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SKYWAN TECHNOLOGY

THE ONE – MASTERMIND OF SATCOM NETWORKS

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CONTENT

SKYWAN BENEFITS THE END-USER

The communication requirements of enterprises and organizations are constantly changing. Flexibility and versatility are key assets of ND SATCOM's core network system SKYWAN, which exceeds all expectations, and provides further assets! ND SATCOM's SKYWAN is a bi-directional satellite communication platform for customer-centric networks. The platform enables star, mesh, multi-star or hybrid topologies with Communications-On-The-Move (COTM) support allowing service providers to adapt network connectivity requirements seamlessly to customer application needs. SKYWAN unlocks new business opportunities with improved total cost of ownership for service providers that need to leverage multiple hub or hubless network configurations. SKYWAN provides MF-TDMA and DVB-S2X, allowing for real-time transmission with high throughput, enabling the best transport per application.

COMMUNICATIONS TECHNOLOGY WITH ADVANTAGES

To bridge the last mile, ND SATCOM integrated and commercialized SKYWAN with LTE as the forerunner to the evolving 3GPP 5G cellular telecommunication standard. In its continual effort to innovate and take this sector by storm, ND SATCOM introduced the SKYWAN spot-beam mesh technology, which permitted roaming of meshed mobile terminals. In addition, ND SATCOM is bringing military technology to the commercial sector, using satellite COTM that can also benefit from an electronic steerable antenna. The uniquely designed SKYWAN modem achieves all this!

FLEXIBLE HUBLESS ARCHITECTURE

The ND SATCOM SKYWAN system requires no standard hub and enables high-speed communication between remote network sites with data rates ranging from 64 kbps to 20 Mbps. With SKYWAN's industry-leading, fully-meshed network topology support with its soft-configurable individual channel settings, connectivity can be established and optimized between any two stations in the network with a single satellite hop. This capability allows deployment of remote-to-remote applications (such as video conferencing & collaboration or voice communications) between sites with minimal satellite bandwidth utilization and link delay.

The SKYWAN platform supports voice, video and data applications. Bandwidth is provided to end-users in the most efficient manner by means of the system's bandwidth allocation scheme. Space segment resources are automatically and dynamically assigned in sub-seconds to stations requiring transmission capacity as and when they need it, thus freeing up resources for on-demand use by other stations in the network. The SKYWAN technology provides a VSAT terminal for establishing wide area networks using GEO wide beam or spot beam satellites where beam switching is supported even in meshed topologies by the SKYWAN Technology for fast travelling high speed trains. This enables a variety of end-user business and government communication applications.

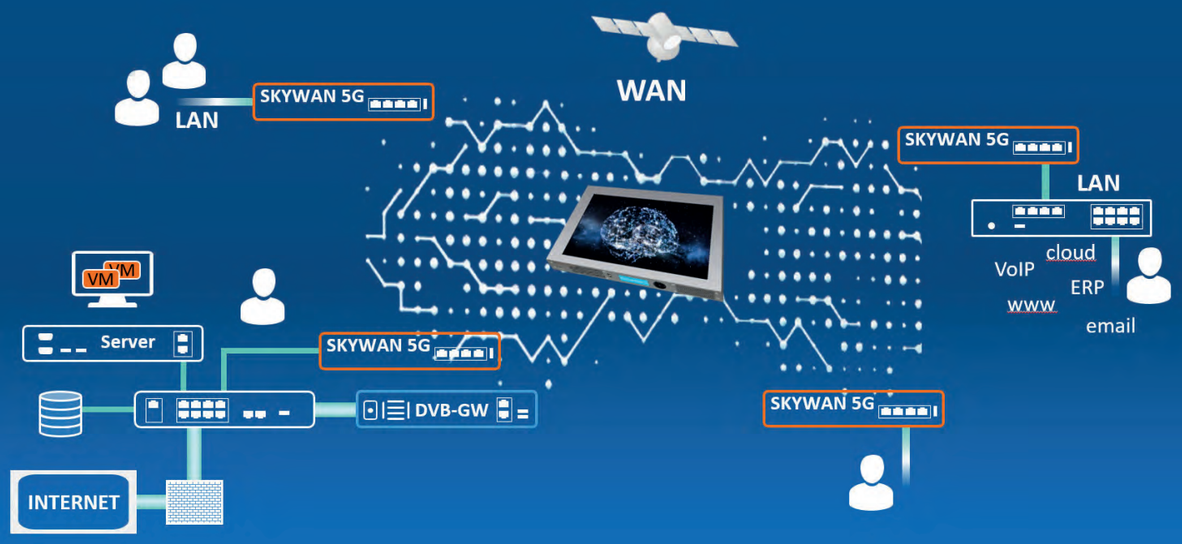
Another benefit of SKYWAN is the hardware; one box stays throughout its lifecycle, also during network changes, when more stations are added or when traffic increases, to save cost and provide ease of use.

