Newtec

IP TRUNKING

www.newtec.eu

IP Trunking and IP Backbones over Satellite

Satellite IP Trunking networks provide local networks with access to the internet (or any other type of network) from a remote access point to the backbone. Providing IP Trunking and Backbone services to ISPs and Telecom operators requires constant scrutinizing of the operational expenses due to a highly competitive market with razor-thin margins.

The Newtec FlexACM® implementation doubles the data throughput in IP Trunking and Backbone networks over satellite at optimal service availability.

Satellite service providers, teleports and satellite operators that provide these services are faced with new and complex challenges to maintain their competitiveness, while remaining profitable. Technical solutions to deal with these challenges and to increase efficiency over satellite is more essential than ever.

Flexible business models based on DVB standards for satellite communications, delivering the best Service Level Agreements and offering Trunking services at competitive prices puts the Service Providers back in the game.

Best-of-Trade Equipment

Newtec is market leader in IP Trunking and IP Backbone networks over satellite with a track record of installations worldwide in Ku-, Ka-, C-band and on Inclined Orbit Satellites.

The Newtec hubs and modems support medium to high rate data communication (1 Mbps up to 380 Mbps) over satellite based on the DVB-S2 and S2 Extensions. Newtec equipment embeds the latest innovative technologies to fully optimize Trunking networks over satellite. Moreover, no extra or new ground infrastructure (antenna or amplifier) needs to be acquired to enable higher efficiencies.

Next to hubs and modems, Newtec also provides peripheral equipment such as redundancy switches and frequency converters to provide the Trunking and Backbone networks with extra stability and reliability.

Over the years Newtec has built an outstanding reputation for its quality and reliable satcom equipment.

> Newtec is market leader in IP Trunking with a track record of installations in Ku-, Ka-, C-band and on Inclined Orbit Satellites.

	Newtec Hub	Newtec Modems
DVB-S2 & S2 Extensions	HUB6000	MDM6000
DVB-S2	EL501	EL470 & EL478

Figure 1: Newtec equipment and modulaion coding matrix

Figure 2: Newtec HUB6000 Satellite Hub

Figure 3: Newtec MDM6000 Satellite Modem wins the 2013 Vision Award

Drive for Standards

Newtec's professional satcom equipment is based on DVB standards. Kick-started by Newtec, key players in the satellite industry have called for a new satellite transmission standard (S2 Extensions) to extend the existing DVB-S2 standard, specifically for professional satellite links.

Open standards such as DVB-S2 and S2 Extensions allow for interoperability and avoid vendor lock-in. Moreover they increase the profitability of the industry by creating an economy of scale and reducing the cost of satcom equipment.

Today S2 Extensions already provide gains up to 37% compared to DVB-S2. These gains exceed the results by proprietary systems in the market.

For Newtec DVB-S2 modems and modulators (Elevation & Azimuth) already deployed in the field, Newtec provides Clean Channel Technology™ as a software field upgrade. As such Newtec customers can immediately benefit up to 15% gain compared to DVB-S2 through implementing a lower Roll-Off factor (5/10/15%) and an advanced filtering technology.

Clean Channel Technology
by NEWTEC

S2 Extensions
by NEWTEC

Figure 4: Upcoming DVB Standard S2 Extensions Improvements
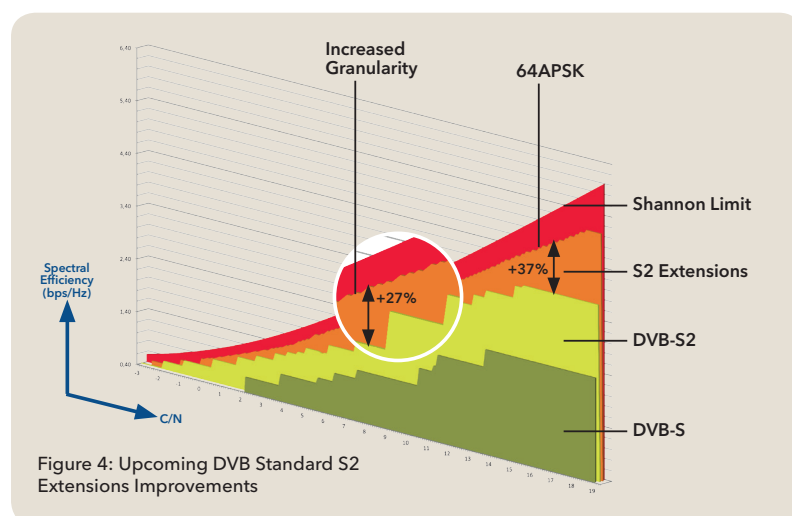
**7 Improvements in S2 Extensions**

- Smaller Roll-Offs
- Advanced Filtering of Satellite Carriers
- Increased Granularity in MODCODs
- 64APSK Support
- Linear and Non-linear MODCODs
- Better Implementation of MODCODs
- Wideband Support

End-to-End Efficiency for Trunking Networks

Efficiency is at the core of Newtec technology in Trunking and Backbone networks. Record-breaking speeds up to 506 Mbps are achieved over a Ku-band 72 MHz satellite transponder at optimal service availability.

