

GOVERNMENT AND DEFENSE FIXED COMMUNICATIONS

Satcom for Government and Defense Fixed Communications

Fixed Satellite Communications are used for multiple applications within government and defense operations. The fixed communication infrastructure is the permanent or semi-permanent satellite link between headquarters and remote operation sites. In many cases these sites are located in hotspots or remote areas around the world that have no access to terrestrial communication infrastructure.

The amount of data, voice and video exchanged between the headquarters and remote sites has grown substantially along the wide number of applications.

Government and defense customers continuously seek solutions to increase satellite link efficiency, to find available satellite bandwidth and to drive down satellite bandwidth costs. Whilst in operation the satellite link needs to be available at all times to assure mission critical communications.

Push more data through the available satellite bandwidth at optimal link availability.

DIALOG

SCPC MODEMS

powered by

Newtec  **iDIRECT**

Government and Defense Applications

Fixed Satellite Communications infrastructures are deployed for a wide range of applications within government operations. The fixed communications establish a satellite link between headquarters and remote sites combining a number of services that are key to the success of the operation and the welfare of the deployed personnel.

Applications for fixed communications are:

- ISR Data Backhaul and Exchange Networks
- Morale, Welfare and Recreation
- Disaster Recovery Networks
- Multiservice Government Networks
- Border Security and Surveillance
- Mission Support Networks
- National Election Networks
- Education, Distance Learning and Scientific Networks
- Civil, Humanitarian and NGO Networks
- Embassy Networks

Global Reach and Fast Deployment

Humanitarian missions into man-made or natural disaster areas, duty at sea and peacekeeping operations take government and defense personnel to remote locations where often terrestrial communication infrastructure is unavailable, or has been destroyed.

Through ST Engineering iDirect technology a satellite link can be set up quickly anywhere in the world, independent of the location on land or sea. First essential communication can be established to assess the situation at hand and take appropriate actions. A permanent link over satellite allows the agencies to run their operations exchanging video, voice and data without any interruption. Once the network is in place extra remotes can be put into operation simply at any time.

ST Engineering iDirect has a track record of fixed communication installations over satellite, linking remote bases in theatre, humanitarian missions, election polling stations, schools and embassies around the world.

Best-of-Trade Equipment and Technology

ST Engineering iDirect can reflect on a track record of fixed satellite network installations worldwide for a wide range of civil, state and defense applications.

Our portfolio of state-of-the-art COTS products and solutions fit for fixed government and defense applications. These products serve as building blocks or turnkey systems for satellite networks. Our satellite systems, equipment, OEM boards and software have been integrated in diverse solutions and configurations for fixed networks over satellite.

The configuration of these networks combine reliable COTS equipment (Dialog® Platform with SCPC, MF-TDMA and dynamic Mx-DMA™ returns and a variety of modems as well as broadcasting modulation equipment), efficiency technology (FlexACM®, Bandwidth Cancellation, Clean Channel Technology™, Cross-Layer-Optimization™) and network optimization software (shaping, acceleration, data-casting). ST Engineering iDirect has its production center in Belgium and is in full control of the production and design process which translates in the outstanding reputation for its quality and reliability in the satellite market.

