

***Guest column: High Throughput Satellites (HTS) are pushing open the satellite market door***

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Anyone in the satellite industry more than six months has probably heard of Ka-band satellites. Anyone (like most of us) who has been in the industry a bit longer knows that the benefits and advantages of Ka-band spotbeam satellites have been endlessly discussed in conferences, meetings, and an uncountable number of other industry events for well over a decade. Most often cited, to the point that it has essentially become an industry mantra, is that Ka-band satellites can dramatically lower the cost per bit of delivering a satellite service. This has developed along the lines of other mantras in our industry like “satellites can deliver services anywhere” and “satellites are the single best technology for point-to-multipoint content delivery”.

NSR does not dispute these claims, nor does it ignore the fact that most in our industry know that Ka-band satellites are in fact here and active in the market. One needs only to point out the Ka-band spotbeam payload on Anik-F2 or the WildBlue-1 and Spaceway-3 satellites. The majority also know that new satellites with even greater throughput are on their way including ViaSat-1 and KaSat. However, while NSR accepts that most in the satellite sector are cognizant that these new satellites are finally here and part of the market, NSR would contend that only a small minority have truly grasped the long-term significance of these satellites and how they have the potential to change every aspect of the market. Just as the move from C-band to Ku-band in the 1980s brought profound (and many unforeseen) shifts in the satellite market, so too will these “high throughput satellites”.

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Before moving on, it is important to define what NSR considers to be a “high throughput satellite” or “HTS”. NSR recognizes that most such satellites will use Ka-band frequencies, but in reality this is not a defining criterion. The Thaicom-4 satellite uses Ku-band frequencies on the user terminal side of their service, and this satellite, with about 45 Gbps of throughput and currently the most throughput by far of any single satellite on orbit, certainly qualifies as an HTS.

Further, other frequencies in the future could be used. At the recently Satellite 2009 conference, ViaSat’s Mark Dankberg



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speculated that the first V-band HTS could be launched as soon as five years from now. Spot beams are certainly an important element of creating an HTS as well as frequency reuse. However, spot beams have long been used on classic FSS satellites and frequency reuse, again in the FSS world, is a familiar concept (think transponder polarization). To qualify as a high throughput satellite (or payload such as the case of Anik-F2), NSR sets the minimum requirement as having at least twice, though usually many times more, the total throughput as a classic FSS satellite for the same amount of allocated orbital spectrum.

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People familiar with our industry would typically say that HTS are for satellite broadband Internet access services like HughesNet or WildBlue. At a stretch, some will also recall that they are being used for local-into-local TV broadcasting (a la DIRECTV). Many would claim that these are relatively specialized uses, and NSR would certainly agree that the driving market that has always been associated with high throughput satellites is what we term single site satellite broadband Internet access services such as the above noted HughesNet and WildBlue examples. Further, those who did think of DIRECTV would normally be quick to point out that local-into-local broadcasting is a uniquely U.S. phenomena driven by regulatory issues and, therefore, specific only to this market and not likely to occur elsewhere in the world.

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It is certainly likely that in instances where satellite operators are considering launching an HTS, the key underlying market will be some kind of consumer satellite broadband service. However, when developing a business plan for any new satellite, the goal is to usually fill up the satellite as fast as possible with profitable clients. Single site satellite broadband services can go a long way to meeting that goal, but there is no reason to stop at this market. Hughes originally developed the Spaceway satellites for the enterprise VSAT market. When HughesNet consumer class services took off in North America, the business plan for Spaceway was changed to reflect this market development. Yet, Hughes has certainly not forgotten the enterprise VSAT market and is already working hard to develop it in parallel to the consumer-class single site satellite broadband Internet access market. In the case of Yahsat, few would expect that consumer-class broadband subscribers in the Middle East and Africa would be sufficient to justify the YahClick project. Yahsat understands this as well, which is why one of its key targets will be various types of business-class Internet access and VSAT services targeting both commercial

enterprises as well as governments that may be considering social inclusion or educational VSAT networking projects in the Middle East and Africa.

