

MORALE, WELFARE AND RECREATION

Satellite Communication for Morale, Welfare and Recreation (MWR)

Morale, Welfare and Recreation (MWR) programmes are a key part of Government and Defense operations. MWR networks are designed to support remotely deployed defense personnel, civilian employees, ship crews and their families.

Satellite communication plays an important role in MWR programmes due to the fact that government and defense operations are mostly located in remote locations or in areas suffering from man-made or natural disasters with no terrestrial connectivity.

The amount of data, voice and video exchanged in MWR networks has grown substantially, along with the wide number of leisure and support services that are being offered.

Government and defense customers continuously seek new technologies to drive down bandwidth requirements and are looking for ways to lower satellite bandwidth costs. Through the flexible and scalable Dialog® Platform and efficient satellite communication technology such as FlexACM®, Cross-Layer-Optimization™, Mx-DMA® and datacasting solutions this objective can be achieved in no time.

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

DIALOG

powered by

Newtec  **iDIRECT**

Best-of-Trade Equipment and Technology

T Engineering iDirect can reflect on many successful satellite network implementations worldwide for a wide range of civil, state and defense applications, including multiple MWR networks.

The configuration of these networks combine reliable COTS equipment (Dialog Platform with SCPC, MF-TDMA and dynamic MxDMA 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 optimisation software (shaping, acceleration, datacasting).

All of our equipment and technology individually contributes to optimising the satellite IP link. But once combined they bring the satellite link to full efficiency.

Our modulators, demodulators and modems are based on standards such as DVB-S2 and the new DVB-S2X standard to enable interoperability between communications over satellite for data, video and voice.

Easy Integration

ST Engineering iDirect equipment and software have successfully been integrated in MWR networks over satellite worldwide. Our hub equipment, modems, modulators and demodulators fit perfectly into rack space at the MWR uplink or at the remote sites. Video, data and voice (file-based or streaming) are transmitted through one modem in the same satellite carrier in the most efficient way.

The network optimisation software such as acceleration, shaping and data casting is available on our IP equipment or as software clients which can be smoothly integrated into existing infrastructures.

ST Engineering iDirect's 30 years experience in video, high data throughput, broadband and voice over satellite have resulted in market renowned efficient and reliable satellite equipment.

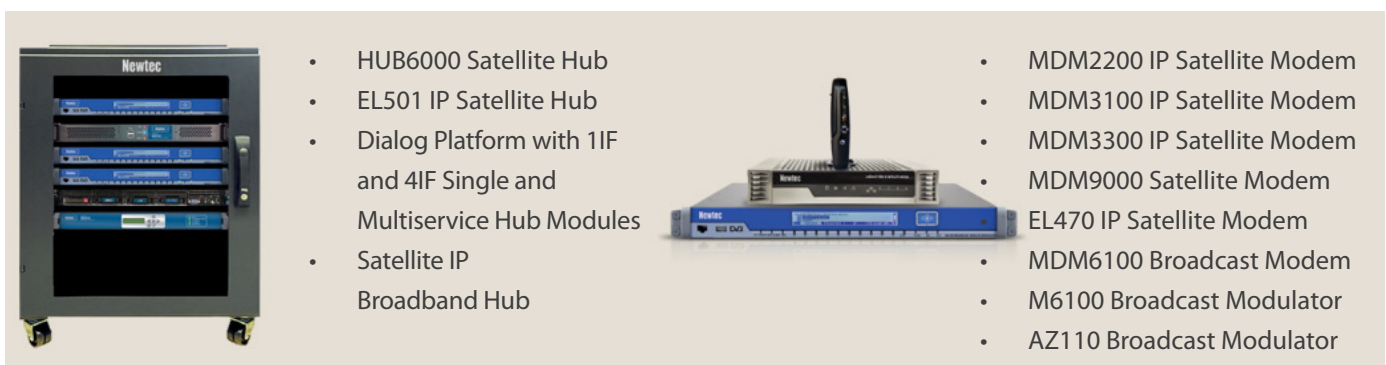


Figure 1: ST Engineering iDirect COTS satellite hubs, modems and modulators (SCPC, MD-TDMA and dynamic Mx-DMA)

Based on DVB Standards for Interoperability

ST Engineering iDirect's professional satcom equipment is based on DVB standards. DVB-S2X is the latest standard and provides gains of over 50% compared to DVB-S2. The support of Wideband technology adds another 20% to the equation. Two migration scenarios towards the DVB-S2X standard are possible:

Scenario 1

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

Scenario 2

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

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

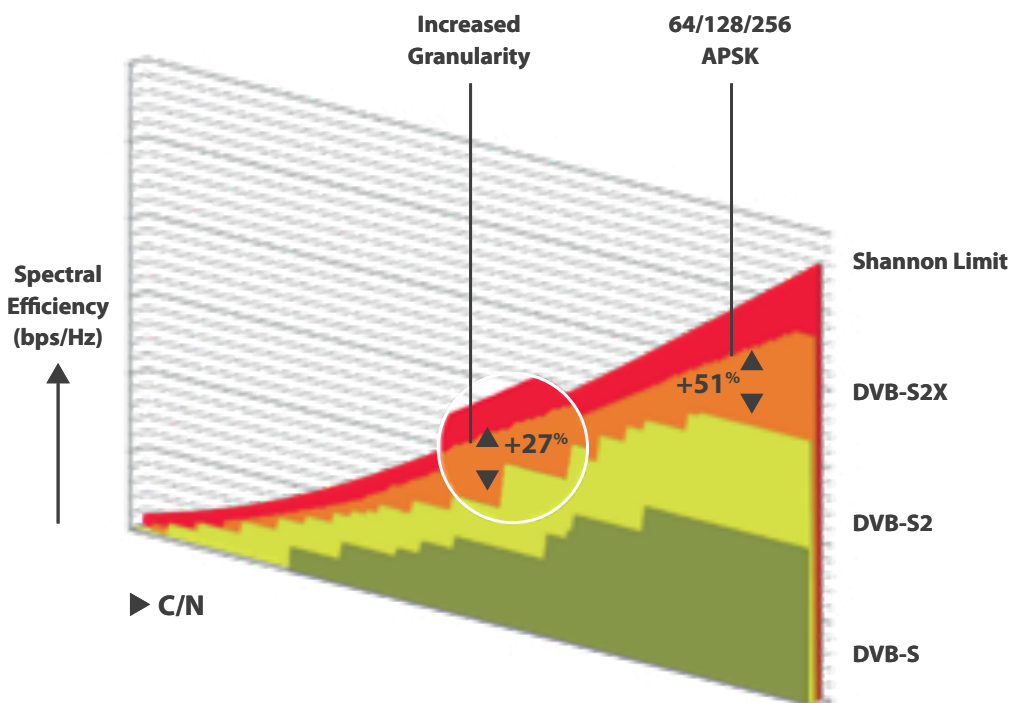


Figure 2: DVB-S2X Standard Improvements

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)

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. Once the network is in place extra remotes can be put into operation simply at any time.

