

# DIALOG

RELEASE 2.5.1

**EFFICIENCY ▪ SCALABILITY ▪ FLEXIBILITY**

[www.idirect.net](http://www.idirect.net)

## INTRODUCTION

Successful business strategies in the satellite market are based on platforms and technologies that embrace change and increase profitability.

More than ever, satellite service providers, network operators and broadcasters need innovative business models, strategies and network infrastructure which adapt easily to change. If these companies want to play a significant role in the entire satellite communications ecosystem, they have to win ground in their core markets and increase profitability.

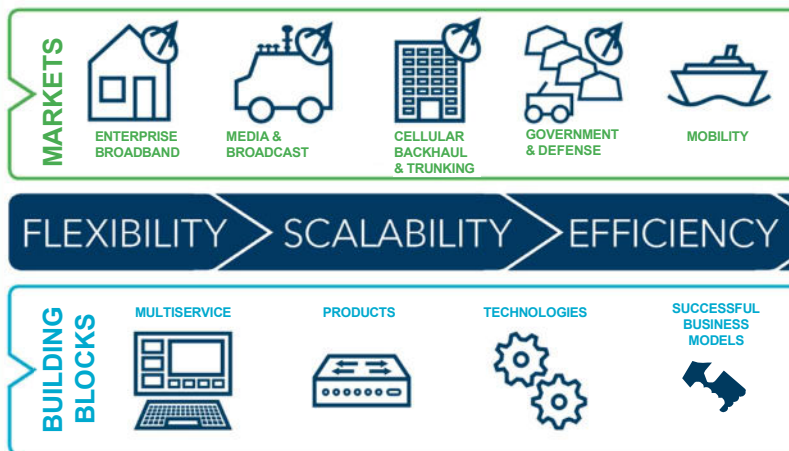
This is where the Dialog satellite platform comes in. All satellite service providers, big and small, can seize the opportunity today to fulfill their ambitious business objectives.

The Dialog platform is a scalable and flexible multiservice satellite communications platform that allows satellite service providers to build and adapt their networks easily as their businesses grow. As such, Dialog secures the future of operators, giving them the power to offer a variety of mobile and fixed services while making hassle-free decisions on which technology to use.

From a commercial perspective, Dialog offers a flexible licensing model and a modular hub architecture which enables service providers and satellite operators to start at the size they need and “pay-as-they-grow”. With a simple upgrade path, service providers can add outbound carriers, return technologies and throughput capabilities to efficiently address new opportunities and markets.

A set of key technologies bolsters the high availability platform to offer highly reliable services at unsurpassed efficiencies. This addresses the continued pressure on profitability and the ever-increasing need for more data throughput.

## INDUSTRY CHALLENGES



## YOUR PLATFORM ADVANTAGES

- More content & services
- More customers per MHz
- Small & large networks
- Fast roll-out & easy to use
- Complete modem portfolio

## WHAT IS DIALOG

Dialog is a multiservice VSAT platform that allows operators and service providers to build and adapt their infrastructure and satellite networking according to business or missions at hand. Based on the cornerstones of flexibility, scalability and efficiency, the Dialog platform gives the operator the power to offer a variety of services on a single platform.

### Key Characteristics:

- Flexible service offering
- Flexible business models
- Multiservice operation
- Anywhere, anytime services
- Streamlined operations

## FLEXIBLE SERVICE OFFERING

The overarching goal of a satellite service is to address a business opportunity in a way that creates value for customers, as well as for the satellite service provider. And how can service providers distinguish themselves from competition? By differentiation.

The Dialog platform fully manages all aspects of a service: bandwidth usage, real-time requirements, network characteristics and traffic classification. The platform offers these services with carrier grade reliability through full redundancy of the platform components.

It supports multiple traffic types:

- Video and audio
- Data
- Voice
- Datacasting

The Dialog system applies a powerful and flexible hierarchical Quality of Service (QoS) concept to the physical bandwidth available over a satellite. Multiple levels of scheduling feed the traffic so that traffic profiles can be defined at different levels simultaneously, for example:

- Individual customer services (e.g. Voice over IP (VoIP) & web traffic on a certain customer site)
- Individual customers (e.g. CIR/PIR for a certain customer site)
- Service aggregates (e.g. aggregate VoIP CIR)
- Customer networks (e.g. aggregate CIR for a corporate access network)
- Virtual Network Operator (VNO) dedicated capacity (e.g. CIR for a VNO to create its own services)

The Dialog network versatility offers layer 2 and layer 3 services. Service providers can offer value added services creating one's own value-added applications on top of open flexible Dialog APIs or by using Dialog value-added applications.

## FLEXIBLE BUSINESS MODELS

The Dialog platform enables many business models including virtual network operator (VNO) models. The model allows optimal sharing of hardware and satellite capacity resources.

This enables business models in which the satellite network operator offers dedicated capacity to a VNO, or in which a VNO acts as reseller for predefined profiles.

Up to 256 VNOs can co-exist on the same multiservice platform with different access rights and tools to operate their services. As such, the service provider can easily integrate the Dialog management interfaces in their existing Business Support System applications (e.g. billing, rating, customer-service) and Operation Support System applications (e.g. service quality monitoring, network performance, resource management).



## MULTISERVICE OPERATION



The global VSAT market has traditionally consisted of specialized service providers, each focused on specific vertical markets and regions. Until now, specialization and customer intimacy have been the key differentiators for most vendors. However, as the industry consolidates and bandwidth demand skyrockets, economies of scale will become the primary competitive advantage.

### Exploiting Application Synergies

Dialog can offer a mix of services within a geographical footprint over a single platform. Multiservice offerings provide risk mitigation and CAPEX/OPEX reduction. OPEX reduction can be achieved by exploiting the complementarity of busy hours and different services; e.g. business users during office hours versus consumers during leisure time.

### Risk Reduction

Multiservice networks offer a way to keep service revenues on par when broadband infrastructure changes in a certain region. At first, the network offers services to individual end-users when no terrestrial infrastructure is available in a certain region. Later, when, for example, a terrestrial broadband infrastructure is introduced, the need for backhauling will increase and the same network will offer backhauling services.

### Key Features

- Wideband outbound carriers: Support for wideband carriers shared across multiple markets
- Wide range of modems: Designed to meet diverse technical requirements and price points
- Industry's most efficient forward and return technologies: Optimized for various traffic patterns and data rates
- Rich API: Application programming interfaces to allow automation and customization
- Market specifics: A feature set supporting dedicated markets via one platform (such as mobility, cellular backhaul, broadcast and government)

## ANYWHERE, ANYTIME SERVICES

Providing a plethora of services anywhere, anytime completes the multiservice paradigm. The Dialog platform enables a set of mobility features with a unique flexibility to manage beam switching among multiple beams of one or multiple satellites. Low acquisition times are achieved by an intelligent selection of the initial beam based on location and beam contours.

Moving across the service area should have minimal impact on service availability during the switch from one beam to another. On top of that the management of the SLA's and cost control can be a big challenge for mobile network operators facing changing traffic demand from mobile terminals and varying capacity availability in different locations. Dialog enables sophisticated beam switching logic and has the ability to make decisions based on numerous inputs ranging from deployment plans and beam fill rates to gateway backhauling cost.



