

# Meeting the Challenges of IPTV via Satellite

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Communications service providers in countries around the globe are focusing these days on a rapidly emerging technology: IPTV. For traditional telephone carriers, IPTV represents a means to change their business model at a time when wireline subscriber numbers are dropping and mobile subscriptions are reaching saturation in many markets. Through IPTV initiatives in Asia, Europe and North America, Telco's are seeking to leapfrog cable and satellite TV providers with a bundled offering consisting of voice, super-high-speed broadband Internet and hundreds of channels of video with high levels of interactivity over xDSL or fiber to the home.

For broadcasters, IPTV represents a new distribution market and revenue stream for content that already exists. It is also an exciting potential distribution outlet for new forms of interactive programming that exploit the unique capabilities of IPTV.

## Not Internet Over Television

IPTV is sometimes confused with streaming television broadcast content over the Internet, also known as Internet TV. But that is an entirely different market segment, where an increasing number of broadcasters are providing extra content and past episodes to viewers through IP streaming from their Web sites. It is also a vibrant market for content piracy.

True IPTV preserves the "walled garden" of traditional television by delivering services over independent, carrier-owned infrastructure instead of the public



**Figure 1.** A Globecom technician checks HD-ready MPEG-4 encoders at the IP-PRIME Super Headend.

Internet. Properly implemented, IPTV is actually more resistant to content piracy than other delivery methods. Because the viewer's set-top box communicates interactively with the Telco's origination system, the content owner knows exactly where the content is going, whether it is a one-way broadcast or video on demand.

### Four Challenges to IPTV Success

In a recent study on IPTV, consulting firm Accenture noted that Telco's face four challenges as they target its commercial potential. The challenges are: (1) to create a clear offering that customers will buy and keep; (2) to make the technology work; (3) to successfully handle the organizational and back-office requirements; and (4) to offer consumers content they want. These are challenges that broadcast, cable and satellite channels have dealt with since their early days, but they are foreign to the telephony business. Nonetheless, large carriers around the world are investing billions in IPTV infrastructure development, programming rights and marketing.

In Hong Kong, PCCW announced in November 2005 that its NOW IPTV service had reached the half-million-subscriber mark, making it the first IPTV platform in the world to achieve this scale. In April, the company announced that a wholly-owned subsidiary had just completed construction of an IPTV system for Thailand's True Digital Entertainment Company, while in May, PCCW announced an alliance with STAR TV to explore IPTV opportunities in overseas markets.

IPTV has gotten off to a slower start on the Chinese mainland, due to outdated legacy infrastructure and the slow issuance of licenses for trials. But market research company In-Status estimates that the nation, which ended 2005 with no more than 100,000 IPTV subscribers, will have 340,000 by the end of 2006 and as many as 18.2 million by 2010. The two incumbent carriers, China Netcom and China Telecom, are the leaders in service trials to date.

In Taiwan, Chunghwa Telecom launched IPTV trials with 20,000 ADSL subscribers in 2001. Today, the company is one of the world's largest IPTV providers, with 120,000 subscribers among its more than 4 million broadband customers. Among its more successful offerings is Karaoke on Demand, which attracted 50,000 subscribers in its first three months.

### Urban Versus Rural

Asian IPTV success stories tend to have two factors in common. The first is that many Asian nations and communities – South Korea, Japan, and Hong Kong – are world leaders in broadband deployment. This creates an IPTV-ready distribution system. The second is that IPTV rollout is occurring in Tier 1 urban markets, where population density creates an attractive business case for carriers. The mega-cities of many Asian nations will provide ample scope for growth for many years to come.

More challenging to carriers are the Tier 2 and Tier 3 markets where subscriber density is lower. Carriers serving these markets must spread the cost of deployment across fewer subscribers and invest more per subscriber to provide the necessary broadband connectivity.

For these reasons, satellite is emerging as the distribution method of choice in the world's Tier 2 and Tier 3 markets. Satellite carriers have introduced offerings modeled on the successful cable TV distribution system, in which an origination facility delivers a multiplexed package of channels via satellite to cable head-ends for local distribution.

Two global satellite carriers – SES AMERICOM and Intelsat – are currently leading the way. SES AMERICOM has created a service called IP-PRIME, while Intelsat has just announced a competing service called Ampage. Both are being launched in the US market. In the near term, they represent new opportunities for Asia-Pacific broadcasters to market channels to immigrant populations in the USA. Longer-term, both companies plan to expand internationally. SES AMERICOM executive Bryan McGuirk recently told an audience at NAB 2006 that if his company were not entering a non-US market a year from now, he would count it a significant setback. International expansion of satellite-delivered IPTV will open much larger opportunities for program distribution deals.

