbcomm to increase its level of vertical integration in the M2M space, and the entrance of new constellations specifically for M2M/IoT connections will mean that the M2M via Satellite economy will have many of its best days ahead. 



Alan Crisp joined NSR in 2014, following a Hong Kong based engineering role at Aurecon. As a member of NSR's Fixed Satellite Services (FSS) group, Crisp's areas comprise of M2M and IoT communications - including the satellite and terrestrial M2M landscapes. He obtained a Bachelor's Degree with Honours in Engineering (Civil & Structural) from the University of Adelaide, Australia.

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SATELLITE INDUSTRY NEWS

BT Delivers BBC's Asian TV Feed and Radio Services on AsiaSat 5

May 5, 2015 - AsiaSat has reached an agreement with BT to deliver BBC World Service Asia feed of 33 radio channels in 21 languages. These services are being distributed in C-band on AsiaSat 5 from the orbital location of 100.5 E to BBC's short and medium-wave transmitter sites, as well as to FM partners and rebroadcasters in Asia and Australasia. The services which are tailored to the region constitute an essential part of BBC's global distribution service. With AsiaSat 5, the BBC services are reaching an ever-growing audience in Asia.

Hughes Announces First Ever Combined Portable/Mobile BGAN Terminal for Inmarsat's BGAN Service

May 5, 2015 - Hughes Network Systems, LLC announced the first ever portable BGAN terminal, the Hughes 9211-HDR, that instantly supports comms-on-the-move applications by docking to an active tracking antenna mounted to your vehicle. The Hughes 9211-HDR combined portable/mobile satellite terminal can easily dock with a Class 10 or Class 11 mobile antenna to support BGAN communications on-the-move. It can connect at background IP speeds of up to 400+ kbps in both transmit and receive, while being used as a portable or on-the-move application. The Hughes 9211-HDR with a dockable mobile accessory antenna is ideal for media, Government agencies, emergency responders, and remote and mobile workers who require reliable, high-speed connectivity in both portable and mobile environments.

Eutelsat Broadband Improves its Businesses Satellite Broadband Services

May 5, 2015 - Eutelsat Broadband announced a new improved range of tooway Business satellite broadband services designed to meet the needs of SOHO, SMB and large corpo-

rates located across Europe, North Africa and large parts of the Middle East. The new services, which will replace the current KA-SAT Access business offering, are faster, more flexible and packed with additional support features to benefit business customers. tooway Business offers broadband packages with a wide range of data allowances up to 200GB a month and a host of flexible B2B features including Public IP addresses, Business Hour Protection and a full array of customisable options including guaranteed bandwidth speeds. tooway Business is ideal for organisations based in locations where fixed line services are slow or unavailable and for businesses that need an alternative to fixed line broadband for critical applications such as disaster recovery or back-up. tooway Business is available today via Eutelsat Broadband's range of authorised distributors across Europe, North Africa and the Middle East.

SES Partners with I DO IT Co., LTD., to Showcase the SelfSat>IP Antenna

May 6, 2015 - SES is showcasing the first commercially manufactured Ku-band flat antenna with integrated IP-LNB at its annual Industry Days. The antenna is produced by Korean manufacturer I DO IT Co., LTD., and will soon be available in major European markets. Its small size of 566x300mm means that this new antenna can be discreetly installed where standard parabolic antenna may not be suitable, such as apartment blocks in cities. Versions with an integrated WiFi router are also available for the camping market. The SELF SAT>IP antenna is compliant with the SAT>IP communications protocol and incorporates eight satellite tuners. It enables the distribution of live HD and UHD satellite broadcasting through an in-home WiFi network and can serve up to eight different displays (smartphone, TV, table PC, laptop computer, etc.) simultaneously. With two legacy coaxial outputs in addition to its IP output, the antenna can also be connected to existing satellite receivers.

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ViaSat and AYESAS Enter into Cooperation for Tactical Data Link Technologies and Services

May 7, 2015 - Aydin Yazilim ve Elektronik San. A.S. (AYESAS) of Turkey and ViaSat Inc. signed a Memorandum of Understanding (MOU) to cover exploration of and cooperation in identifying Tactical Data Link (TDL) products and services opportunities in Turkey and other international markets. The MOU areas of focus include manufacturing of components, software and hardware development and testing, and maintenance and repair services. AYESAS is a Tactical Data Link software supplier to the Turkish Armed Forces for ATDL-1, Link-1, Link-11/B and Link 16 requirements as well as an advanced electronics and electro-mechanical assembly supplier for major global aerospace and defense companies. AYESAS is recognized globally for its ability to offer great flexibility, cost efficiency, accuracy and innovation power along the entire value chain of tactical data link solutions.