Newtec satellite hubs or modems are installed on each side of the satellite link. Networks in Point-to-Point, Point-to-MultiPoint (star) or Multiple Point-to-Point configuration are supported through Single-Channel-per-Carrier (SCPC) or Multi-Channel-per-Carrier (MCPC) technologies. Within the same carrier different services such as data, video, voice, internet access, VoIP, WiMAX, GPRS, 3G/4G can be aggregated.

Newtec technology is based on DVB-S2 and S2 Extensions standards and combines a set of innovative technologies in order to fully optimize the Trunking and Backbone links. These technologies are FlexACM®, Cross-Layer-Optimization™, Clean Channel Technology™, Automated Equalink®, Automatic Uplink Power Control (AUPC), Bandwidth Cancellation and Wideband up to 72 Mbaud.
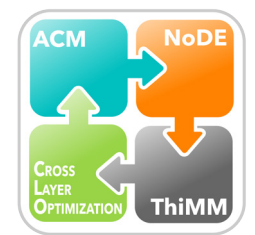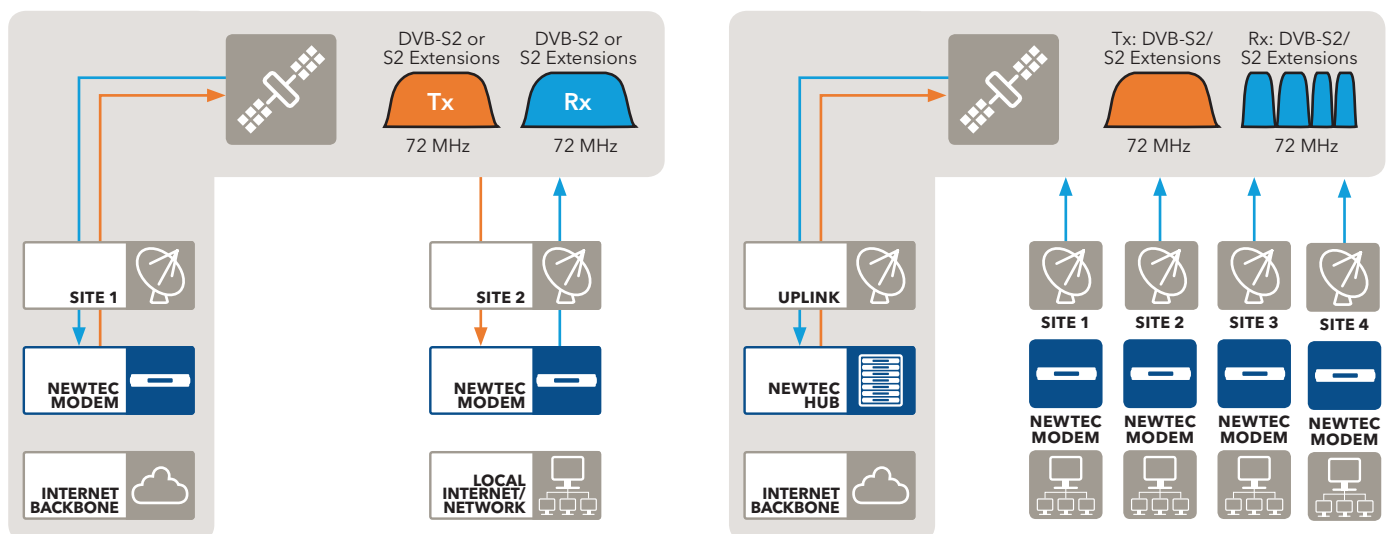
FlexACM
BE EFFICIENT. END-TO-END

Figure 5: Point-to-Point Network and Point-to-MultiPoint Network

Proven Return-on-Investment

The Trunking business is a highly competitive market with continuous pressure on pricing and profitability. The implementation of FlexACM® translates directly into new business opportunities for ISPs, Satellite Service Operators and Satellite Operators. FlexACM increases the customer base within the same bandwidth. At the same time it introduces ways to reduce OPEX costs and increase the profitability of your business. Resulting in a quick Return-on-Investment.