SKYWAN FEATURES

The features of SKYWAN include:

- star, hybrid or meshed network topology supporting all GEO satellites
- highest quality for voice calls with superior Quality of Service (QoS) mechanism
- dynamic bandwidth allocation
- 20 Mbps per TDMA channel with option to cascade up to four TDMA channels plus additional 80 Mbps on DVB-S2 link per station
- integrates as IP network with virtual routing functions (VRF) including OSPF and BGP and smart tunnelling mechanisms (MPLS, trunking) with other terrestrial or telecom networks and Operations Support Systems (OSS)

SKYWAN 5G – THE ONE MASTERMIND



Network Flexibility & Versatility

SKYWAN Technology

Product Benefits

Assets of SKYWAN

1 FLEXIBILITY

2 VERSATILITY

4 AVAILABILITY

5 PERFORMANCE

6 EFFICIENCY

7 SECURITY

FLEXIBILITY

Using our SKYWAN technology, you get a fully tailored, custom-built solution. No matter what kind of network topology (mesh, star or hybrid) or business application (IP or legacy protocols), our unified platform always suits your needs. Instant bandwidth-on-demand and easy network expansion (size, bandwidth) guarantees your flexibility.

While the majority of today's VSAT platform systems are designed for larger star networks or point-to-point Single Carrier Per Channel (SCPC) connections, ND SATCOM's SKYWAN technology allows service providers to deploy lower total cost of ownership (TCO) multi-star, mesh or hybrid star/mesh topologies that closely match end-customer network traffic flows. Satellite bandwidth utilization and link delays are thus minimized in situations where there are requirements for direct single hop communication between remote sites (mesh mode) or a traffic path from remote sites to both a regional centre and an international headquarter location (multi-star mode).

The SKYWAN platform is inherently a hubless system that does not require deployment of a high-cost central hub; a smaller customer-centric star network can be implemented using the system with minimal upfront capital investment. SKYWAN's flexibility is further enhanced by its ability to support simultaneously a mix of IP-based traffic with bandwidth guarantees even in VRF environments to provide connectivity to separate end users groups per location. Even legacy analogue and digital voice channel interfaces such as E&M, FXS/FXO, E1/T1 and ISDN can be seamlessly integrated into a SKYWAN network through use of external Frame Relay Access Devices (FRADs) connected to the SKYWAN station.

Now with enhanced COTM, Cross-Strapped and HTS Spot Beam support, the ND SATCOM SKYWAN platform remains the technology of choice for service providers looking to enter new markets, pursuing new applications or simply differentiating their service from other "standard" platform offerings.

VERSATILITY

The Master/Backup Master is an interesting concept with SKYWAN technology. Each station is able to act as a Master or Backup-Master station. The primary functions of the Master are overall network bandwidth coordination and channel capacity assignment. In the case of Master failure, the Backup-Master station seamlessly takes over all of these functions with no service disruption or network downtime for active user connections.

You can configure multiple or even all stations in your network as the Backup-Master is capable of ensuring the ultimate level of availability and performance for networks supporting highly critical end user applications. The key TDMA features of this facility are:

- automatic geographical redundancy for Master Station
- seamless transfer of control from Master to Backup-Master in less than 300 ms
- no network outage for remaining stations in the unlikely instance of failure
- active traffic connections between stations keeps up and running during failover
- absence of/disconnection to NMS has no influence to running configuration – network keeps operative
- multiple NMS locations are possible, just IP connectivity needed

The second major advantage is by using DVB-S2 links as additional traffic paths from any source station to one or many destination stations. The originating station decides where to forward traffic – real-time traffic benefits most from the TDMA sub-system while other traffic – not sensitive to delays – will use the high throughput DVB-S2 link with its Adaptive Coding & Modulation (ACM) mechanism selecting the most bit-efficient ModCod. ACM and the Policy Based Routing decision allows to choosing the most economic path per traffic class. With redundant DVB-S2 gateways, the reliability can be increased further.

Taking advantage of both time domain and frequency domain access methods, SKYWAN allows users to benefit from multiple services such as data, voice, and video on one simple, integrated platform. In addition, this enhances the maximum use of satellite bandwidth.

SKYWAN supports configurations with full geographic redundancy between Master and Backup Master central sites. In star topologies such stations are called redundant HUBs. Each remote station can communicate with either the Master or Backup Master, thus guaranteeing automatic switchover to the backup site in case communication is lost to the previous Master station.