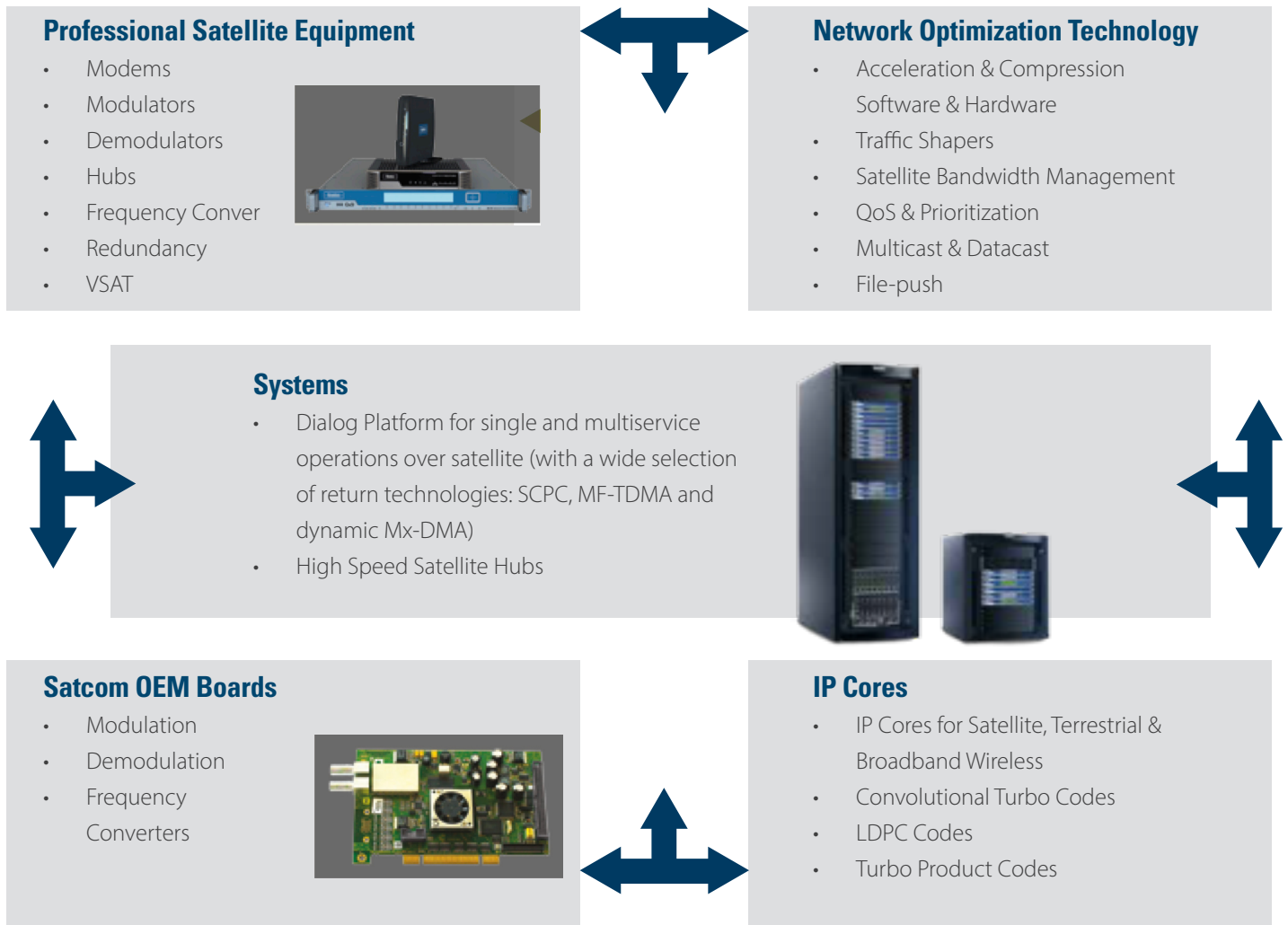


Figure 1: ST Engineering iDirect COTS Product Portfolio with professional satcom equipment, network optimization technology, hub systems, OEM boards and IP cores.

End-to-End Efficiency for Milsatcom Networks

ST Engineering iDirect's professional satcom equipment is based on DVB standards.

Today DVB-S2X provides gains up over 50% compared to DVB-S2. The support of Wideband technology adds another 20% to the equation. These gains exceed the results by proprietary systems in the market. Both standards are already available for ST Engineering iDirect hubs and modems.

Two migration scenarios towards the DVB-S2X standard are possible:

For ST Engineering iDirect DVB-S2 equipment already deployed in the field, we provide Clean Channel Technology™ as a software field upgrade. As such,

ST Engineering iDirect satcom equipment is based on standards such as DVB-S2 and the new standard DVB-S2X to enable interoperability between communications over satellite.

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.

An ST Engineering iDirect DVB-S2X modem with the Transmodulation technology on board is put in front of the existing DVB-S/ S2 infrastructure. The satellite link is fully optimized with the DVB-S2X efficiency gains and our modem takes care of the transmodulation to DVB-S/S2 to support the existing installed base equipment (receivers, IRDs etc.)

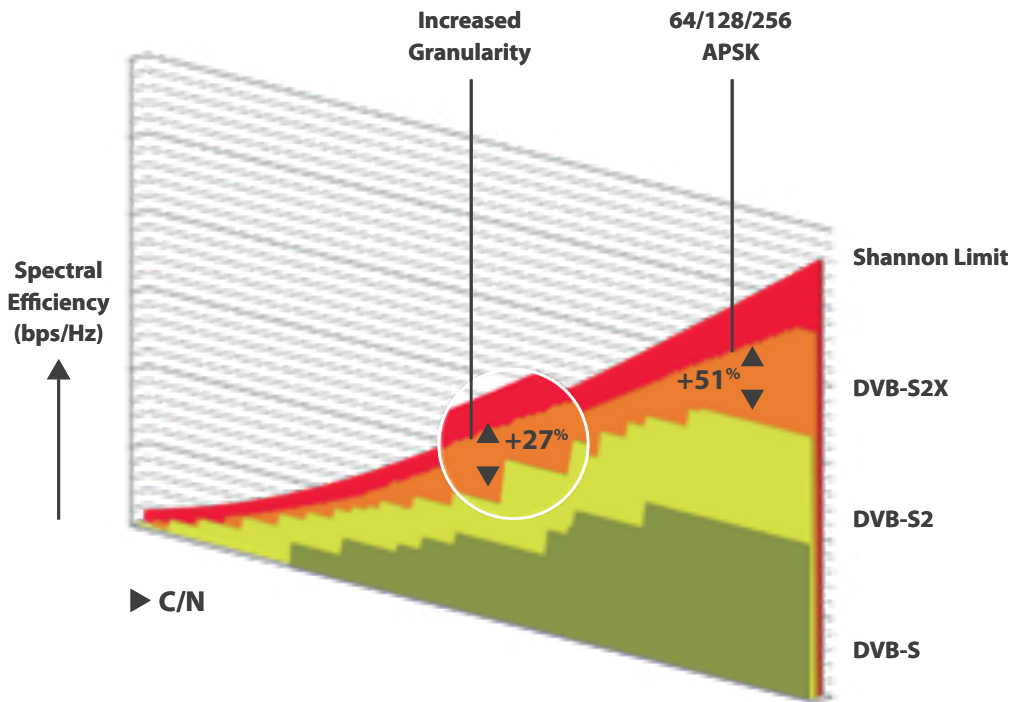


Figure 2: DVB-S2X Standard Improvements

10 Improvements in DVB-S2X

- Smaller Roll-Offs
- Advanced Filtering of Satellite Carriers
- Increased Granularity in MODCODs
- Higher Order Modulation: 64/128/256 APSK support
- Linear and Non-linear MODCODs
- Better Implementation of MODCODs
- Wideband Support
- Very Low SNR Support for Mobile Applications
- Channel Bonding
- Additional Standard Scrambling Sequences to Mitigate Co-Channel-Interference (CCI)