Kratos Awarded Satellite Ground System Contracts to Support Thaicom 8 Satellite

May 8, 2015 - Kratos Defense & Security Solutions, Inc. announced that Thaicom Public Company Limited (Thaicom) awarded Kratos Integral Systems International (Kratos ISI) contracts for a Satellite Control Center (SCC) and a Tracking, Telemetry and Command (TT&C) Station. Both will support the new Thaicom 8 satellite. The projects, which are direct contracts with Thaicom, were awarded to Kratos under two separate procurements. Scheduled for a first half 2016 launch, Thaicom 8 will have a total of 24 Ku-band transponders covering Thailand, South Asia and Africa and will serve customers' needs for increased Ku-band capacity. Thaicom 8 is a GeoStar2 telecommunications satellite built by Orbital ATK. This will be the 16th Orbital ATK GeoStar satellite that Kratos ISI has supported. Kratos ISI will deliver a complete satellite control system for Thaicom 8 based on Kratos' EPOCH® command and control and OASYS® flight dynamics solutions, which are the flagship products of the EPOCH IPSTM Integrated Product Suite. EPOCH IPS is an all-in-one satellite fleet management system with the ability to simultaneously control multiple satellites from different manufacturers from a single consolidated system.

ESA and Airbus Defence and Space Signed Contract for Europe's Copernicus Programme

May 11, 2015 - ESA and Airbus Defence and Space signed a €177 million contract to develop the Jason-CS / Sentinel-6A satellite mission for Europe's Copernicus programme. The mission will use a radar altimeter to observe changes in sea-surface topography with centimetre precision, providing insights into global sea levels, the speed and direction of ocean currents and ocean heat storage. These continuous measurements are vital for modelling the oceans and predicting rises in sea levels. With the signing of today's contract, the satellite is foreseen to be launched in 2020. Jason-CS / Sentinel-6 will ensure the continuation of ocean surface topography measurements from its Jason-3 predecessor, planned for launch this summer. The satellite will also carry on measurements from the CryoSat satellite, which has been in orbit since 2010, and the Sentinel-3 mission. The contract includes an option for a sister satellite, Sentinel-6B. This can be activated later this year after the completion of the programme subscription at Eumetsat, one of the programme partners.

TSGN Collaborates with APT on Communication Satellite Project

May 12, 2015 - APT Satellite Company and TS Global Network (TSGN), a privately-owned Malaysian company, announced TSGN's investment in a designated payload on APT's Apstar 9 Satellite to be launched in Q4 2015. The designated payload will also be known as TSGN MySAT-1. The satellite payload will propel privately-owned TSGN's growth trajectory and ambitions to play a leading regional role in delivering reliable, high speed and affordable SATCOM communications and solutions to a wide spectrum of government and commercial customers. It will also play a pivotal role in bridging the digital divide by offering similar services to the underserved and un-served areas in Malaysia and the region in general. Targeting the ASEAN and Asia Pacific markets, TSGN aims to build on a strategic business model based on smart collaborations successfully built to date in Brunei and Indonesia to gain rapid access to serve its target markets via MySAT-1. 

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- 3 **CommunicAsia 2015 Satellite Summit** • Singapore • www.communicasia.com/conference/conference-programme/#day2-satelliteindustry
- 6 **Milsatcom 2015** • London, U.K. • <http://conferences.theiet.org/milsatcoms/>
- 17-19 **Convergence Africa World 2015** • Nairobi, Kenya • www.convergenceafricaworld.com
- 28-29 **ICSSC 2015 International Conference on Satellite and Space Communications** • London, U.K. • www.waset.org/conference/2015/06/london/ICSSC