FlexACM combines DVB-S2 and S2 Extensions with different technologies to get as much data through the same satellite bandwidth as possible. FlexACM will auto-adaptively set modulation parameters to the optimal point and overcomes distortion, noise and variation in the satellite link. Newtec gets as close to the zero margin limit as possible allowing the full use of the satellite link.

Through FlexACM the data rates between uplink and remote sites (for both Point-to-Point and Point-to-Multipoint Networks) can be doubled in the same bandwidth without the need to acquire extra satellite capacity. As such a quick Return-on-Investment can be achieved in a matter of months.
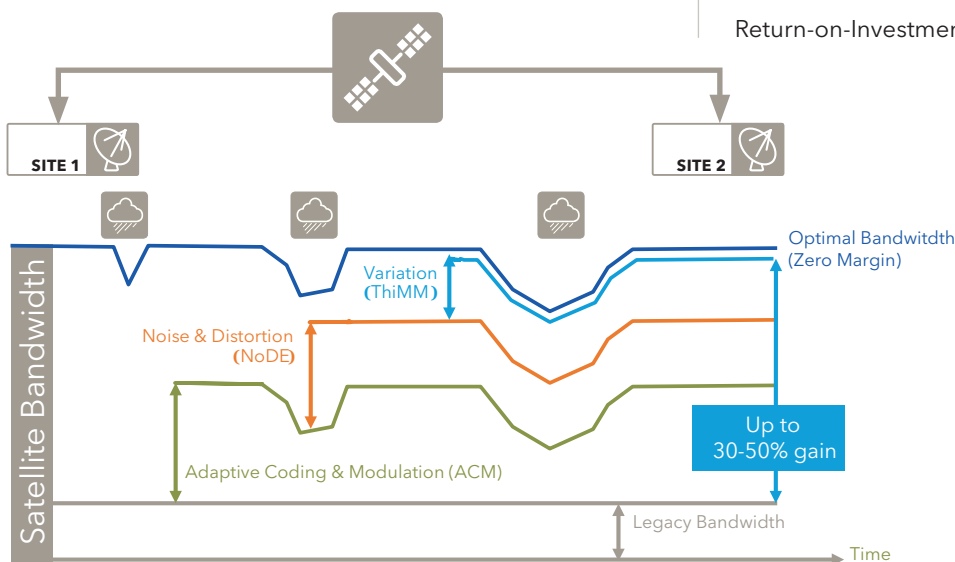

Figure 6: Double throughput with Newtec FlexACM technology results in direct business opportunities

> Newtec's FlexACM® doubles the data throughput without the need to acquire extra satellite bandwidth.

Optimal Service Availability

Communication lines over satellite need to be available at all time to exchange critical information and to keep customer satisfaction at a high level. However, fading conditions could seriously disturb the satellite transmission and lead to temporary link losses. Fading conditions could be due to different circumstances: the choice of satellite (Inclined Orbit, Ku-, Ka- and X-band), environmental (rain, dust) or interference (between two adjacent satellites).

Thanks to the auto-adaptive technology incorporated inside Newtec's FlexACM® these fading conditions will no longer interrupt the transmission between the hub and remote sites nor result in the loss of data. In fading conditions FlexACM will switch to a more robust modulation and provide optimal availability. As soon as fading conditions are over FlexACM technology automatically switches back to maximum efficiency.

Moreover service priorities (e.g. video, data, voice) and Quality-of-Service policies can be auto-adapted on-the-fly depending on the bandwidth availability through Newtec's Cross-Layer-Optimization™ technology.