Opening the door even wider, HTS could also have interesting (and potentially dramatic) impact in the broadcasting sector, which is often justifiably considered the core of the classic FSS market. As a first instance, consider classic occasional use and satellite news gathering (SNG) services. Little more than a fixed or mobile VSAT terminal specialized for the broadcast of video content, OUTV and SNG services could readily and easily be implemented over an HTS in parallel to consumer single site satellite broadband Internet access services, especially when one moves to the larger classes of HTS that have many tens, if not over 100, Gbps of total throughput.

The benefits of moving the OUTV and SNG services to HTS are several. First, the cost of offering an OUTV or SNG service on a HTS is lower than using classic FSS capacity. So, a lower price (say half that compared to using typical FSS capacity) could be charged to the end client for OUTV/SNG services, while at the same time higher margins are possible because the cost of capacity to the satellite operator on an HTS may be 10% of that on an equivalent FSS satellite. Second, if the OUTV/SNG client has been using capacity on a key video broadcasting satellite that carries a high proportion of broadcasting clients for DTH, cable headend, or free-to-air distribution, this frees up valuable capacity on the FSS satellite to be resold to these high value, long term broadcasting clients. Third, HTS satellites are typically designed with an asymmetry of use in mind with higher total capacity on the forward link (satellite to end user) than the return link (end user to satellite). A judicious targeting of clients that value the high return link throughput, such as OUTV and SNG, can help a satellite operator better balance the loading of HTS in order to optimize its usage.

Pushing the door open even further, HTS in certain instances can be very competitive with FSS satellites when it comes to the classic broadcasting markets and, again, make even more profit for a satellite operator if used intelligently. In the case where a country or region is entirely covered by just one, two or three spot beams on an HTS, the possibility of using these beams for purely broadcasting services can become very persuasive compared to using more classic FSS capacity. In the instance of South Korea,

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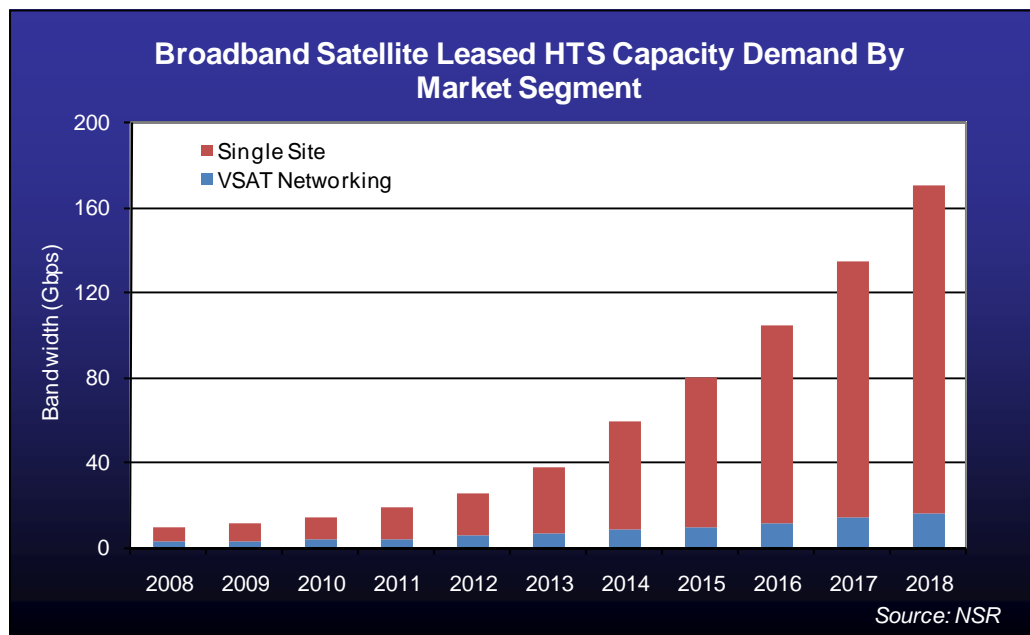
which is covered by just one beam from the Thaicom-4 satellite, or countries like Ireland, Bulgaria, Switzerland or Albania that will be covered by two or three beams on the future Ka-Sat, a satellite operator can begin to consider offering very cost effective IPTV, DTH or video distribution service over these relatively small markets. Again, margins can be much higher compared to using equivalent FSS capacity, and the FSS capacity that is not used for such a small market can be effectively repurposed to geographically larger markets (e.g. Poland, Germany, France, Ukraine) where the FSS satellite truly does offer a cost advantage over the HTS because of the wider area covered by its footprint.