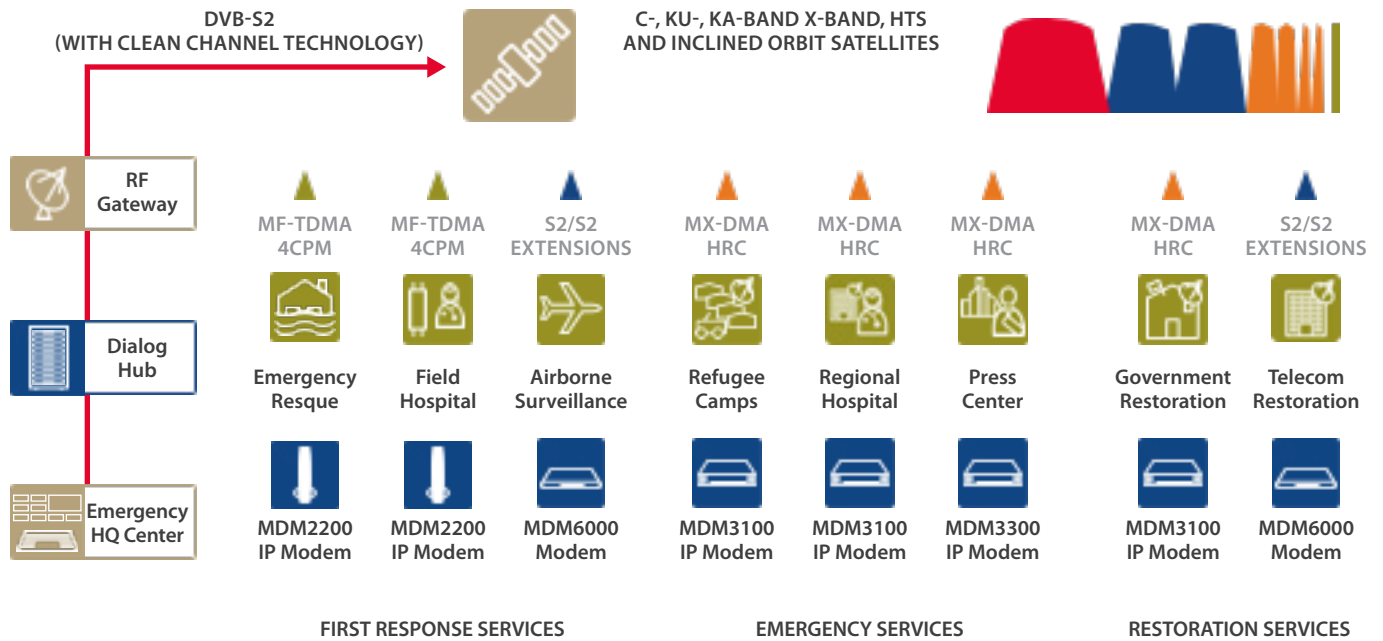


Figure 3: Dialog Platform for multiservice satellite networks connecting camps, forward bases and remote offices.

The Flexible and Scalable Multiservice Platform

Through the Dialog® platform large camps, forward bases, government offices, schools and embassies can be connected to a single multiservice hub in order to establish access to different data, video, voice or datacasting services.

By aggregating the data traffic in a common forward carrier and combining equipment on a single Dialog 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 multiservice network. The Dialog hub comes in two flavors: a compact, cost effective version for small networks and an all-encompassing, versatile Hub for multiservice and multi-gateway satellite networks.

The satellite service operator has the flexibility to select the carrier return technology that best fits this application. The efficiency of SCPC, the flexibility of MF-TDMA or the best of two worlds: dynamic Mx-DMA (Cross-Dimensional Multiple Access) return technology that fills the gap between SCPC and MF-TDMA.

The Dialog platform provides reliable two-way IP connectivity through a flexible, scalable hub and efficient, cost-effective and low power consumption terminals. The network contains management functions for monitoring, control, SLA management, advanced QoS, Fair Use Policy and Reservation through the NMS and the Satlink Manager™.

The government or defense satellite service operator will be able to provide IP Access and Exchange services in a direct way (VSAT) or an indirect way (Backhaul, WiMAX, Trunking) to end users in theater, on mission or in remote offices.

Double Throughput in Same Bandwidth

Both the amount of (video, voice and data) traffic and the number of government and defense networks over satellite have increased substantially. The boost in rates needs to be balanced with the lack of satellite capacity over some areas of operation.

Dedicated technologies such as FlexACM®, Bandwidth Cancellation, Clean Channel Technology™ and Equalink® pre-distortion are used in a large number of these networks to achieve maximum throughput independent of the selected satellite. At the same time important OPEX reductions can be accomplished.

FlexACM uses the full capability of DVB-S2/S2X and combines it with different technologies to get as much data through the same satellite bandwidth as possible.