## STREAMLINED OPERATIONS

An effective NMS is a vital tool for operating any network service provider. Maximum operational efficiency and service delivery assurance are key network operational concerns. Addressing both concerns through a single management interface provides a key advantage over a plethora of management tools.

Based on insightful resource performance trends provided by the NMS, a service provider can optimize the network and plan possible extensions. Given the technical expertise and CAPEX investment required to operate a satellite hub, a flexible VNO model enables service providers to offer services with limited investment. The integration of the NMS with other OSS and BSS elements optimizes a company's overall business and operational processes.

The rate at which a network can grow is driven by how easy it is to configure and install additional terminals. In addition, accurate terminal installations result in operational efficiency and interference risk reduction.

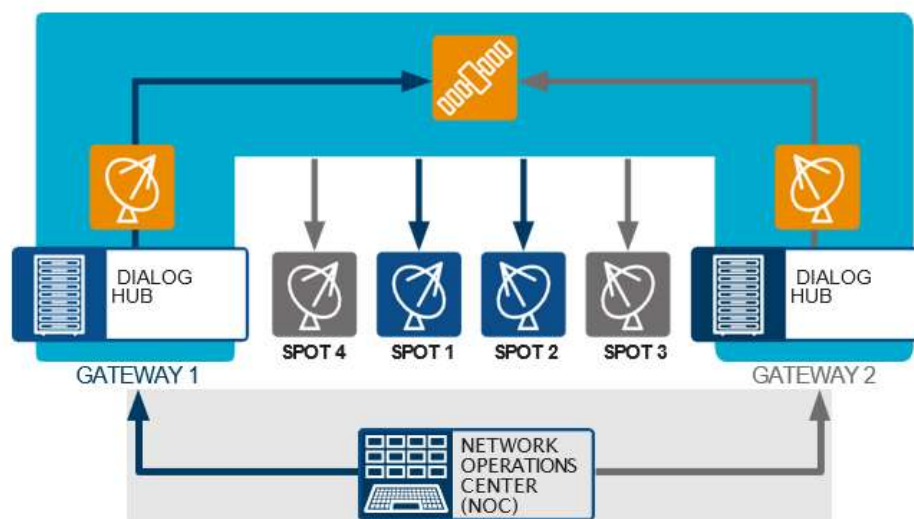
### Efficient and Effective Service Assurance

The Dialog NMS performs both short- and long-term trending to assess the performance of Dialog network services and resources. To react to degradations of the network, the NMS features intelligent alarming capabilities such as hysteresis, absolute and relative thresholds.

### Streamlined Service Activation and Configuration

An essential ingredient to efficient operations is configuring and activating new services with ease. To this end, the Dialog NMS allows new services to be provisioned over the platform through an easy-to-use, workflow-based Graphical User Interface (GUI). Satellite terminal configuration is made easy through use of profiles and duplication.

Installation of satellite terminals is made extremely simple by over-the-air provisioning functionality. Besides simplicity, it also ensures end-to-end consistency for services running over a Dialog network.



### Network Optimization Enabler

The roll-out of a satellite network often starts off with an initial assumption of link budgets, traffic patterns, etcetera. As the network further expands, it is vital for network operators to be able to monitor how efficiently and effectively services are being delivered. The Dialog NMS comes with a breadth of long-term Key Performance Indicator (KPI) trends on satellite link efficiency, traffic usage, congestion level, ... This enables a network operator to optimize the efficiency of the network, while still maintaining an effective service.

### OSS and BSS Integration

The Dialog NMS comes with a full set of APIs. This enables service providers to easily integrate OSS and BSS tools with the Dialog platform. These can be:

- Billing and revenue management systems
- Provisioning systems
- Reservation systems, such as the SatLink Manager or other third-party tools
- Integrated Management Systems that also cover, for example, terrestrial connectivity

### Fast Network Roll-out

The Point&Play smartphone app supports installation site acceptance based on a graphical overlay of the satellite orbital position on the smartphone screen. Furthermore, it supports accurate fine-tuning of the antenna orientation by showing the received signal level as a function of time, as well as showing the highest signal level found.

After mounting and positioning, the integrated certification ensures correct installation by giving instant link quality approval. It guarantees that each terminal works at maximum efficiency and with reduced interference risk.

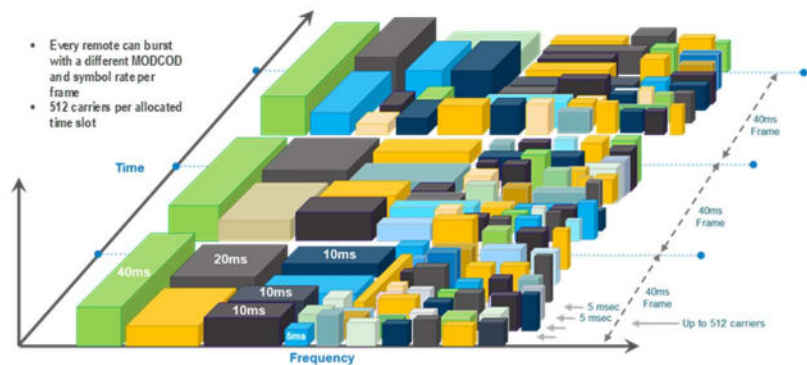
Network operators and satellite operators want to mitigate the risk of interference generated by badly installed terminals. Since badly pointed terminals use more satellite bandwidth it is in the interest of the satellite network operator to avoid this.

The Terminal Installation Certification enables an operator to measure, certify and monitor the terminal installation quality in an automated way. End-users want good service and swift access. The self-installation capabilities of the terminal enable this demand. On the other hand, the service providers want to know if the terminal is installed correctly in order to guarantee the quality of their service



## RETURN WAVEFORM

ST Engineering iDirect's Mx-DMA MRC (Multi-Resolution Coding) is a patented, efficient and dynamic waveform and multiple-access scheme bringing ultimate service agility in a single return technology. With Mx-DMA MRC, service providers can support the largest networks and a full spectrum of use cases while sharing satellite capacity more efficiently over a group of different satellite terminals.



- Mx-DMA MRC delivers the highest level of intelligent, real-time bandwidth allocation without limits on efficiency.
- The scalability of Mx-DMA MRC allows a single network to support thousands of terminals for the widest mix of applications and network requirements.
- Mx-DMA MRC offers a simpler way to manage complex traffic demands. Its service agility provides the highest Quality of Experience on a multi-service platform.
- Performance on Mx-DMA MRC expands into data rates formerly only achievable by SCPC. The waveform reaches 100 Msps resulting in a record 300 Mbps throughput on the return channel.

As a single waveform that covers the widest mix of use cases, Mx-DMA MRC is engineered to meet any range of user requirements with the simplest yet most complete technology available to the satellite industry.

Mx-DMA MRC ensures the highest efficiency for any type of application, fixed or mobile, and from very bursty traffic to fixed high bitrate services. The shared return can support a broad mix of traffic profiles. Applications with relatively lower bitrates, such as SOHO and broadband access, typically have a higher degree of overbooking to accommodate bandwidth sharing. Moving up the scale, Enterprise, SNG, Government, Cellular Backhaul and Maritime market applications have higher bandwidth requirements with less bandwidth sharing.