> FlexACM® optimizes the throughput for fading sensitive satellites (X-, Ku-, Ka-band) but also for Inclined Orbit Satellites.
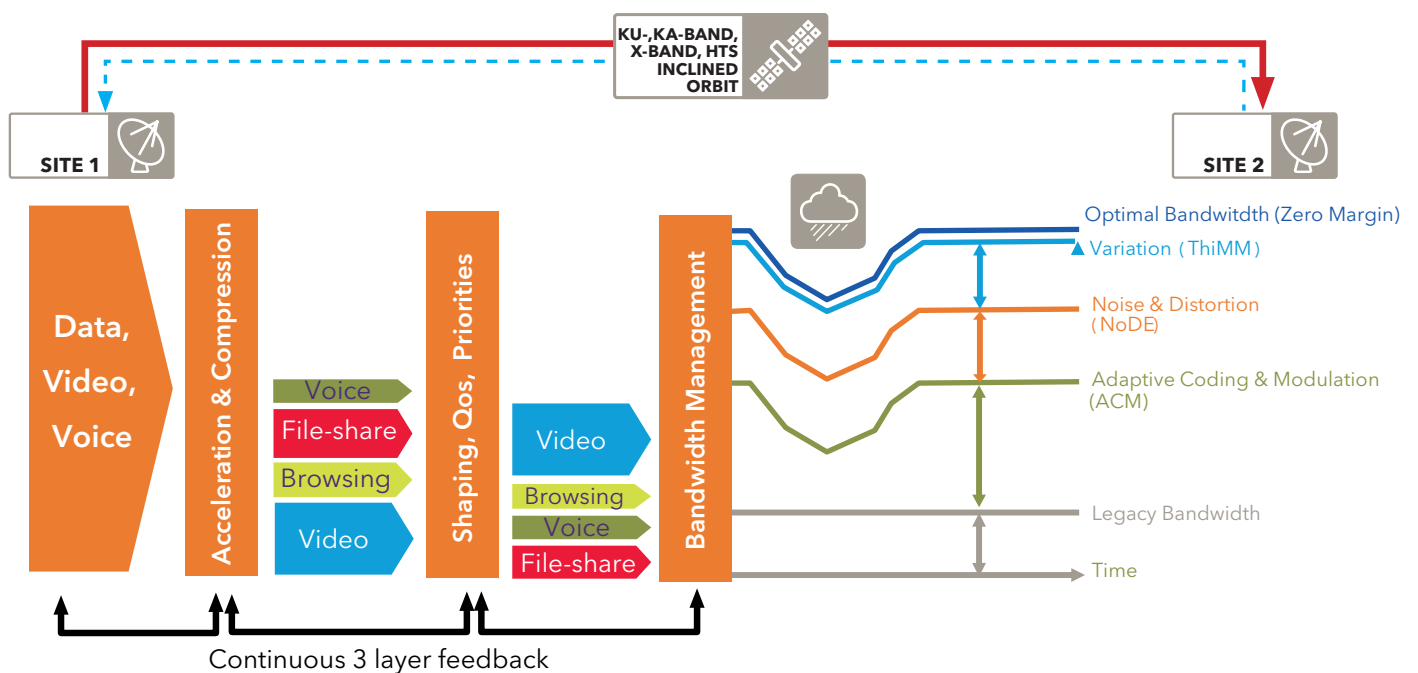

Figure 7: FlexACM and Cross-Layer-Optimization protect satellite links against fading effects

Committed Information Rates in Adaptive Environments

Newtec is the only player in the satellite market that can provide different flavors of adaptive modulation and coding (ACM) which enables the service provider to adapt their Trunking Point-to-MultiPoint network to their preferred business model.

Newtec FlexACM technology provides Committed Information Rates in highly adaptive satellite bandwidth environments for services such as video, VoIP or for customers demanding a fixed throughput at all times. The FlexACM Fixed Rate Flavor provides up to 70% gains compared to VCM (Variable Modulation and Coding) networks.

Customer Quote:
'Newtec turns Ku-band into C-band'
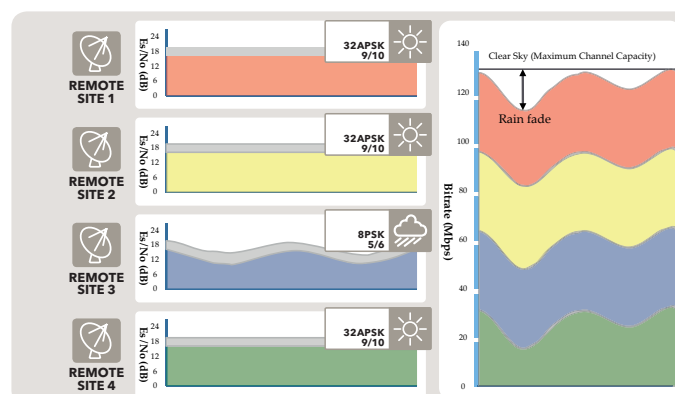
FlexACM Shared Rate:

- Fading at remote site 3 (8PSK) affects the throughput and bandwidth of the other sites
- ACM 'shared' scenario is ok if all remotes are part of a same network.
- Not fit for fixed rate services.
- ACM version applied by majority of the market today

FlexACM Independent Rate:

- Fading at remote site 3 (8PSK) does not affect the throughput and bandwidth of the other sites
- The sites are only influenced by their own fading conditions.
- Not fit for fixed rate services.
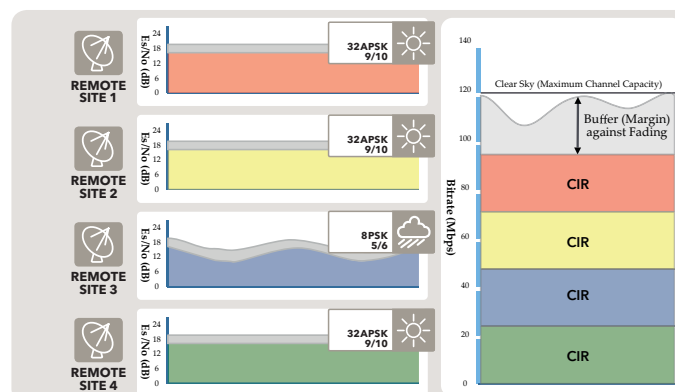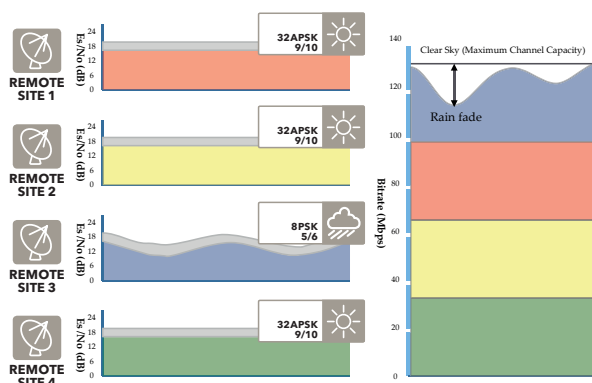
FlexACM Fixed Rate:

- Fading at remote site 3 (8PSK) does not affect the throughput and bandwidth of the other sites.
- A buffer (margin) compensates for any fading situation across the network through statistical multiplexing.
- Customers can get Committed Information Rates (CIR), even in adaptive environments for VoIP or Video etc.
- Rest of symbols (bandwidth) can be distributed over network (PIR or Peak Information Rate)
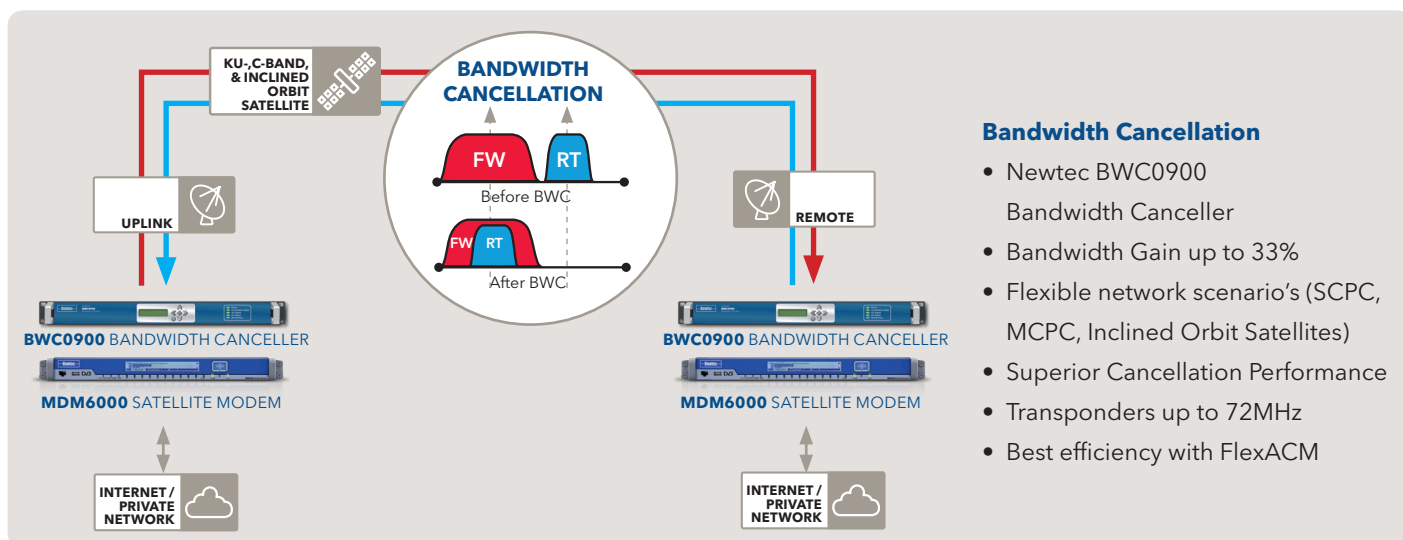
Figure 8: Different flavors in FlexACM solution adaptable to the business situation of the service provider

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Need for Speed

**Newtec holds World Record Speed with 506 Mbps in a 72MHz Ku Transponder**

Efficiency and more through-put are inherent elements in each Newtec solution in IP Trunking and IP Backbone applications.