One unique aspect of IPTV deserves mention here. While a cable network transmits all channels to each user, an IPTV network operates interactively and transmits only the channels the viewer is actually watching. The number of channels that can be offered on a traditional cable network is limited by the amount of spectrum allotted on its hybrid fiber-coax distribution system. But the number of channels on an IPTV network is effectively unlimited. Thus, IPTV represents a paradigm shift in the ability to target programming to niche audiences that cannot be economically addressed today.

### Meeting the IPTV Challenge in Tier 2 and 3 Markets

How will a satellite-based service help Tier 2 and 3 carriers meet the IPTV challenge? A close look at one of the services makes it clear.

SES AMERICOM announced its IP-PRIME service in September 2005. The service launch was quickly followed by the announcement of marketing agreements with the National Rural Telecommunications Cooperative (NRTC) and the National Telecommunications Cooperative Association. These nonprofit organizations have more than 1,000 small to midsize Telcos as members, and they are aggressively marketing the IP-PRIME service. NRTC in particular has a track record of success. It was a major early investor in DirecTV and its member marketing has been instrumental in the success of that American DTH service.

Delivering on the vision has required SES to learn new skills. It has worked with third parties to license programming

for IPTV delivery, with a target of providing a bouquet of 200 channels, including rebroadcast of local stations in markets around the USA. As if this were not enough, the company also had to break new ground in systems development by creating a satellite-based IPTV program acquisition and distribution system. Called a Super Headend (SHE), the facility ingests content provided by fiber, satellite and tape, and then manages, encodes, schedules and encrypts it for distribution, all with a high degree of automation.

### Broadcast and IP Network Experience

To meet the challenge, SES AMERICOM selected Globecom Systems of Hauppauge, New York, USA to design and integrate the SHE. Much of the world's television and radio programming already moves through digital transmission systems and studios built by Globecom. The company has developed uplink, program acquisition and digital video broadcast systems for such well-known names as DirecTV, CBS, ASkyB, Fox, STAR TV, PCCW, Shinawatra, TVBjERA, and Israel DBS.

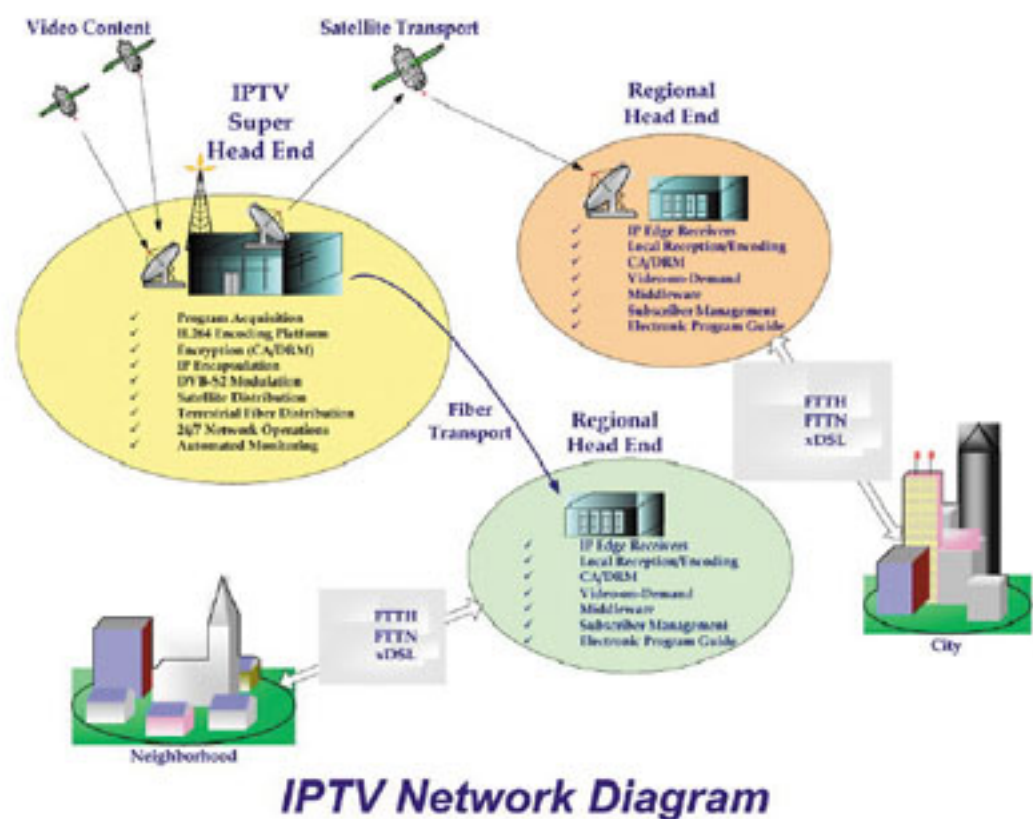


Figure 2. Configuration of a typical SkyBorne satellite-based IPTV distribution network from Globecom