Terminals with a steady traffic demand will operate like a SCPC link, with slowly varying transmission parameters depending on link conditions, but will seamlessly share capacity with highly overbooked terminals carrying bursty traffic. Terminals not passing traffic will log off and restart transmission with an unsolicited logon mechanism when needed. This means that there is no idle capacity consumption.

An investment in Mx-DMA MRC infrastructure is future-safe, knowing that any future service plans will be supported in shared capacity, and sharing the infrastructure.

Mx-DMA MRC scales in MHz independent of the number of terminals. Customers served by a single return link for the majority of their use cases experience minimized operational complexity and maximized statistic multiplexing. Designing an Mx-DMA MRC link does not require precise knowledge of the traffic and terminal mix as the link self-optimizes in real time. Moreover, the high efficiency enables bandwidth savings, higher throughput, better network availability.

In addition to Mx-DMA MRC, Dialog supports these other return technologies:

- Mx-DMA HRC (high resolution coding) for aero applications
- SCPC for very high data and video rate return links using S2 Extensions to provide the highest efficiency but without means to share capacity or to overbook services
- MF-TDMA for very bursty traffic patterns and the ability to share bandwidth with a very high amount of users at the expense of the overhead of the TDMA scheme

## WHY DIALOG

### FLEXIBILITY

Dialog is built for flexibility. Whether the satellite service provider addresses a single application or multiple markets, Dialog offers customers optimal technology without compromising while enabling multiple VNO business models. This produces a multitude of possibilities for optimizing the usage of infrastructure and satellite capacity for different markets.

Dialog easily adapts to any business needs and goes hand-in-hand with delivering tailored services. End-users can now be served with the optimal SLA at the right price.

### SCALABILITY

The platform scales to every type of satellite network: from small networks, with five remotes, up to the largest networks, having hundreds of thousands of remotes, from single coverage to multispot HTS networks. Additionally, satellite service providers can invest as the business grows. The Dialog hub module equipment and the platform software licenses enable low up-front CAPEX.

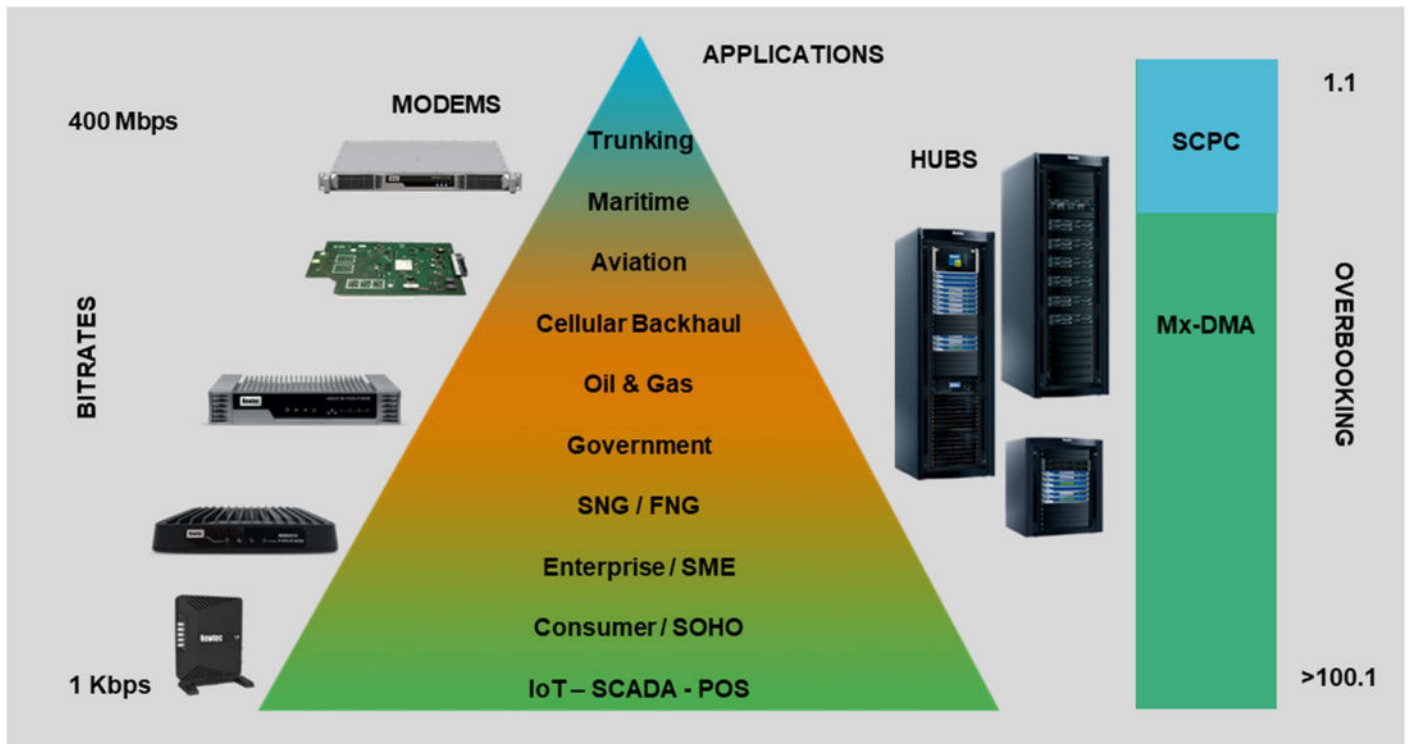
### EFFICIENCY

Efficiency is defined both at operational and technology level in the Dialog platform. Satellite service providers can select the best transmission technology for their particular application. For the forward link, all applications share a highly efficient DVB-S2 or DVB-S2X technology.

In the Satellite return link, Mx-DMA MRC sets the benchmark by uniting efficiency, scalability, service agility and performance into one—the industry's most flexible and dynamic return technology. With Mx-DMA MRC, service providers can support the largest networks and a full spectrum of use cases while sharing satellite capacity more efficiently over a group of different satellite terminals. The efficiency of the satellite links is combined with ST Engineering iDirect's core technologies such as FlexACM® and Cross-Layer-Optimization.

The service provider can now easily optimize modulation and bandwidth allocation, while guaranteeing the highest efficiency and availability. Operational efficiency is guaranteed through a single, unified interface for all configurations, monitoring and troubleshooting operations on the whole Dialog platform.

## BUILDING BLOCKS



Dialog is a revolutionary VSAT platform enabling a wide range of business-to-consumer, business-to-business and governmental applications over a single versatile satellite communications system covering both fixed and mobile environments. The core of the Dialog platform is the Dialog hub which is designed to be a fully scalable and flexible multiservice solution.

The unsurpassed scalability and flexibility is fully exposed through the NMS which makes it perfectly suited for basic star networks with just a few terminals up to complex networks with multiple spot beams accessed from multiple gateways with many thousands of terminals. The versatile modem portfolio provides the right performance, application-specific characteristics and price point for a wide range of targeted applications.