Dedicated technologies such as FlexACM®, Bandwidth Cancellation, Clean Channel Technology, Network Optimization and Automated Equalink enhance the data throughput up to record breaking speeds in a large set of IP Point-to-Point or Point-to-MultiPoint networks.

Bandwidth Cancellation

- Newtec BWC0900 Bandwidth Canceller
- Bandwidth Gain up to 33%
- Flexible network scenario's (SCPC, MCPC, Inclined Orbit Satellites)
- Superior Cancellation Performance
- Transponders up to 72MHz
- Best efficiency with FlexACM

Automated Equalink®

- Pre-distortion to compensate for the effects of imperfections in the filters and amplifiers of the satellite
- Bandwidth Gain up to 10% (or 2dB)
- Support Linear & Non-Linear links
- Supports 16/32/64 APSK
- Supports Saturated Transponders

Figure 9: Efficiency technologies Bandwidth Cancellation and Automated Equalink to further optimize the satellite link
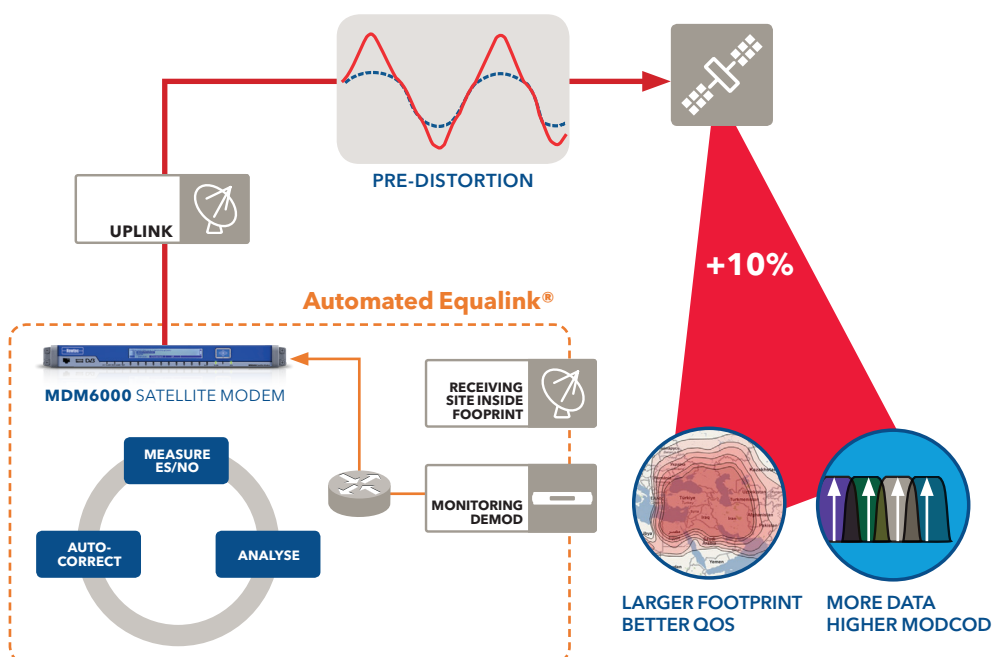
Flexible Business Models

The Newtec HUB6000 and EL501 Satellite Hubs allow the service provider to rapidly and flexibly adapt his network to changing business conditions

In a market where throughput rates are increasing significantly and competition is fierce, the Service Providers must be able to offer a flexible and affordable service to their customers to cope with changing market conditions and still remain profitable.

Newtec's HUB6000 and EL501 Hubs house the unique Bandwidth Manager feature where both the IP and the satellite segment can be shaped.

Individual customers are flexibly added or removed from the same network. Different services (Internet Access, VoIP, etc.) can be combined in the same satellite carrier with separate Service Level Agreement (SLA) requirements and rate options. Both Committed Information Rates (CIR) and Peak Rates are offered in an adaptive satellite environment at various speeds.