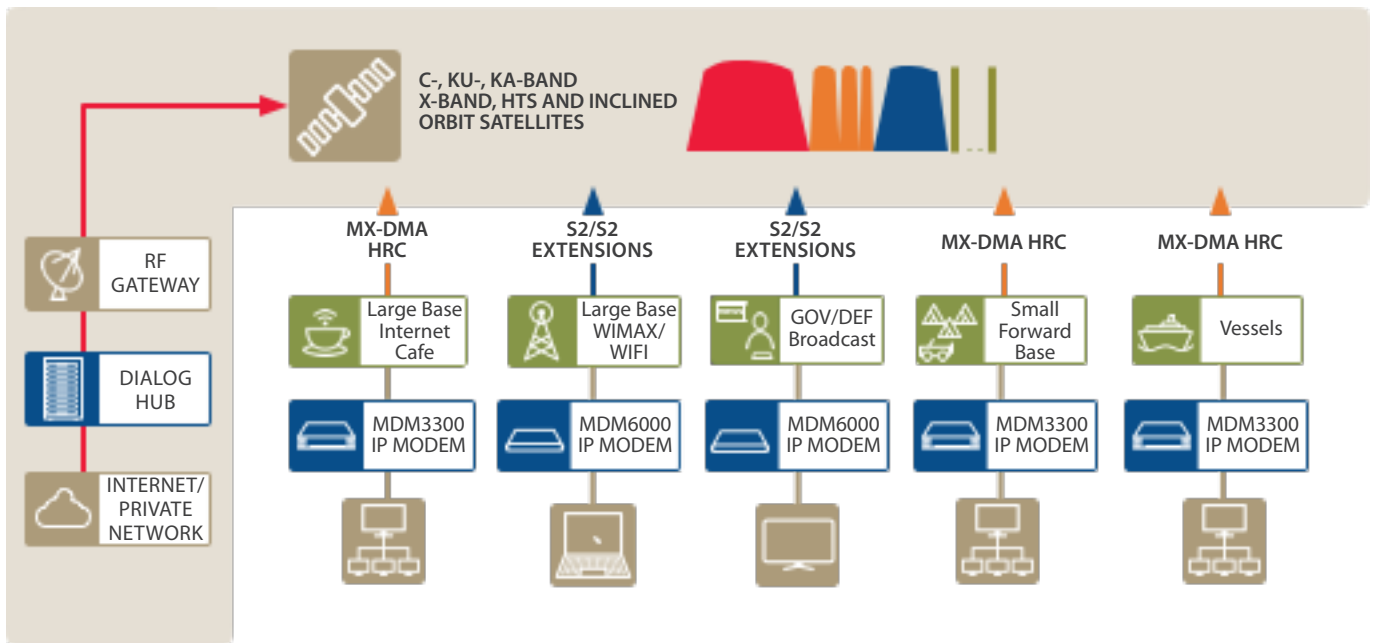


Figure 3: Dialog Platform addresses multiple services and connects both large camps, small sites and vessels

Dialog® - A Flexible and Scalable Multiservice Platform

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

The Dialog hub comes in two flavors: a compact, cost effective version for small networks and an all-encompassing, versatile Hub for multi-service and multi-gateway satellite networks. The satellite service operator has the flexibility to select the carrier return technology that best fits his 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 2-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.

Double Throughput in Same Bandwidth

Both the amount of (video, voice and data) traffic and the number of MWR 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 by ST Engineering iDirect such as FlexACM®, Bandwidth Cancellation, Clean Channel Technology™ and Equalink® are used in a large number of MWR networks to achieve maximum throughput independent of the selected satellite. At the same time important OPEX reductions can be accomplished.

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

Optimal Service Availability over Variable Conditions

Even in the most harsh and hostile conditions it is important to have MWR networks over satellite available for crew and personnel at all times.

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 ST Engineering iDirect's FlexACM® these fading conditions will no longer interrupt the transmission between the hub and remote sites nor result in the loss of data.

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.

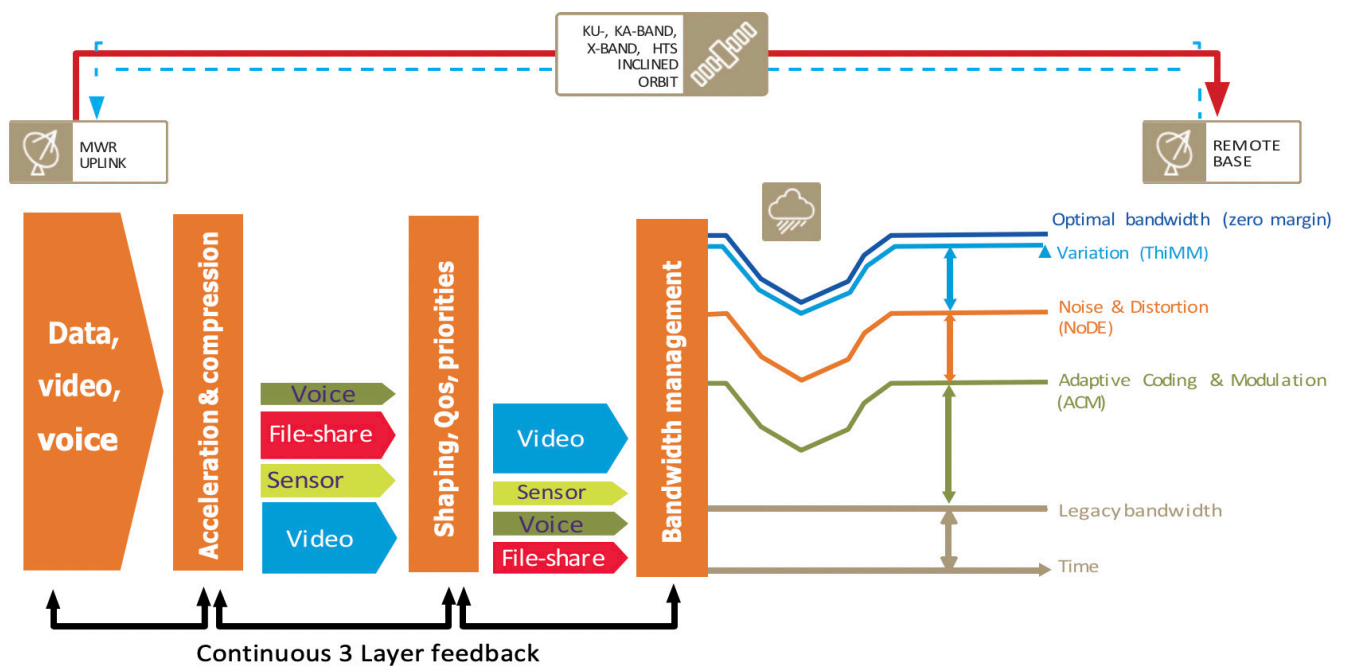


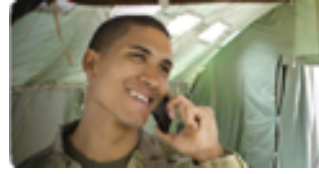
Figure 4: FlexACM and Cross-Layer-Optimization technologies optimize both throughput and service availability over satellite