The Dialog platform functionality can be continuously increased through software upgrades which maximize the hub and modem equipment investment.

## MODEMS

The Dialog modem series optimally matches the wide variety of market and application requirements. The modems share a wide range of key features and can be easily mixed in a single satellite network. Full terminals are offered by while the modems have also been certified with several application-specific antennas for maritime and Communication On The Pause (COTP).

Product – Market Couples	Consumer Broadband	Community Broadband	SME Connectivity	Fishing	Merchant Shipping	Offshore Oil & Gas	Backhaul 2G / 3G	Corporate Network	Backhaul 4G	Cruise	Broadcast	Fiber Restoration
MDM5010	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MDM3315	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MDM2510	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MDM2010	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

## KEY FEATURES

### Satellite Interface

- DVB-S2X ACM Receive up to 500 Msps

### Traffic Optimization

- True broadband experience with embedded TCP acceleration and encryption
- Low jitter for real-time applications
- Multilevel QoS with fourteen classes
- DNS cache/relay

### IP networking

- Versatile IP routing and addressing
- Multiple virtual networks behind the modem
- Support of IPv4 and IPv6

- Next hop routing
- Forward Multicast support (IGMPv2 / static configuration)
- Return Multicast support -

### Layer 2 services

### Operational

- Easy installation using Point&Play®
- Over-the-air monitoring and diagnostics tools
- Over-the-air software upgradeability
- Multilingual web GUI for installation, diagnostics and troubleshooting

## ADVANTAGES

- The most optimal return modulation and bandwidth allocation while guaranteeing the highest efficiency and availability
- Highest forward efficiency using DVB-S2X
- Up to 50% satellite bandwidth savings with Mx-DMA
- True broadband experience
- Rapid and risk-free network deployment

## TECHNOLOGIES

- DVB-S2X
- Mx-DMA
- FlexACM
- Point&Play
- Cross-Layer-Optimization
- Clean Channel Technology
- Multicast
- Acceleration & Compression
- Wideband

## MDM2010

The MDM2010 Satellite Modem is a wideband DVB-S2X two-way, high throughput modem that supports Mx-DMA with Multi-Resolution Coding (MRC) return links. It is combined with a range of different antenna sizes and interactive LNBS forming a cost-effective satellite terminal on the Dialog platform.

The modems support various IP services like Internet/Intranet access, VoIP and multicasting. It is perfectly suited for home users, Small Office and Home Office (SOHO), Small and Medium Enterprises (SME) as well as supporting applications like telemetry networks, Point of Sale (POS) or banking.



### MDM2010

#### Key Features

- DVB-S2X support up to 500 Mps in the forward link
- Mx-DMA with MRC (Multi-Resolution Coding) up to 10 Mps return link
- High throughput, up to 100/10 Mbps
- Support for single cable and dual cable outdoor units
- Optional embedded wifi
- Unique Point&Play easy-installation capability
- Easy to use multilingual web GUI for installation, diagnostics and troubleshooting
- Compact, lightweight desktop modem
- MF-TDMA and patented Mx-DMA return capabilities
- Low power consumption
- High performance peak throughput up to up to 100/10Mbps
- Optional wifi variant
- bundled with a range of different antenna sizes and interactive LNBS
- Up to 50% satellite bandwidth savings with Mx-DMA

## TERMINAL CONFIGURATIONS

The MDM2010 is bundled with a range of different antenna sizes and interactive LNBS forming an affordable satellite terminal on the Dialog platform. Its ease of installation and high-performance modulation techniques enable network operators to offer IP broadband services in a cost-effective way.

### ODU Portfolio

	Ku-band			Ka-band						
	ILB2140	ILB2140	ILB2141	ILB2220	ILB2220	ILB2221	ILB3210	ILB3210	ILB3211	
<b>ODU Type</b>	ANT2010	ANT2025	ANT2035	ANT2010	ANT2025	ANT2035	ANT2010	ANT2025	ANT2035	
	0.75 m	1 m	1.2 m	0.75 m	1 m	1.2 m	0.75 m	1 m	1.2 m	
<b>Rated Power</b>	2	2	2	2	2	2	2	2	2	Watt
<b>Rx Frequency Range</b>	10.7-12.75			18.1-20.2			17.7-20.2			GHz
<b>Tx Frequency Range</b>	13.75-14.5			28.1-30.0			29.0-30.0			GHz
<b>Return Waveform Support</b>	4CPM Only			4CPM Only			4CPM & Mx-DMA MRC			

## MDM2510

The MDM2510 is a compact, low power consumption modem, perfectly suited to service Small Office and Home Office (SOHO) customers and Small and Medium Enterprises (SMEs). The modem features high throughput DVB-S2X and Dialog's return waveform technology Mx-DMA with Multi-Resolution Coding (MRC) to guarantee the highest efficiency and availability.

With data rates up to 120 Mbps, the MDM2510 supports applications such as Point of Sale (POS) and banking networks. The modem's ease of installation through multilingual web GUIs and Point&Play application allows services providers to deploy their services quickly, in a cost-effective way.



## MDM2510

### Key Features

- DVB-S2X support up to 480 Msps in the forward link
- Mx-DMA with MRC (Multi-Resolution Coding) up to 20 Msps return link
- High throughput, up to 120/20 Mbps
- Support for single cable and dual cable outdoor units
- OpenAMIP and GXT file support
- Embedded GTP acceleration and compression
- Optional external -48V DC compatible converter
- compact with rack mount kit option
- MF-TDMA and patented Mx-DMA return capabilities
- Low power consumption
- High performance peak throughput up to up to 120/20Mbps
- Optional external -48V DC compatible converter
- Antenna control interface compatible with OpenAMIP
- Embedded GTP Acceleration
- Up to 50% satellite bandwidth savings with Mx-DMA

## TERMINAL CONFIGURATIONS

The MDM2510 has full flexibility in the use of different antenna sizes and types, frequency bands and output power. It can be bundled with a range of different antenna sizes and proprietary interactive LNBS forming an affordable satellite terminal on the Dialog platform. It can be also offered in combination with a set of carefully selected and tested antenna sizes and BUC combinations.

	Ku		Ka			C	
	1 m	1.2 m	75 cm	1 m	1.2 m	1.8 m	2.4 m
2W ILNB				✓			
2 W BUC							✓
3 W BUC	✓				✓		
4 W BUC	✓						
5 W BUC							✓
6 W BUC	✓						

## MDM3315

The MDM3315 is ideal for enterprise, cellular backhaul, maritime, broadcast, and government markets and supports a wide range of fixed IP, mobility, and multicasting services. Peak throughput reaches 150/70 Mbps and the wideband receive capability makes the MDM3315 a perfect fit for usage on HTS/VHTS. The modem's ease of installation through web GUIs and remote commissioning applications allows services providers to deploy their services quickly, in a cost-effective way.



The modem is also available as a board level variant, the SMB3315, which is suitable for both fixed and COTM terminal solutions.



## TERMINAL CONFIGURATIONS

The modem is offered separately or in combination with the ODU Portfolio, a set of carefully selected and tested different antenna sizes and BUC combinations. The modem has been certified with several application-specific antennas for maritime and COTP applications.