Whatever scenario the Service Provider selects, the Bandwidth Manager allows to flexibly build business models dedicated to the provider's needs and profitability.
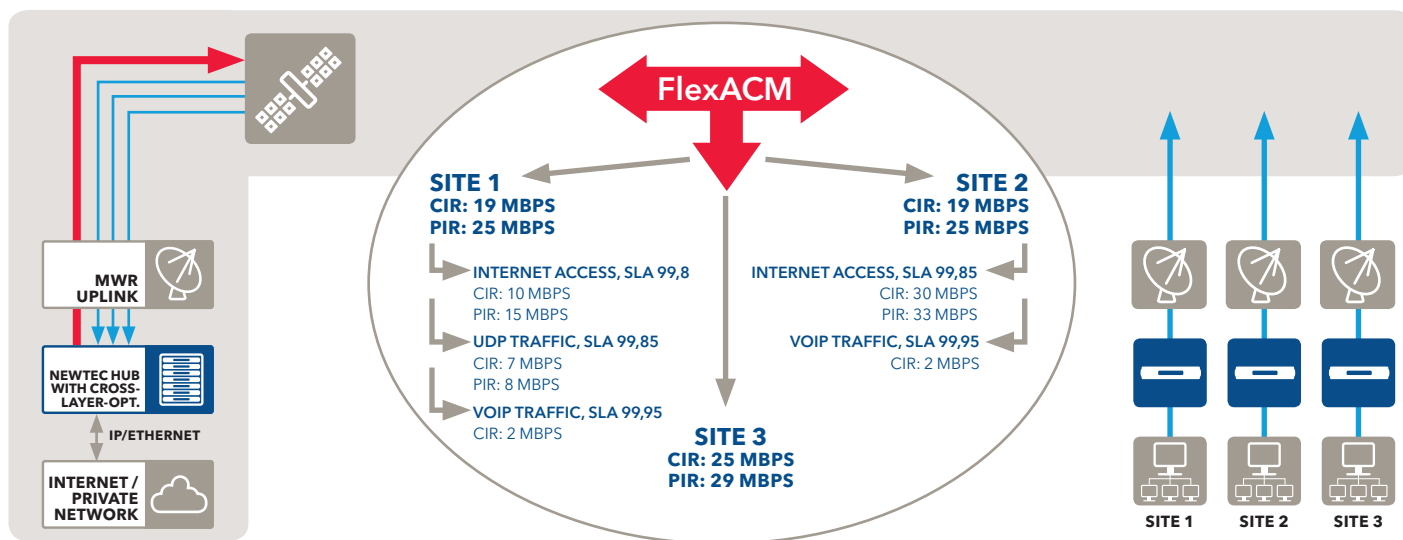
Figure 10: The Newtec HUB6000 and EL501 Satellite Hubs allow for flexible business models

Optimizing Satellite Network Traffic

Newtec's Network Optimization Technology Improves Customer Experience and results in important bandwidth gains

Network congestion reduces the customer experience and the overall throughput over the satellite link. In order to enhance speed and save on bandwidth service providers can easily add Newtec Network Optimization to their Trunking links.

The Newtec Network Optimization consists of the latest TCP/IP Acceleration and Compression technologies which increases the efficiency of the satellite link on top of technologies such as Newtec's FlexACM. The Network Optimization is available as option in the Newtec Hubs or can be added as separate equipment or software.

Newtec's Network Optimization technology offers up to 35% bandwidth reduction for typical applications such as file download, web surfing and content streaming. The reduction of traffic in both volume and number of packets is up to 20% in the forward and up to 90% in the return.
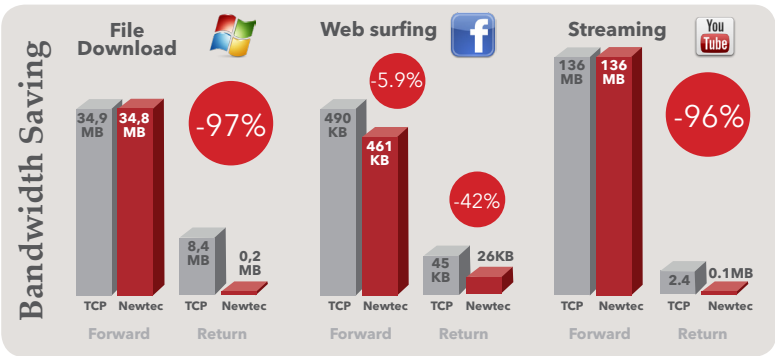
Bandwidth Saving
PC with Win Vista SP1, Internet Explorer 8.0, SLA: 10 Mbps FWD / 1 Mbps RET
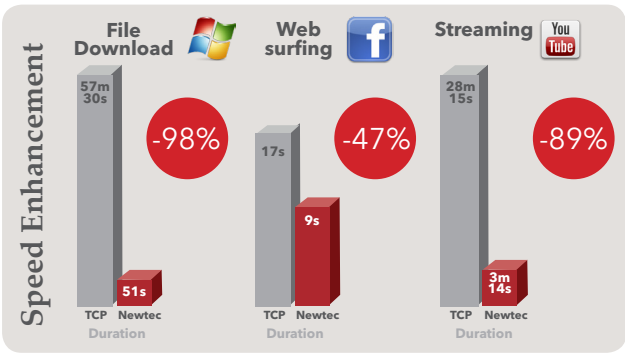
Improved User Experience
PC with Win Vista SP1, Internet Explorer 8.0, SLA: 10 Mbps FWD / 1 Mbps RET