FlexACM® doubles the data throughput for fading sensitive satellites (X-, Ku-, Ka-band, HTS) and Inclined Orbit Satellites.

FlexACM will auto-adaptively set modulation parameters to the optimal point and overcomes distortion, noise and variation in the satellite link. ST Engineering iDirect 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 can be doubled in the same bandwidth without the need to acquire extra satellite capacity.

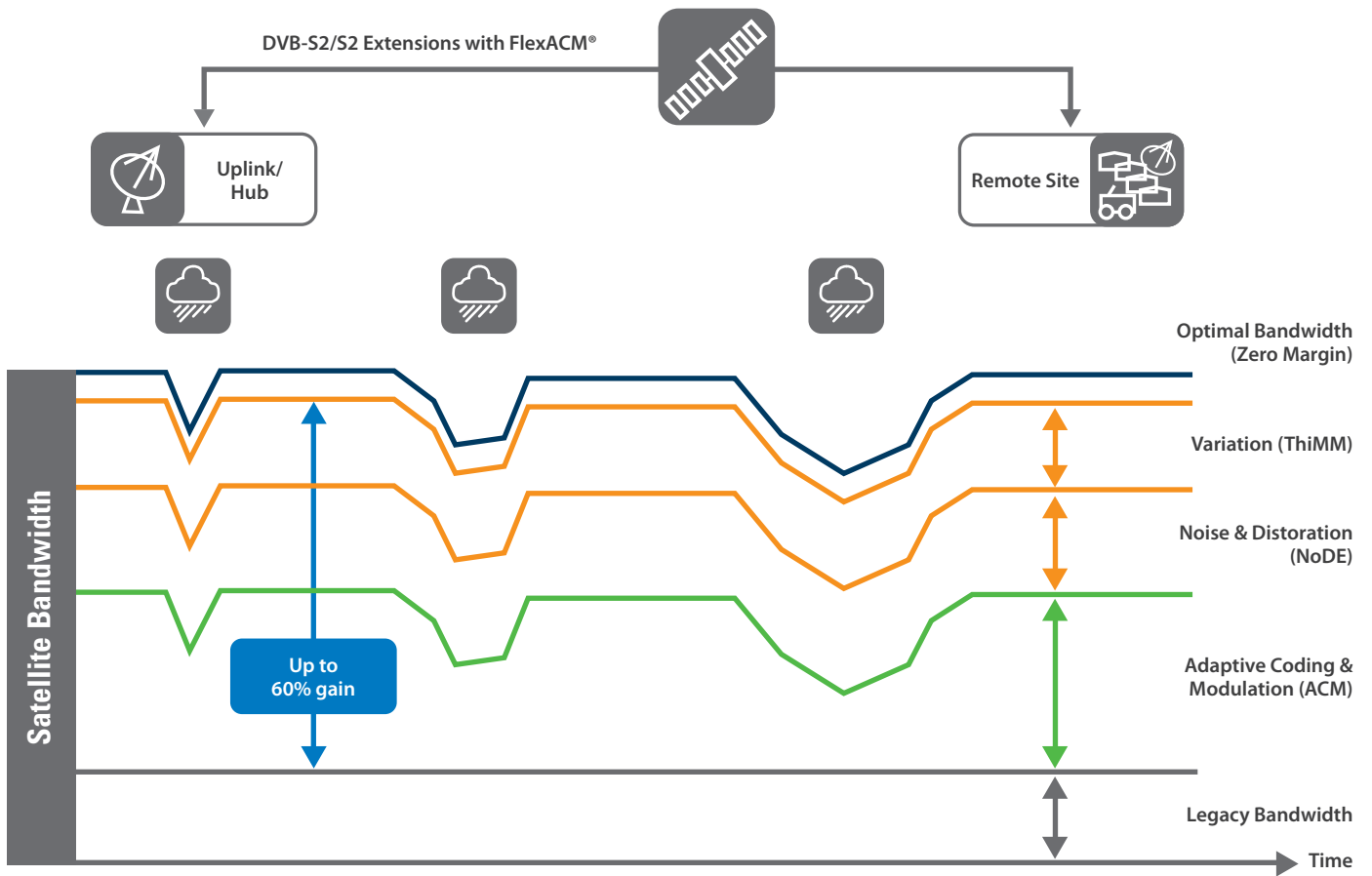


Figure 4: FlexACM® combines different technologies to increase throughput over satellite