## MDM3315

### Key Features

- DVB-S2 (up to 45 Msps) / DVB-S2X\* (up to 500 Msps) outbound
- Supports DVB-S2X\* MODCODS up to 64APSK
- Return max rates up to 29 Msps (ATDMA), 64 Msps (SCPC), 40 Msps\* (MX-DMA MRC)
- Ideal for both fixed and mobility applications
- OpenAMIP and GXT file support for mobility
- Optional 256-bit AES encryption\*
- ATMEL chip for authentication
- Embedded TCP acceleration, GTP acceleration and header compression
- For operation in Dialog, Evolution or Velocity networks
- -48Vdc mains support
- Up to 50% satellite bandwidth savings with Mx-DMA

## MDM5010 SERIES

The MDM5010 Satellite Modem is a high throughput modem supporting a wide range of fixed IP services, including enterprise, cellular backhaul and maritime connectivity as well as multicasting. In one modem, MDM5010 delivers three distinct forward-return combinations of VSAT and SCPC modes for high to very-high data rate applications. On Dialog release 2.5.1, the modem reaches 300 Mbps throughput in Mx-DMA MRC mode resulting in unprecedented performance.



The MDM5010 is a one-of-a-kind combination of speed and capabilities that increases Quality of Experience for the user while it decreases total cost of ownership for the service provider. The high-speed capabilities and high efficiency make it the perfect fit for even the most demanding traffic profiles and SLAs such as bandwidth-intensive applications across enterprise, backhauling, offshore and maritime markets.

In a single modem, MDM5010 offers three operational modes and aggregate performance profiles, reset by a simple reboot:

### 1.1 Gbps DVB-S2X forward and award-winning Mx-DMA return

Mx-DMA is our patented and award-winning, flexible and dynamic waveform which enables service providers with the ultimate service agility to support the very largest networks and a full spectrum of use cases by sharing satellite capacity more efficiently over a group of satellite terminals.

### 1.2 Gbps DVB-S2X forward and SCPC return

Offload very high rate steady-state traffic in the from DVB-S2X/Mx-DMA to DVB-S2X/SCPC mode for video-rate return links. This mode is perfect for those use cases where there are instances very high bandwidth required.

### 1.6 Gbps SCPC point-to-point

For very high data rate use cases, MDM5010s can be used in a point-to-point mode, which does not require a Dialog platform. For additional flexibility, service providers may also move several discrete SCPC links to a common Dialog shared outbound link to allow overbooking and statistical multiplexing gains. Alternatively, the MDM5010 used on a Dialog platform can be switched to higher data rates simply by moving the modem from a shared outbound to dedicated SCPC point-to-point mode.

## MDM5010

### Key Features

- DVB-S2 (up to 64 Msps) / DVB-S2X (up to 500 Msps) outbound
- Supports a full range of DVB-S2X MODCODS up to 256APSK
- Return max rates up to 133 Msps (DVB-S2X/SCPC), 100 Msps (Mx-DMA)
- Supports 220Msps (SCPC P2P)
- Bandwidth cancellation up to 133 Msps (140 MHz) carriers
- OpenAMIP and GXT file support
- Embedded TCP acceleration, GTP acceleration and header compression
- SFP optical ethernet data port
- Dual Tx/Rx for multi-orbit
- Backward compatible with MDM6000
- Simple, intuitive GUI
- Up to 50% satellite bandwidth savings with Mx-DMA
- Very high packets per second processing for any application
- Serves the most demanding customers in any market with a single modem platform

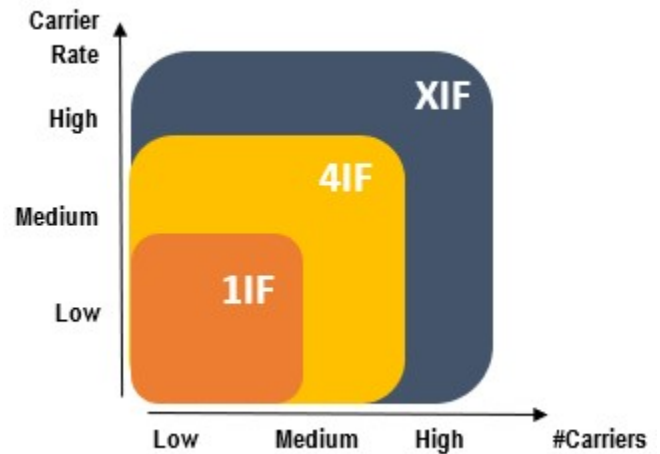


## HUBS

Dialog offers multiple hub types providing reliable hub infrastructure for different network configurations and scale. Each hub provides flexibility and modularity facilitating the growth of networks and the addition of services.

Service providers and operators can build their business to the market need and size they need it. As a result of the low upfront CAPEX, they can invest as their business grows. The Dialog hubs support multiple satellites, multiple frequency bands, regular and spot beam satellites.

The hub easily integrates with the 'IP backbone' router and the RF gateway up/downlink. Optional redundancy can provide better than 99.99% availability.



### KEY FEATURES

- Highly efficient DVB-S2/DVB-S2X ACM in the forward link
- Mx-DMA, SPCP and MF-TDMA return link technology on a single forward
- Fully integrated, connecting directly to IP and RF uplink and including:
  - Forward link equipment (1F or L-band)
  - Return link equipment (L-band)
  - Traffic and QoS management
  - Acceleration/Compression/Encryption
  - Dialog NMS
- Advanced hierarchical QoS management
- Extensive networking/routing capabilities, easy integration into terrestrial network

### ADVANTAGES

- Scalable from a few to hundreds of thousands of terminals
- Customizable number of forward modulator and return multicarrier demodulator units
- Carrier grade availability, better than 99.99%
- Easy to install and maintain

**HUB6501 1IF Hub**  
Small scale, dedicated networks

**HUB6504 4IF Hub**  
Small gateway deployments

**XIF Hub**  
Large gateway deployments

### KEY FEATURES

- One satellite network, up to 250 terminals
- Up to 300 Mbps aggregate throughput
- Includes all traffic processing functionality
- Optional redundancy
- Lowest initial investment for small networks
- Low-cost infrastructure for dedicated hubs on customer premises or in country



- Single rack
- Up to four satellite networks
- Up to 1,600 Mbps aggregate throughput
- Up to 133 Msps forward carriers
- Carrier grade reliability with built-in redundancy
- Low initial cost, pay-as-you-grow



- Highly flexible and scalable gateway architecture
- Optimized baseband density & flexibility with baseband matrix
- Up to 500 Msps forward carriers
- Carrier grade reliability with built-in redundancy
- Full virtualization flexibility through Private Cloud
- Pay-as-you-grow



## MODULATORS AND DEMODULATORS

The Dialog hub modules are equipped with modulators and multicarrier demodulators according to the satellite network requirements. Full detailed specifications can be found in the respective product leaflets on our website.