TV & RADIO BROADCASTING



LEISURE & ENTERTAINMENT



TELECOM



TRAINING

Support of Video, Voice and Data

Morale, Welfare and Recreation services are a combination of voice (calling the home front), video (news, sports, entertainment, TV and radio broadcast, training movies) and data (social media, 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 MWR services over IP can be combined either in the multiservice hub module or the remote into a single carrier for efficient transfer over satellite at optimal service availability.

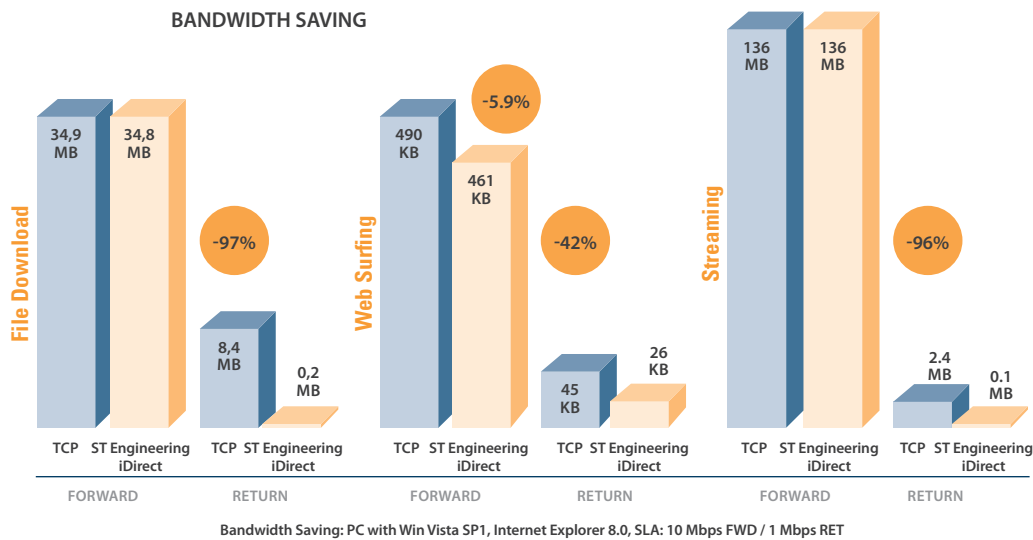


Figure 5: ST Engineering iDirect Network Optimization Gains

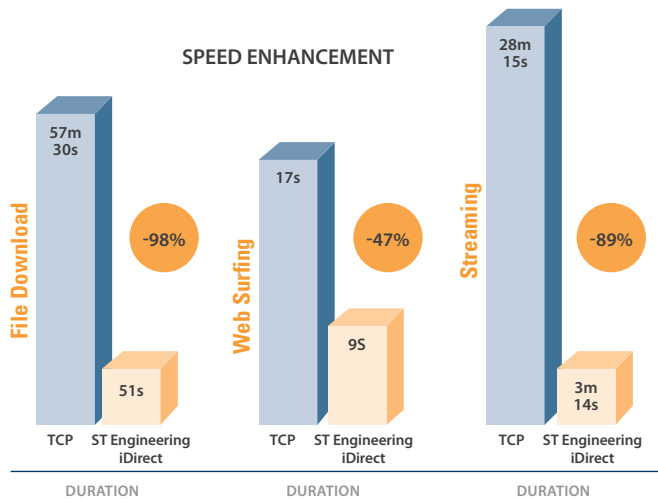


Figure 5: ST Engineering iDirect Network Optimization Gains

Improved User Experience: PC with Win Vista SP1, Internet Explorer 8.0, SLA: 10 Mbps FWD / 1 Mbps RET

Broadband Experience Away from Home

For true broadband experience over satellite the ST Engineering iDirect modems and terminals in the MWR network 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

Reliable and Efficient Datacasting

Multicasting MWR content towards remote sites and ships with ST Engineering iDirect's Datacasting Software will immediately result in important efficiency and OPEX gains. The transmissions towards remotes are aggregated in a common efficient DVB-S2 FlexACM® forward over satellite. The content is stored on the server located at the remote.

The reliability of the datacasting (digital cinema, news, shows, 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 & playback support over satellite and is robust against outages.