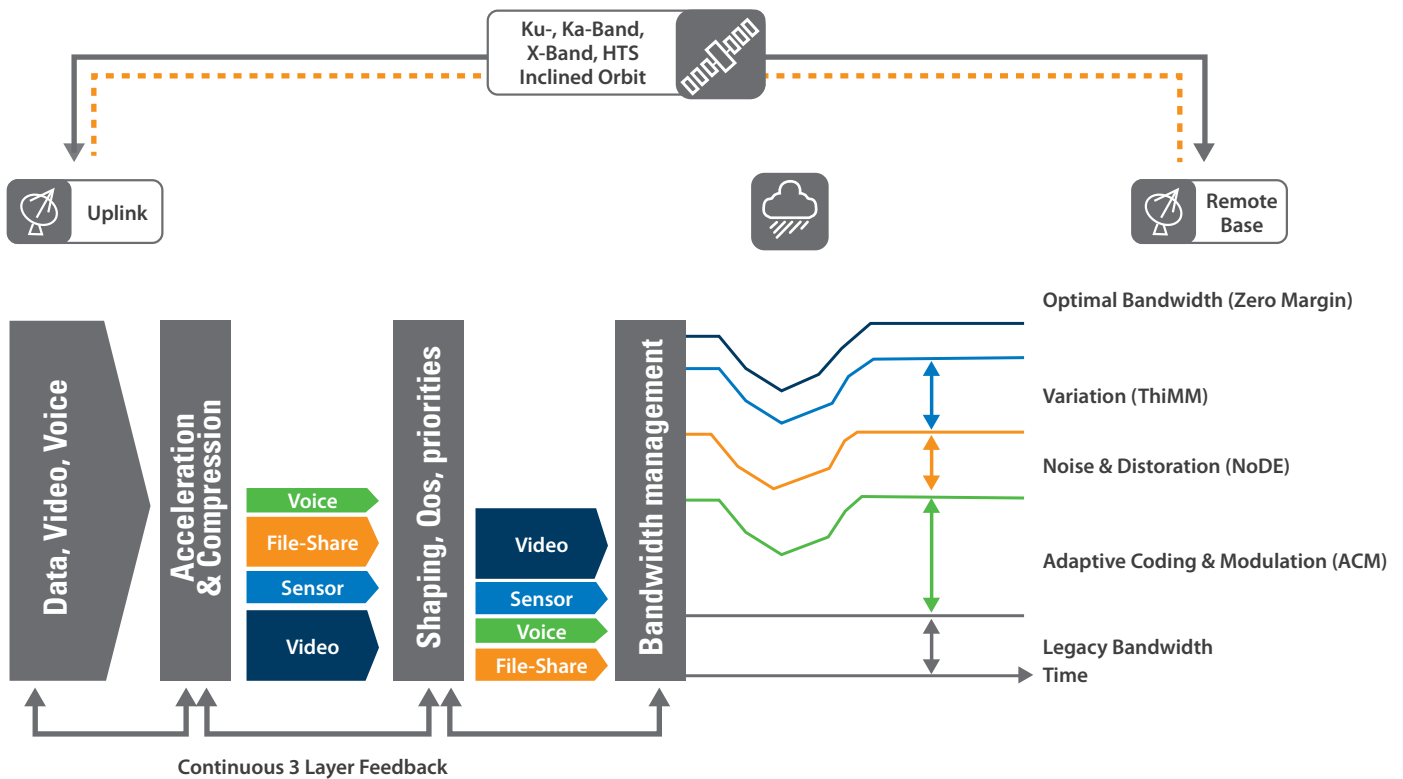


Figure 4: FlexACM® and Cross-Layer-Optimization technologies optimize both throughput and service availability over satellite

Optimal Service Availability Over Variable Conditions

Even in harsh and hostile conditions it is important to have government and defense communication lines over satellite available at all times to exchange mission critical and life-saving information.

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, HTS), frequency band (Ku-, Ka- and X-band), environmental (rain, dust) or interference (between two adjacent satellites).

Thanks to the auto-adaptive technology incorporated inside 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. During the entire operation it is possible to sustain Committed Information Rates (CIR).

Other technologies such as DVB-S2X low SNR implementation and Automatic Uplink Power Control on board our hubs and modems will increase the availability in order to answer the most demanding Service Level Agreements (SLAs).

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 our Cross-Layer-Optimization™ technology.

Increased Flexibility to Support Operational Efficiency

Flexibility is a key asset for government and defense satellite communication equipment in order to anticipate the continuous changing missions, services and areas of operation.

On the Dialog® platform new remote sites can easily be added to the network. Data, voice or video services for different government applications are aggregated in a single carrier to get maximum efficiency out of the satellite link.

At any time these services can be removed, added or replaced. Moreover, the different services and applications will get a prioritization scheme in order to ensure critical mission information to pass first.

Dialog hub modules 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.

ST Engineering iDirect satellite hubs with bandwidth management and shaping technologies allow for flexible network models to support improved operational efficiency.

Whatever scenario the government and defense service operator selects, the Bandwidth Manager allows to flexibly build network models dedicated to increase the operational efficiency.