		MCD7500 MULTICARRIER DEMODULATOR		MCD7000 MULTICARRIER DEMODULATOR	MCM7500 MULTICARRIER MODULATOR	M6100 MODULATOR
Forward				SCPC/DVB-S2/S2 Extensions <sup>(2,3)</sup>	DVB-S2, DVB-S2X	DVB-S2, DVB-S2X
Return	Mx-DMA MRC	SCPC / Mx-DMA HRC	MF-TDMA 4CPM			
Modulation	QPSK, 8PSK, 16APSK, 64APSK	VLSNR <sup>(5)</sup> , QPSK, 8PSK, 16APSK, 32APSK	4CPM	QPSK to 32APSK	QPSK, 256 APSK	QPSK to 256APSK
Carrier Options: Number of Carrier Bandwidth	512 carriers 100 Ksps - 100 Msps	Up to 12 carriers in range 0.12 - 68 Msps  Up to 24 carriers in range 0.03 - 20 Msps	144 <sup>(4)</sup> carriers 0.128 to 4 MHz	3 carriers 133 Msps max	1 carrier Max. 500 Msps <sup>(1)</sup>	1 carrier Max. 133 Msps <sup>(1)</sup>
Processing BW	105MHz	72 MHz	40 MHz	3 x 140 MHz	525MHz	
Data Throughput	400Mbps	216 Mbps	50 Mbps	370 Mbps	2 Gbps	370 Mbps
Roll-off					5, 10, 15, 20, 25 and 35%	5, 10, 15, 20, 25 and 35%
Pre-distortion					Equalink	Equalink
Active Terminals	5000					

(1) Modulator specifications, network configuration may be limited by modem capabilities.

(2) Software upgradable to new DVB-S2X standard.

(3) Demodulator specifications, network configuration may be limited by modem capabilities.

(4) Multicarrier demodulator can process up to 3000 logged-on terminals, generating concurrent traffic.

(5) Only available for 20 Msps carrier option

## GEOREDUNDANCY CONTROLLERS

### GEOGRAPHICAL HUB REDUNDANCY CONTROLLER

The Dialog hubs can be optionally fitted with a Geographic Hub redundancy solution. This allows two hub modules with the same configuration (satellite capacity, terminals) to work in an active-standby setup. The configuration of the standby hub is continuously synchronized with the active hub by a Geographical Hub Redundancy Controller to allow rapid switchover. In the event the network fails to operate over the active hub, an operator can decide to switch over to the other hub to continue operation through the Geographical Hub Redundancy Controller.

### GEOGRAPHICALNMS REDUNDANCY CONTROLLER

The Dialog NMS module can also be optionally fitted with a Geographic Hub redundancy solution. This allows two standalone NMS modules to work in an active-standby setup. The configuration of the standby NMS is continuously synchronized with the active NMS by a Geographical Hub Redundancy Controller to allow rapid switchover. In the event the active NMS module fails, an operator can decide to switch over to the other NMS module to continue operation through the Geographical NMS Redundancy Controller. The same solution can also handle the georedundancy of the Mobility Manager modules which can optionally operate on top of the NMS modules.

# NETWORK MANAGEMENT SYSTEM

## SINGLE, SCALABLE & TURNKEY MANAGEMENT INTERFACE

The Dialog NMS provides a single, unified interface for all configurations, monitoring and troubleshooting operations on the whole Dialog platform. It is made with the scalability of the Dialog platform in mind.

Whether a small, dedicated private hub or a large HTS network with teleports at different geographical locations, the Dialog platform can handle all operations whatever their size. This means network operators can handle their globally distributed Dialog platform all from the same NOC.

### KEY FEATURES

- Feature-rich performance trending and analysis tools
- Bubble-up & drill-down alarm identification flow
- Comprehensive alarm lifecycle management
- Streamlined service configuration & activation
- Single management interface
- Scalable for a small private hub to a global HTS or multiple coverage zones network
- APIs for OSS/BSS integration
- API for beam switching supporting external business logic
- Flexible VNO model

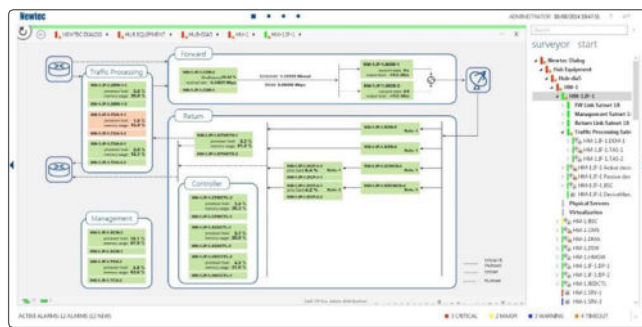
### VNO SUPPORT

The Dialog management system supports two kinds of business roles. Firstly, it has a Network Operator (NO) business role which has full access to the complete network. Secondly, it has a VNO business role to support multiple service providers over the same platform, each with their management domain. The flexible Dialog VNO concept can be used to support different business models, from a model where specific capacity and routing is dedicated to a VNO, enabling it to create its own service profiles, to a model where a VNO is simply a reseller of specific network operator defined service profiles. Each VNO is provided with tools to manage the services, network and elements it is provided access to by the Network Operator. The VNO has both GUI and API access for its dedicated resources.

### INTUITIVE WEB-BASED GUI

The navigation of the GUI is built around a topology tree structure with bubble-up alarm severity propagation and drill-down capabilities. This allows rapid isolation of fault conditions and service-delivery impact through powerful analysis features such as export, statistical analysis.

In addition, the NMS features comprehensive alarm lifecycle management via a user-centric alarm console. This versatile console enables alarm sorting, smart filtering, masking and acknowledging, exporting and much more.



Alarm ID	Severity	Description	Status
1001	High	Service Unavailable	Active
1002	Medium	Configuration Error	Resolved
1003	Low	Performance Degradation	Monitoring

## NMS APPLICATIONS

The NMS Applications are software applications that extend the capabilities of the Dialog NMS by leveraging its extensive API. They either provide turnkey solutions for operators and service providers for specific market applications or provide operational support in the planning of satellite networks.

### MOBILITY MANAGER

As ships and airplanes move around the globe, mobile VSAT terminals often need to transition between satellite footprints. This process is known as “Beam Switching”. The Dialog Mobility Manager is a turnkey solution for managing mobility networks. The solution provides a centralized beam switch decision logic, giving flexibility to mobility network operators to bring specific business logic in the beam switching decision making. This business logic can be optimized for different customer types and use various input parameters to make the switching decision.

### VALUE

The Dialog Mobility Manager provides unprecedented control over beam switching logic, minimizing OPEX and optimizing customer experience. It allows to exploit the benefits of High Throughput Satellites without beam switch control headaches

### ADVANTAGES

Efficient and Effective Service Assurance

- Guarantee a consistent service across the whole network
- (consistent service over a specific region, number of cruise ships)
- Provide the best connectivity experience to your most demanding customers

Effortless Mobility Management

- Have control on when a ships switches from one beam to another
- Minimize the need for excess capacity
- (to serve as a margin of error, as terminals move around in unpredictable ways)
- Easily include additional business parameters in the beam switching logic

### KEY FEATURES

- Streamlined service activation and configuration
- Customizable mobility management policies
- Web-based GUI with multi-layer maps
- Key Performance Indicator trending

## SATLINK MANAGER

Multiple satellite applications are characterized by the occasional nature of the services. These applications can be found in multiple markets. Broadcasters are looking for optimization of capacity usage, reliable automation of link set-ups, flexible workflow support and a solution that can be tailored exactly to the needs of the broadcaster.