Hier steht eine Grosse Headline

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SCALABILITY

Satellite communication is limited within the footprint of a satellite. These footprints, as with the beam of a flashlight, could cover a large area (such as a continent) with small power or concentrate on a small area (like a country) with high power. But what if you have to connect your operations across several continents? What if you have to connect your offices in Brazil with your Headquarters in Europe? SKYWAN offers the unique feature to make use of interconnected transponders, thus combining footprints pointed at different areas into one multi-station network.

With High Throughput Satellites (HTS) using Spot Beams, you either configure your network in star topology or – when supported by advanced satellites' on-board capabilities – benefit from single-hop station-2-station communication with SKYWAN.

The SKYWAN technology allows your organisation to broaden your network around the world. With its "hubless" approach to communication, SKYWAN safeguards the lowest total cost of ownership (TCO) for smaller networks. With SKYWAN you start with two stations and grow up to 250 stations per network segment. This is the best approach for mid-sized networks that need diversity.

AVAILABILITY

With SKYWAN a remote station can communicate with multiple stations simultaneously. This allows load sharing of IP traffic from remotes to up to 5 other locations over separate TDMA links.

With SKYWAN you get excellent Quality of Service (QoS) mechanisms for voice and other latency critical applications, such as radar and trading. SKYWAN makes sure that your data always gets the priority it requires. Efficient connections from all locations to all other locations are feasible with a single hop. The quality and bandwidth usage of single hop connections are much better in comparison with connections with a double hop, thus achieving user satisfaction and lowering space segment costs. With SKYWAN you stay connected everywhere.

Geographic redundancy of the bandwidth assignment controllers, station redundancy, and alternate TDMA channels or forwarding to multiple equal cost destination stations based on actual traffic load prevent single points of failure. SKYWAN brings ultimate availability and reliability to your network operation at all times.

The key features of this solution are:

- dual Master support already in basic design
- support of carrier load-sharing
- support of multiple path routing
- automatic re-routing in case of a station outage
- OSPF routing support above the VSAT domain with terrestrial router

Bildbeschriftung

PERFORMANCE

The SKYWAN station reliably delivers throughputs of 65,000 packets per second (pps) which is sufficient for even a stack of up to 4 TDMA receive channels (up to 80 Mbps) in a cascaded station and DVB-S2. This throughput is consistently maintained across a wide range of traffic packet sizes including the smaller (<64 bytes), high overhead packets that are typical of applications such as VoIP.

Do you need to receive more traffic than you send? Then cascade SKYWAN units at one location or use the Shared Amplifier Mode to avoid amplifier backoff mode.
Do you want to be fast? The time period required for a SKYWAN system to adapt to your ever-changing bandwidth requirements is 100 ms. In the blink of an eye, the network assigns bandwidth to newly started applications at any station. Speed and bandwidth flexibility are key for today's IP-based applications.

BITTE BILDDATEN IN HOHER AUFLÖSUNG

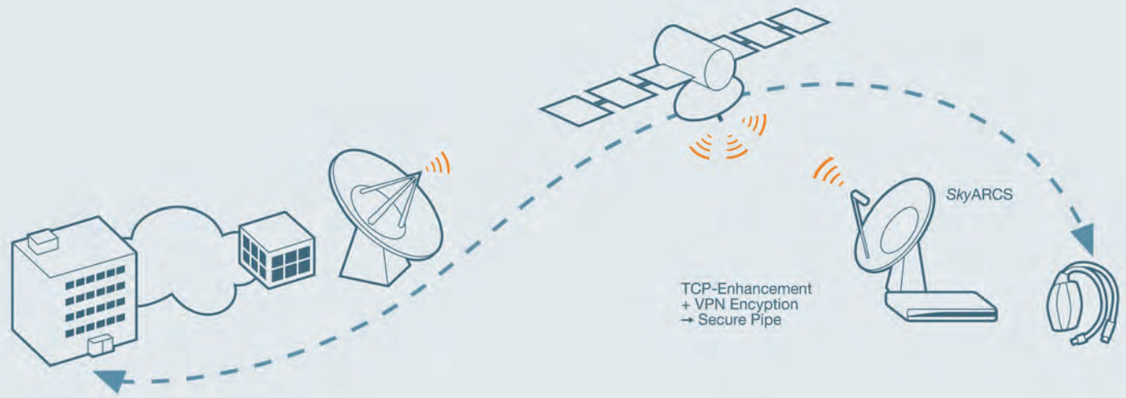
Bandwidth adaptation within a blink of an eye

Do you want to be even faster? For example, do you need access to your central Enterprise Resource Planning (ERP) system from remote places? Are you tired of the sluggish behaviour of your SAP application when working in your branch office in Africa, Brazil or the Bavarian countryside? ND SATCOM has the solution ready for you.