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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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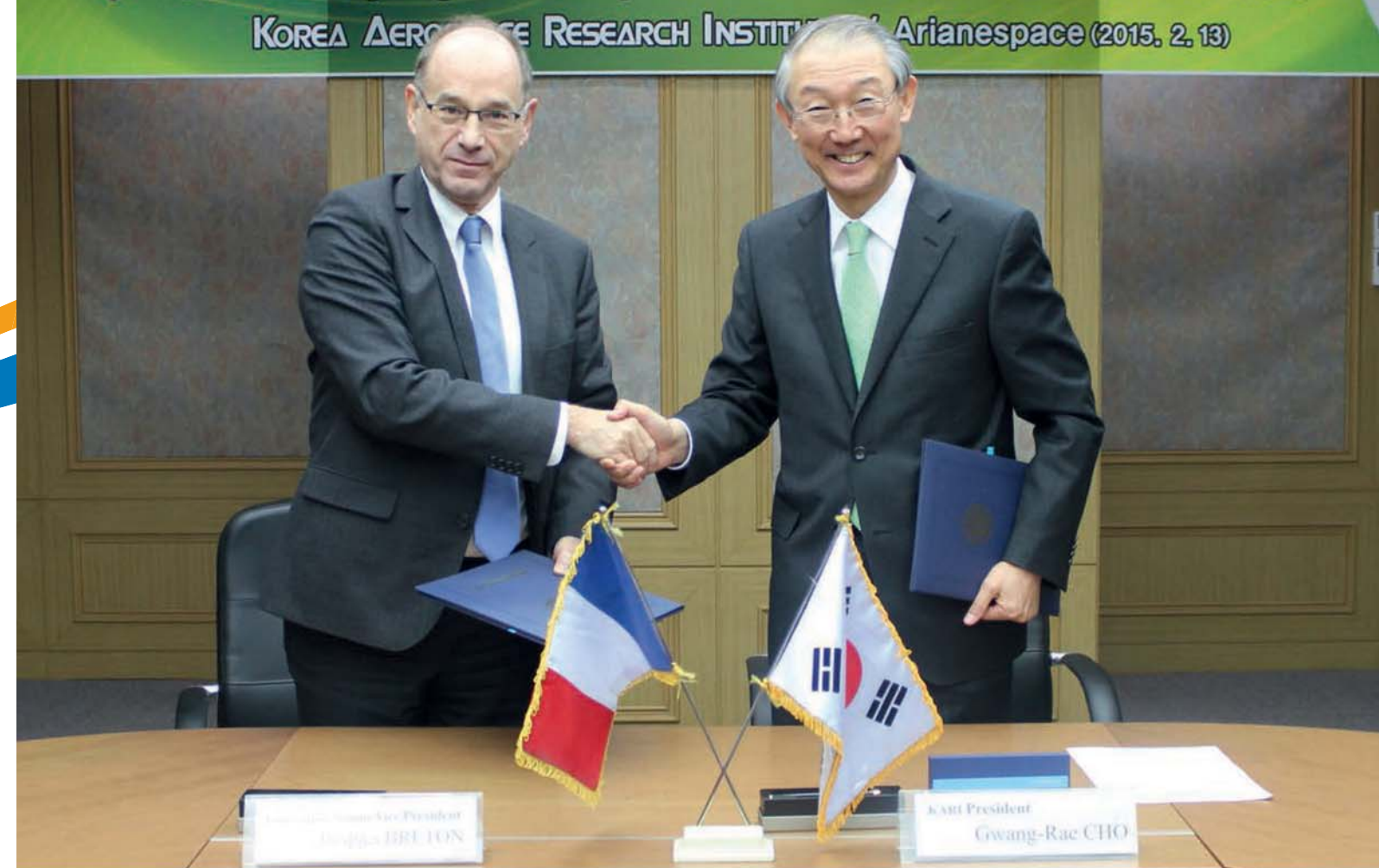
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정지궤도복합위성 발사용역 계약 조인식

Contract Signing Ceremony for GEO-KOMPSAT-2 Launch Services

Korea Aerospace Research Institute & Arianespace (2015. 2. 13)



LAUNCH SMART

The Korea Aerospace Research Institute has selected Arianespace to launch GEO-KOMPSAT 2A and 2B on Ariane 5 in 2018 and 2019 from the Spaceport. Built by KARI in Daejeon, South Korea, GK-2A will perform meteorological and space weather monitoring while GK-2B will provide ocean and Earth environmental observation services. Nations the world over know to launch smart.

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