Equally, telco service providers are confronted with the need for occasional link transmissions, i.e. for fiber restoration purposes. This requires an ad-hoc, reliable, automated setup of bidirectional IP links for a limited time.

## VALUE

The SATLink Manager allows service providers to efficiently manage the transmission resources and capacity and, at the same time, guarantees error-free link set-ups by fully automating the satellite ground equipment. The satellite resource management capabilities and equipment automation of the SATLink Manager ensures bandwidth-optimized, cost-effective, permanent and occasional use transmissions.

## ADVANTAGES

### Reduced OPEX through Optimized Satellite Capacity Management

The SATLink Manager optimizes the satellite capacity required for occasional use transmissions through the support of pooled capacity. The satellite capacity used for the transmission is taken from a pre-configured pool of satellite bandwidth which can be shared by multiple remotes and by multiple services.

Contention management ensures the pooled capacity is not overbooked, thereby guaranteeing the bandwidth for a transmission once it is reserved. Configured satellite capacity can be dynamically added, removed or updated.

The SATLink Manager provides flexible ways of space segment allocation. Allocation of space segment for a transmission can be through:

- Manual capacity allocation by entry of start and end frequency.
- Slot-based capacity allocation, whereby capacity is divided into specific slots.
- Optimized capacity allocation, whereby the SATLink Manager optimizes the space segment usage by determining a free space segment with a bandwidth based on the requested info rate. Optimized capacity allocation ensures the most efficient use of satellite space segment, minimizing OPEX.

### Support for a Variety of Link Topologies

The support for flexible link topologies offers the user the choice between bandwidth-efficient, low delay mesh unicast multicast links at the expense of high powered and therefore more costly ODU, versus star-based transmissions with cost-effective terminals, at the expense of extra transmission delay and satellite bandwidth.

## KEY FEATURES

- Booked and ad-hoc satellite ground equipment and space segment resource allocation and reservation
- Resource allocation based on session service characteristics
- Manual, slotted and optimized bandwidth allocation
- Multiple services supported on shared satellite capacity
- Full automation of link set-ups/teardowns
- Support for mesh and star-based SCPC and MCPC link topologies
- Support for per reservation QoS and SLA definitions
- VNO support
- Support for dynamic additions/removals/updates of space segment resources
- Multihop session support

## FILE EXCHANGE MANAGER

The File Exchange Manager application is a versatile solution for the non-linear contribution, distribution and exchange of file-based digital assets.

## VALUE

Service providers in the enterprise and governmental market are confronted with the need for the dissemination of files to a variety of remote stations like cinemas or POS. As well as a reliable and secure transmission, this also requires the management of different content bouquets for different receiver groups while honoring the importance and priority of those.

The broadcast industry is gradually moving from linear workflows to non-linear, file based workflows, thereby benefiting from all the advantages it brings: the possibility for off-peak hour content exchanges, error-free transmissions of assets, embedded support for content metadata.

File based workflows come, however, with their own challenges: the need for reliable, secure and bandwidth- efficient transmissions, demanding end-to-end automation of the transmission, OPEX friendly transmissions through optimized and flexible capacity usage and a transmission workflow that can be tailored exactly to the needs of the broadcaster.

## KEY FEATURES

- Reliable point-to-point file contribution
- Reliable point-to-multipoint file using IP multicast
- Transport layer FEC & lost packets retransmission
- Watch folder-based queue-based transmissions

## ADVANTAGES

- Ability to permanently 'fill the satellite pipe'
- Flexible workflow management support
- OPEX friendly transmissions through optimized and flexible capacity usage

## TECHNOLOGIES

With its passionate commitment to R&D, ST Engineering iDirect continues at the forefront of technological development. Pioneering contributions have led to industry standards (including DVB-S2 and DVB-S2X, DVB RCS and iSatTV) and barrier-breaking efficiency technologies that help customers achieve greater efficiency to increase performance and expand market reach.

The Dialog platform integrates innovative and revolutionary technologies including the award winning Mx-DMA MRC waveform and return access technology that conveys the highest levels of efficiency, scalability, agility and performance. The combination of the technologies serve the overall Dialog platform solving bandwidth issues, providing excellent quality of service and managing the availability of the satellite link.

### FLEXACM

End-to-end solution optimizing IP trunking links

### POINT&PLAY

Self-installation system for antenna positioning

### MX-DMA

The industry's most flexible and dynamic return technology

### CARRIER ID

Identification of the source of an interfering carrier

### DVB-S2X

DVB-standard on Dialog

### WIDEBAND

Extra 20% gain over 72 MHz transponders

### CLEAN CHANNEL TECHNOLOGY

Improve efficiency by up to 15%

### CROSS-LAYER-OPTIMIZATION

Optimization of satellite links without data loss

### BANDWIDTH CANCELLATION

Unrivalled capacity gain through full digital processing

### EQUALINK

Pre-distortion compensating filter and amplifier effects

### ACCELERATION & COMPRESSION

Higher user experience of Internet or enterprise applications

### MULTICAST

Efficient distribution technology for content and media

### MULTISTREAM

Aggregation of IP streams into a single satellite carrier



## MARKETS & APPLICATIONS

Today's satellite service providers interact with many different communication technologies across a broad range of platforms. The operator, satellite service provider and end-users all expect to receive the data rates and QoS level to fit their application requirements. The key for the satellite service provider here is to fully understand the business or the operation of its customers and to provide services according to the nature of these applications.

A good approach is to draft different user profiles (per market, application or segment in the value chain) based on typical Satcom usage, priorities and performance attributes. A typical user profile will look at the following performance attributes:

- Data throughput
- Availability (SLA)
- User experience
- Terminal cost
- Ease of use
- Efficiency
- Performance
- Product/application fit

Different applications and markets have different needs. The user profile and performance attribute expectations of a home user with Internet access over satellite is entirely different from a broadcaster. For the broadcaster, not losing the satellite link for live sports video feed has priority over pricing, whereas 'assertive' consumer VSAT users tend to switch service providers quickly if they are not happy with the user experience or pricing.

The strength of the Dialog platform is the ability to combine different applications and user profiles on the same platform, which results in massive efficiency gains as well as cost savings. Furthermore, bandwidth allocation can be shifted among the different applications depending on the business opportunity or the mission at hand.