Figure 11: Newtec Network Optimisation gains

Multi-Service Networks

Through the Newtec Multi-Service hub both service providers, B2B and B2C VSAT customers are connected with a common forward satellite carrier. The return technology can be SCPC or MF-TDMA depending on the return rates, the size of the remote or the network configuration.

By aggregating the data traffic in a common forward carrier and combining equipment in a single hub, important CAPEX and OPEX savings can be made. Extra bandwidth gains are achieved by implementing FlexACM, Clean Channel Technology and Cross-Layer-Optimization technologies on top of the Multi-Service network.

In order to mitigate the risk of a slow take-up of VSAT services, the service provider can compensate revenue with the fast (temporarily) uptake of Trunking demands on the same capacity. The Multi-Service network also allows the service provider to provide IP access services in a direct way (VSAT) or an indirect way (Backhaul, WiMAX, Trunking) to the end user.

> The Newtec's Multi-Service network model provides the service provider with a pro-active and flexible business model that allows him to scale between Trunking and VSAT capacity.
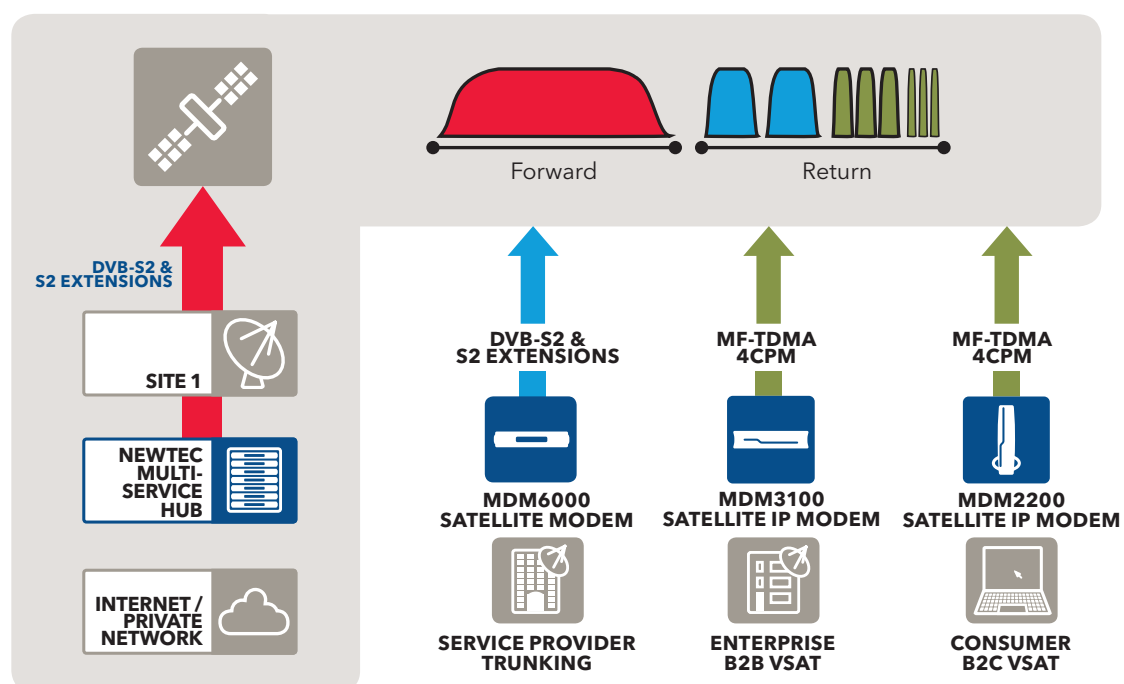

Figure 12: Newtec Multi-Service Offering with a Shared Hub for SCPC and MF-TDMA terminals

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More Information:

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