In the past decade, Globecomm has also developed a specialty in engineering and operating next-generation IP networks that involve "a little bit of satellite." In theory, next-generation networks offer high performance with less complexity at a lower cost. But achieving these goals can be challenging, because most of today's network devices, particularly for broadcast video, were designed before IP became

a dominant standard. Satellite links themselves can offer an inherent challenge to IP, because the time that signals take to reach the satellite and return is longer than IP was originally designed for. Unless the network is conditioned to handle these challenges, performance can suffer and costly bandwidth can be wasted. In developing networks for a broad range of applications (from military comm-on-the-move to video distribution) Globecomm has built expertise in managing the many protocol translations and "tweaking" the network interfaces for maximum throughput.

SES AMERICOM also selected Scientific-Atlanta to supply the MPEG-4 encoding system for the network and its ROSA Network Management System to run it.

### Designing for the Future

With a new broadcast center serving a completely new market, the one certainty is change. The facility had to be engineered to acquire content from multiple sources. It needed a stable and robust technology platform that could be adapted and scaled as needed. And, it all had to meet the high availability and reliability criteria required by SES AMERICOM, and the quality standards that program providers and operators would expect.



Figure 3. Fixed 7m Simulsat multi-beam antenna and 4.5m motorized antenna provide content acquisition at the SES AMERICOM Super Headend.

Globecomm covered the satellite access requirements with a 7-meter Simulsat multi-beam antenna from ATCi capable of accessing up to 37 satellites within a 75 degree arc at the same time. Supplementing this was a 4.5-meter motorized antenna capable of accessing the entire domestic arc. Feeds from the antennas were directed to Low Noise Block (LNB) down-converters located in an environmentally controlled cabinet, and the resulting signals routed via Foxcom's Sat-Light L-band interfacility links to the broadcast center.

The flexible design included Integrated Receiver Decoders (IRDs) for over two hundred programs in full 1:1 redundancy, with ability to scale as needed. The design featured IRDs for standard definition (SD) analog NTSC, SD Analog NTSC with VideoCypher II, SD Digital with encryption and SD Digital DVB without encryption. The facility is HD-ready throughout. All outbound content is encoded at MPEG-4 for maximum bandwidth efficiency.

To meet SES AMERICOM's demands for extensive and instantaneous quality control, Globecomm provided an Evertz MVP Multi-Signal Monitoring Solution, which displays the video on 42" Sharp Professional LCD monitors, provides automatic monitoring of the video and audio feeds, and



Figure 4. The IP-PRIME control room at Vernon Valley, designed by Globecomm.

interfaces with SA's ROSA Network Management System.

As the systems integrator for the IP-PRIME broadcast center, Globecomm worked closely with SES personnel to define the end-to-end design, as well as on construction, hardware and software acquisition and testing, integration, documentation, training and specification of spare parts. The company also coordinated closely with Scientific-Atlanta to ensure that its systems integrated seamlessly into the Super Headend solution.

### Regional Headend

The final link in the chain is the so-called Regional Headend (RHE), which is the IPTV equivalent of the headend at the local cable TV operation. Unlike cable customers, however, local telephone companies have no familiarity with video. This means that a successful Regional Headend must come as close to plug-and-play for Telco customers as possible.

A successful RHE provides content acquisition – including local free-to-air broadcast channels – as well as content management, subscriber management,

packaging and delivery to the carrier's distribution network. It must also be the access point for revenue-generating services such as local advertising insertion, video-on-demand and other forms of interactive entertainment, such as gaming, shopping, picture-in-picture and multiple camera angles at sports events.

In February, NRTC announced the start of testing for IP-PRIME with a select group of its Telco members and predicted that its IP-PRIME offering

would become generally available in the summer of 2006. In April, Globecomm introduced its new SkyBorne RHE system, consisting of a set of pre-engineered modular "building blocks" that can be configured to a Telco customer's exact needs, at NAB 2006. Thanks to IP-PRIME, Globecom has a head start in designing and delivering IP-based MPEG-4 satellite SHEs and RHEs. But with IPTV subscriber revenues worldwide expected to top \$9.9 billion in 2009, according to the Multimedia Research Group, satellite providers and Telco customers will have plenty of technology solutions to choose from in the years ahead.

**Thomas G. Parish**, Vice President, Broadcast Technology, at Globecomm Systems, Inc. has over thirty-five years experience in troposcatter, microwave, satellite, and broadcast communication engineering. For the past ten years, Mr. Parish has focused on developing the digital broadcast capabilities of Globecomm, a global provider of systems and services that integrates satellite into network applications to provide reliable, high-quality connection to the edge of the network, broadcast one-to-many, and support bandwidth hungry applications.