	Services	Benefit
<b>MARITIME</b>		
	<ul style="list-style-type: none"> <li>• Voice</li> <li>• Internet access</li> <li>• Cellular backhaul</li> <li>• Crew welfare</li> <li>• Corporate data</li> <li>• System monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Industry standard interfaces for mobile antenna integration</li> <li>• Beam switching based on maritime specific business logic</li> <li>• Support of different maritime segments in the same capacity with MX-DMA MRC</li> <li>• Highest efficiency high speed mobile services</li> <li>• Multi-band antennas support</li> </ul>
<b>CELLULAR BACKHAUL</b>		
	<ul style="list-style-type: none"> <li>• 2G Backhauling</li> <li>• 3G Backhauling</li> <li>• 4G Backhauling</li> </ul>	<ul style="list-style-type: none"> <li>• Single platform for different backhaul services</li> <li>• Advanced QoS, QoE and performances</li> <li>• Highest number of sites per MHz bandwidth</li> <li>• Satellite capacity dynamic management according to traffic</li> <li>• GTP acceleration support by a wide modem portfolio</li> </ul>
<b>TRUNKING</b>		
	<ul style="list-style-type: none"> <li>• Fiber restoration</li> <li>• Leased line</li> <li>• IP backbone</li> <li>• IP trunking</li> </ul>	<ul style="list-style-type: none"> <li>• Committed Information Rates in Adaptive Environments</li> <li>• Automated workflows for fiber backup</li> <li>• Advanced bandwidth savings</li> <li>• Low to very high-speed point to multipoint</li> </ul>
<b>ENTERPRISE</b>		
Offshore Oil & Gas	<ul style="list-style-type: none"> <li>• Crew welfare</li> <li>• Corporate data</li> <li>• TV Video Conferencing</li> <li>• System monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Industry standard interfaces for mobile antenna integration</li> <li>• Multi-modem support on a single antenna</li> <li>• Multilevel QoS with fourteen classes</li> </ul>
Energy	<ul style="list-style-type: none"> <li>• Corporate Applications</li> <li>• Video Conferencing</li> <li>• VoIP</li> <li>• Internet access</li> <li>• Data Casting</li> <li>• SCADA M&amp;C</li> </ul>	<ul style="list-style-type: none"> <li>• Highly reliable and cost-effective services</li> <li>• Support for very high throughput</li> <li>• Land and offshore connectivity</li> <li>• Low entry level hub for small private networks</li> <li>• Low latency/jitter</li> </ul>
IoT/SCADA	<ul style="list-style-type: none"> <li>• Always-on monitoring data</li> <li>• On Site VoIP and Internet access</li> <li>• Remote video</li> </ul>	<ul style="list-style-type: none"> <li>• Lowest Total Cost of Ownership with low cost MDM2010 terminals</li> <li>• High efficiency transactional communications with Mx-DMA MRC</li> <li>• Combined data, video and high end video services on single platform</li> </ul>
Enterprise / SME	<ul style="list-style-type: none"> <li>• VoIP</li> <li>• Private networking</li> <li>• Premises-based VPN</li> <li>• Business continuity</li> <li>• Datacasting</li> </ul>	<ul style="list-style-type: none"> <li>• Service model to create tailored services with guaranteed behavior</li> <li>• Seamless integration into terrestrial network, layer 2 and layer 3 based</li> <li>• Low entry level HUB module for private HUBs</li> <li>• Carrier grade availability</li> </ul>
Enterprise Broadband	<ul style="list-style-type: none"> <li>• Internet access</li> <li>• Voice</li> </ul>	<ul style="list-style-type: none"> <li>• True broadband experience</li> <li>• Lowest customer acquisition cost with low cost terminal and Point&amp;Play</li> <li>• Single public IPv4 address per terminal</li> <li>• Unlimited scalability from 100s to 100,000 of customers</li> <li>• Bridging the service ramp up phase with other services</li> </ul>

**Services**
**Benefits**
**GOVERNMENT**

Government Networks	<ul style="list-style-type: none"> <li>• Internet access</li> <li>• Datacasting</li> <li>• Video conferencing</li> </ul>	<ul style="list-style-type: none"> <li>• Easy carrier and capacity grooming</li> <li>• Maximum service availability in order to maintain mission critical data exchange</li> <li>• Be ready to deploy anywhere, anytime</li> <li>• Invest as operations grow or different missions are engaged</li> </ul>
ISR & Border Security	<ul style="list-style-type: none"> <li>• Backhaul of aggregated ISR data to HQ</li> <li>• File-exchange</li> <li>• CCTV feeds and sensor data contribution</li> </ul>	<ul style="list-style-type: none"> <li>• Dynamically cater for small and large ISR feeds from sensors in the theater</li> <li>• Reliable and efficient Multicasting technology</li> </ul>
Disaster Recovery	<ul style="list-style-type: none"> <li>• First assessment and response</li> <li>• Telecom services</li> </ul>	<ul style="list-style-type: none"> <li>• Easy deployment of terminals</li> <li>• Single platform for different phases of recovery process</li> </ul>
MWR	<ul style="list-style-type: none"> <li>• Internet access</li> <li>• Voice</li> </ul>	<ul style="list-style-type: none"> <li>• Rich choice in COTS satcom equipment and technology</li> <li>• Broadband Experience Away from Home</li> <li>• Dynamically cater for small and large remote sites or operations on-the-move</li> </ul>

**MEDIA & BROADCAST**

FNG / IP-SNG	<ul style="list-style-type: none"> <li>• FNG video quality for breaking news</li> <li>• Simultaneous live and file</li> <li>• Voice coordination channels</li> <li>• Broadband access</li> </ul>	<ul style="list-style-type: none"> <li>• Always-on broadband connectivity</li> <li>• Cost-effective and ruggedized terminals with easy installation</li> <li>• Complementary to cellular bonding solutions</li> <li>• Efficient use of satellite resources</li> <li>• High availability on Ka-band networks</li> </ul>
SNG	<ul style="list-style-type: none"> <li>• News and Sports contribution</li> <li>• PTP and P2MP</li> <li>• Broadband access</li> <li>• Fleet management</li> <li>• Simultaneous live and file</li> </ul>	<ul style="list-style-type: none"> <li>• Flawless end-to-end workflow automation support</li> <li>• Less highly skilled staff required for every event</li> <li>• Faster link setup</li> <li>• Effective use of satellite and equipment resources</li> <li>• Compact equipment for native video and accelerated IP</li> </ul>
Fixed Contribution	<ul style="list-style-type: none"> <li>• Occasional Use SD / HD</li> <li>• DVB-S2 TS live transmissions</li> <li>• PTP and P2MP</li> <li>• Simultaneous live and file</li> </ul>	<ul style="list-style-type: none"> <li>• Flawless end-to-end workflow automation support</li> <li>• OSS/BSS and scheduling systems interfacing possibilities</li> <li>• Effective use of satellite and equipment resources</li> <li>• Hybrid terrestrial - satellite</li> <li>• A range of terminals with support of high bitrates</li> </ul>
Distribution	<ul style="list-style-type: none"> <li>• TV/Radio</li> <li>• Always-on return channel</li> </ul>	<ul style="list-style-type: none"> <li>• Remote monitoring of towers and headends via secure connection</li> <li>• Efficient transponder usage of Multistream and Equalink</li> </ul>
Direct-to-Home (DTH)	<ul style="list-style-type: none"> <li>• Quadruple play package</li> <li>• Hybrid set-top box, connected TV</li> </ul>	<ul style="list-style-type: none"> <li>• Simultaneous DTH and broadband using single antenna</li> <li>• Efficient transponder usage with Equalink</li> </ul>