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Going a step farther, as HTS become more popular and audiences begin to build up, one can even imagine “micro-broadcasting” scenarios where very specific and localized content can be provided to city-sized or region/department sized markets. Again, it is not a very big step for a company like Orange offering IPTV services in France via both DSL and satellite to be able to offer major cities or specific French departments the ability to offer TV channels to very targeted audiences. The city of Paris could easily afford the few thousand Euros a month it would cost to deliver one SD channel over the Ile de France just as local cable companies in the USA used to offer spare (and at the time unused) capacity on cable networks at low cost to community channels. Many of these community channels have disappeared in North America as cable companies have recuperated the valuable capacity on their networks for digital and HD programming as well as broadband services, but the demand for truly local content has not gone away in any market in the world. The fact that community channels were so popular despite their poor, even laughable, production quality shows just how much potential there is in the micro-broadcasting market once a means to cost effectively tap demand is available.

The above paragraphs illustrate just a few of the initial ideas of how “high throughout satellites” have the potential to create a paradigm shift within the satellite industry. Just as the move to Ku-band led to enormous new markets in the 1980s, the gradual introduction of HTS has the potential to profoundly reshape the satellite market in the coming decade. In preparation for these developments, NSR has begun the process of segmenting out and forecasting demand trends between classic FSS C-band and Ku-band services and those satellite applications that will use HTS capacity. The initial effort in this area is NSR’s recently release *Broadband Satellite Markets, 8<sup>th</sup> Edition* study that for the first time (to the knowledge of

NSR of any publically available forecast study for the satellite industry) makes this kind of segmentation. The chart below illustrates NSR's global prediction for lease of commercially provided "high throughput satellite" capacity within the broadband satellite markets through 2018. An almost twenty times increase in leased commercial HTS capacity is forecasted with single site satellite broadband services driving the market demand, but broadband VSAT networking services for corporate and governmental clients is an important secondary market.



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In future editions of NSR studies, most notably the next edition of the *Global Assessment of Satellite Demand* report, NSR will apply the segmentation of demand trends between classic FSS satellites and the new class of HTS a step further and apply it to all commercial satellite applications for forecasting purposes.

It is true that the industry is in the early days of adoption of "high throughput satellites" and future trends, just as they were for Ku-band services in the early 1980s, are still crystallizing. The general lines of the market development can be seen, but it is likely that some unsuspected applications and uses are just waiting in the shadows and will only become evident as the industry moves forward with the launch of ever greater numbers of HTS. At times in the coming years the market development for high throughput satellites will be challenging, and there will be some failures (how



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many remember the original business plan for Satellite Business System, the first company to offer commercial Ku-band services?), but if there is one thing that NSR believes, it is that “high throughput satellites” will force the industry to move beyond its basic mantras and completely re-examine how it serves its clients. In some cases this may lead to seeming competition between FSS and HTS satellites (especially when it is two different operators going after the same client), but in more cases than not it will mean offering the best technology to serve the client and expanding the overall market base by opening the door to many new business opportunities that will now be within the grasp of the industry.

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