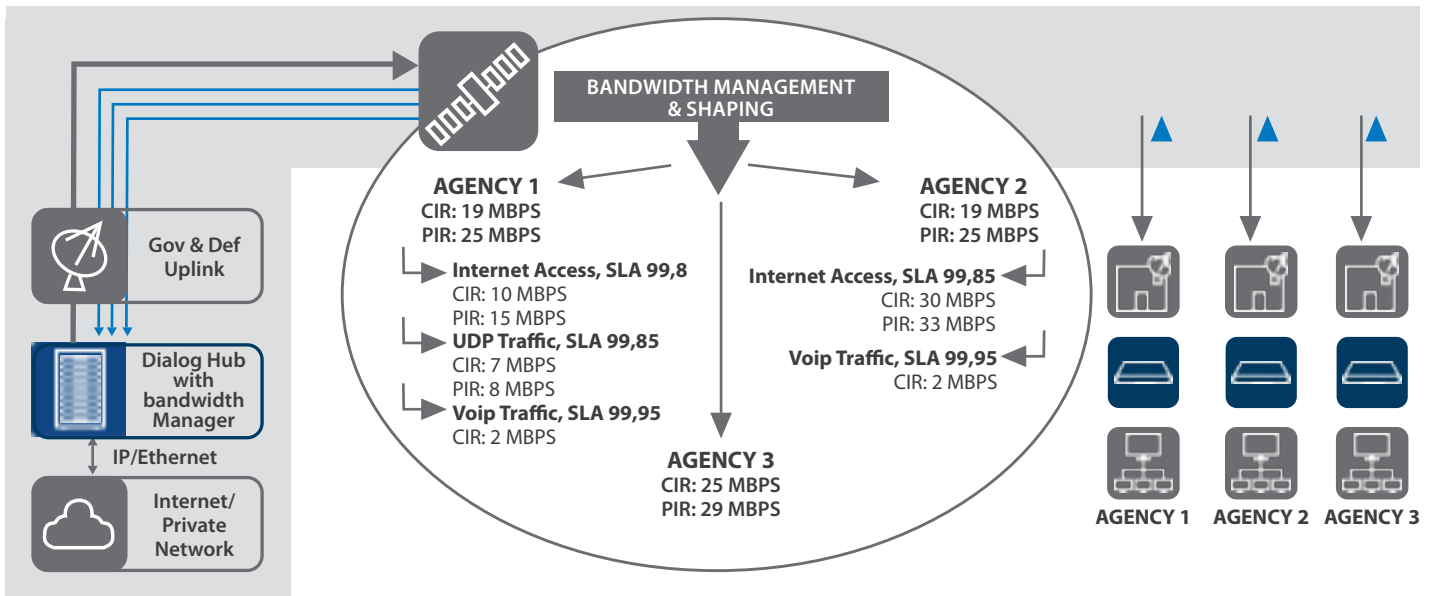


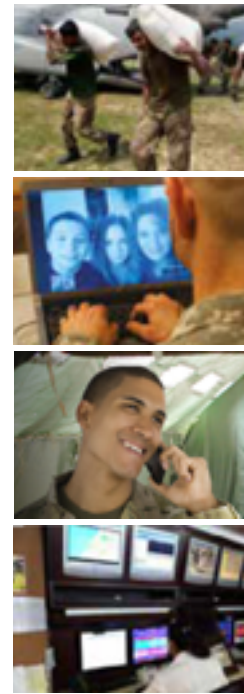
Figure 6: Dialog Hub with Bandwidth Manager allow for flexible network configurations to support improved operational efficiency

Support of Video, Voice and Data

Government and Defense satellite communications are used for tactical, administrative, mission support, scientific or welfare purposes. These various services are a combination of voice (Telecom, VoIP), video (surveillance, broadcast, video conference, training movies) and data (sensor, ERP, administration, mail, browsing). Most of these streaming and file-transfer based services have converged towards IP.

ST Engineering iDirect has more than 30 years experience as market leader in transport of video, high data throughput, broadband and voice links over satellite: from broadcast distribution and contribution to IP trunking, internet access and telecom backbone applications.

Through the Dialog platform the different government and defense services over IP can be combined either in the multiservice hub or the remote into a single carrier for efficient transfer over satellite at optimal service availability.



MISSION SUPPORT

WELFARE

TELECOM

SURVEILLANCE

Increased User Experience for Remote Sites

For true broadband experience over satellite our modems and terminals in government and defense networks implement the most efficient technologies, such as FlexACM® in the forward link, adaptive return technologies and embedded IP traffic enhancement software (aka Cross-Layer-Optimization™) such as shaping, TCP acceleration, pre-fetching and compression.

Next to an improved end-user experience, considerable cost gains can be achieved:

- Reduction of Webpage Load Time up to 60%
- Reduction of File Download up to 90%
- Up to 35% Bandwidth Reduction

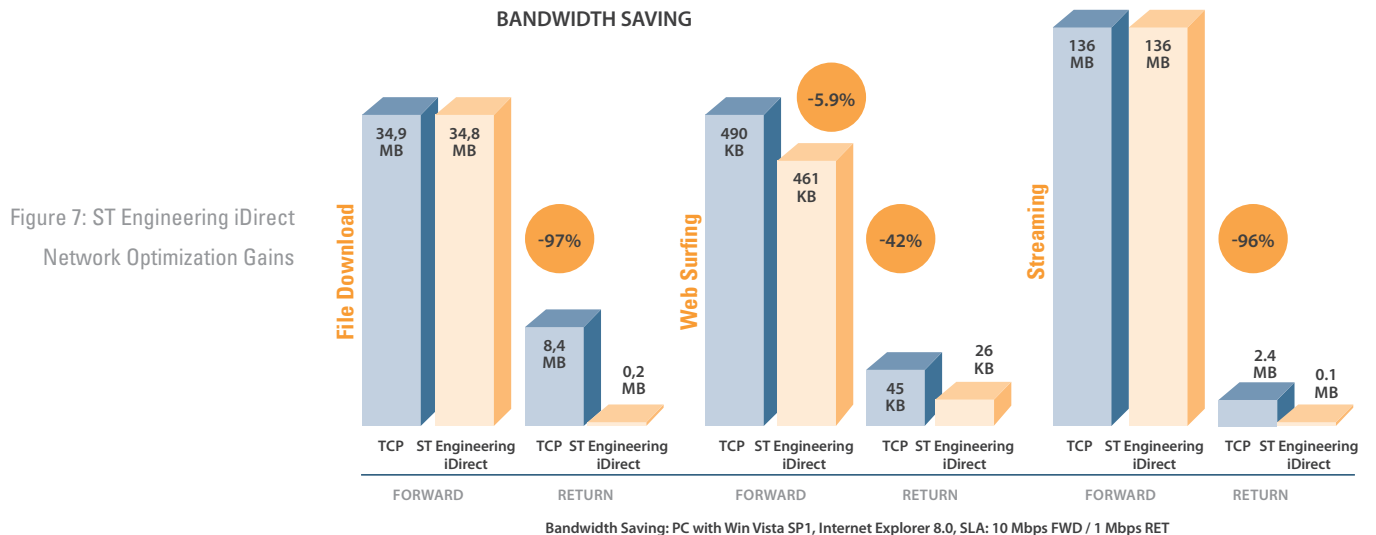
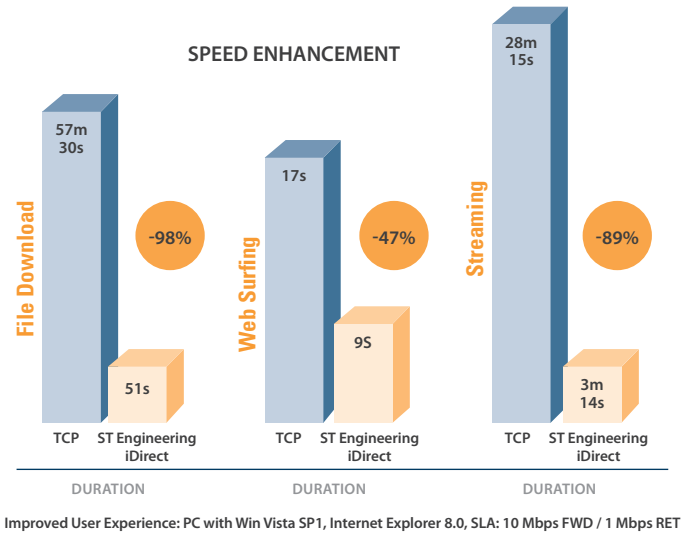


Figure 7: ST Engineering iDirect Network Optimization Gains

Reliable and Efficient Datacasting

Multicasting government and defense content towards remote sites and mobile platforms with our Datacasting Software will immediately result in important efficiency and OPEX gains. The transmissions towards remotes are aggregated in a common efficient DVB-S2/DVB-S2X FlexACM® forward over satellite. The content is stored on the server located at the remote.

The reliability of the datacasting (ISR video and sensor feeds, Welfare video, etc.) is enhanced by the software's partial retransmission capabilities. Only the detected missing fragments are retransmitted which provides important OPEX gains for services on-the-move or those suffering from fading or interference conditions.

Our Datacasting Software also has the following possibilities:

- Dynamic Scheduling & Prioritisation
- Authentication, Authorisation & Accounting
- Automated Content Distribution via "hot folders"
- Monitoring & Control

ST Engineering iDirect's Datacast solution provides efficient store and playback support over satellite and is robust against outages.

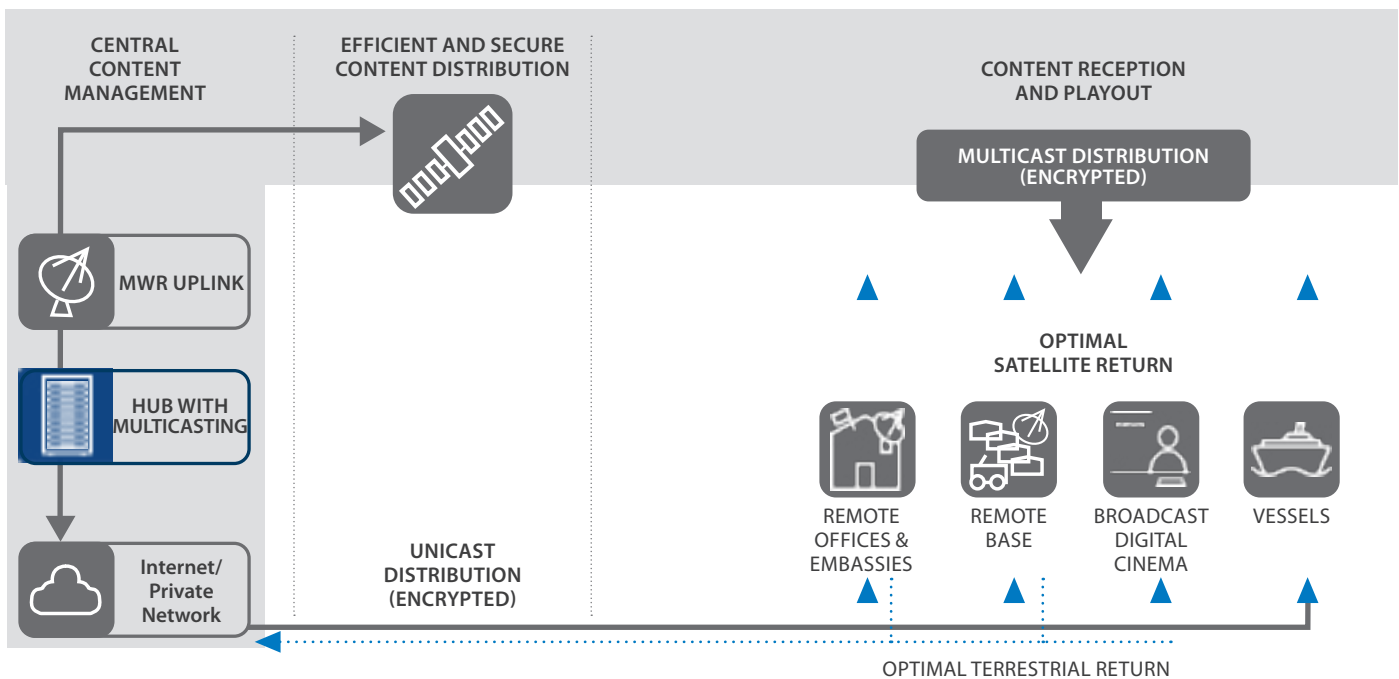


Figure 8: Example of Datacasting Software for Efficient and Reliable Delivery of MWR Content

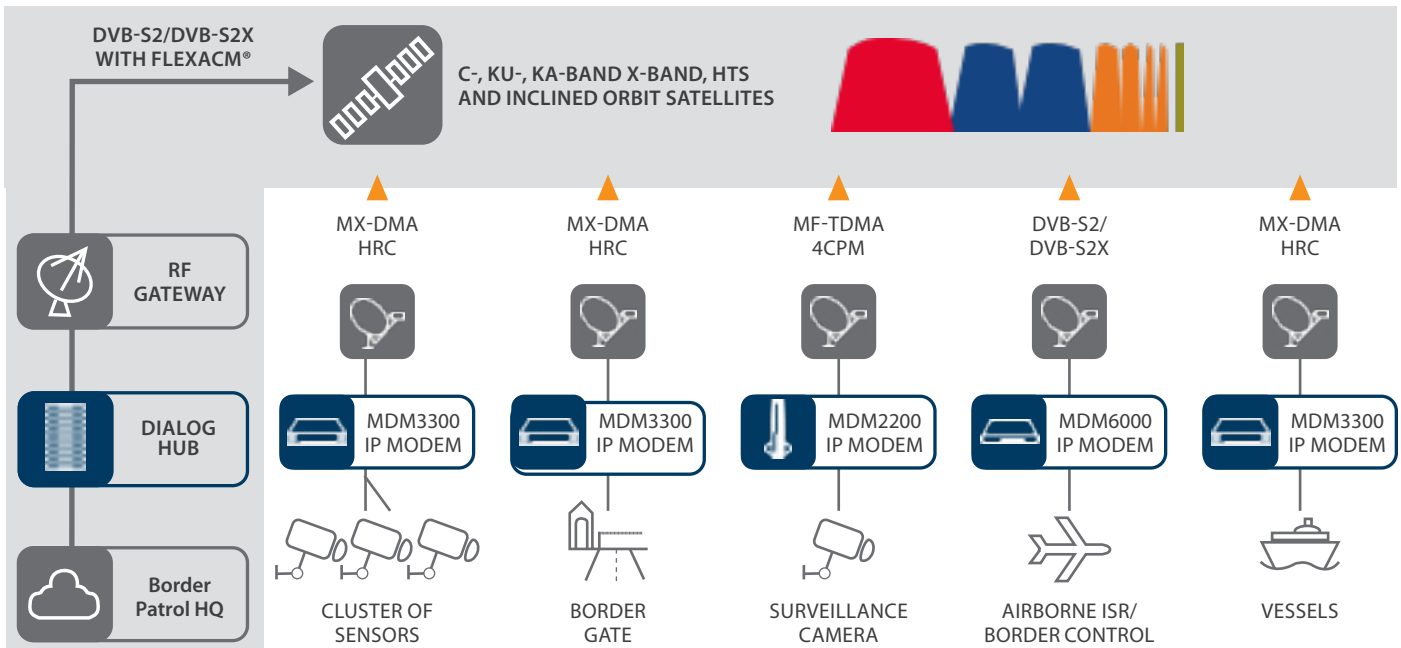


Figure 9: Example of Dialog platform for a Border Control and ISR network with combination of bursty CCTV traffic and continuous video feeds coming from different sources

Countering Increasing ISR Demands

Intelligence, Surveillance, and Reconnaissance (ISR) systems are integral components of both national policymaking, border control and peacekeeping operations. In order for policy makers or operational headquarters to make correct assessments of the situation at hand, these surveillance and information exchange systems have to provide users with a detailed and comprehensive understanding of issues based on information from all sources. These sources rely heavily on video and sensor technologies.

The data-hungry sensor and video technologies have contributed to an insatiable demand for satellite bandwidth. As satellite capacity is expensive and not always available over some regions ST Engineering iDirect provides new ways to get more ISR information over satellite links at lower OPEX and CAPEX.

Technologies such as FlexACM, network optimization and multicasting efficiently deliver video and sensor feeds from the remote site to the mission control headquarters.

Moreover ST Engineering iDirect has a vast experience in video broadcasting and multimedia exchange systems over satellite to provide video and sensor connectivity from different sources towards the mission control headquarters.

Both bursty traffic (e.g. motion activated CCTV feeds) and continuous video ISR feeds are supported through the Dialog Platform via efficient SCPC returns, or flexible MF-TDMA returns, or the best of both worlds, the dynamic Mx-DMA returns.