The DVB-S2 receiver already integrated in each station receives up to 80 Mbps. SKYWAN is best in class when it comes to minimal use of bandwidth. With its low-bandwidth requirements, G.729 is an algorithm used in VoIP applications for voice encoding. SKYWAN obtained a Mean Opinion Score of 4.0 when tested using the Spirent test suite.

BITTE BILDDATEN IN HOHER AUFLÖSUNG

Voice quality rating



EFFICIENCY

Efficiency is paramount. SKYWAN provides instant bandwidth-on-demand through its fully dynamic bandwidth allocation scheme. Space segment resources are automatically and dynamically assigned to stations requiring transmission capacity as and when they need it.

The SKYWAN TDMA implementation gives users full flexibility when optimizing each channel for throughput, delay or jitter for a given station – individually for each of it's up to 16 channels. To get the best efficiency on the satellite link SKYWAN Technology supports 24 ModCods with TDMA and 25 ModCods with ACM on DVB-S2, which gives the engineers flexibility for network designs and station layouts.

To further make best use to the allocated satellite capacity, the patented SKYWAN concept of Virtual Channel Groups (VCGr) allows not only to ensure bandwidth guarantees to grouped traffic flows but also to offer shared capacity pools of temporarily unused satellite capacity for all VCGrs without operator intervention in real-time. This mechanism allows to ensure service guarantees on IP domain level while sharing the scarce satellite bandwidth when available for excessive traffic peaks.

SKYWAN brings lower overall operational and investment costs. Efficient network sizing results in reduced terminal, space segment and start-up costs.

Payload Compression

Typical real-time traffic protocols employed in IP networks generate a notable amount of overhead versus actual traffic payload, thus making them highly bandwidth inefficient. When real-time data is transported over satellite links where bandwidth is a valuable resource, the protocol overhead becomes a crucial expense factor.

The SKYWAN platform utilizes header compression to compress a 40-byte IP/UDP/RTP header down to as little as 2 bytes, thereby increasing overhead/payload efficiency for a VoIP packet from 33 % up to 91 %. Other compression profiles apply to the GTP encapsulated user traffic used by GSM, UMTS and LTE, IP-only or GRE tunnels with its IP-in-IP headers.

Service Providers use compression in combination with sophisticated QoS mechanisms to enforce service agreements while saving satellite bandwidth without capacity overbookings or the need for external appliances.

TCP Traffic Acceleration

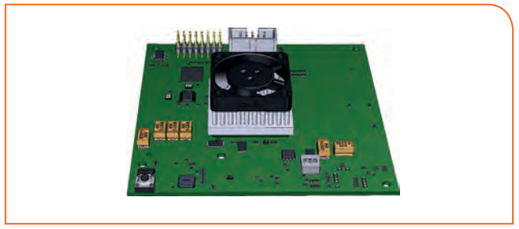
The theoretical throughput of a TCP connection is limited by the protocol's window size and latency of the transport link. For a typical GEO satellite link with 580 ms round trip time, TCP traffic throughput is limited to a few hundred Kbps. SKYWAN accelerates application performance up to 2 Mbps without intercepting TCP sessions; it avoids decreasing the window size that will throttle the TCP traffic independent of the satellite bandwidth actually used.

Efficient Encapsulation

SKYWAN TDMA does not transport IP packets plus Ethernet-Frames like a Layer 2 device, but replaces the Ethernet-Headers by its own shorter Link Layer to save bandwidth. SKYWAN is a fully-fledged Layer 3 router. It looks in detail to the IP packets and even higher layer headers, supporting granular QoS & prioritizations with multiple transmit queues. Concatenation of different/multiple packets in one TDMA slot is automatically supported to get the best/optimized filling grade of each transmitted slot without adding jitter or buffering delays. On DVB-S2 links the standardized encapsulation methods apply.

SECURITY

Known for its high level of security, SKYWAN Technology provides reliable station-to-station and rooftop-to-rooftop communication. SKYWAN provides sophisticated, state-of-the-art security functionalities: such as Link Encryption, network access based on remote station's address and login to the station's operator interface requires secured protocols (HTTPS, SSH).



SKYWAN Encryption Board

Non-secure protocols like SNMP have only read-only access. Network wide reconfigurations using NETCONF, a secure management protocol standardized by IETF for telecom network operators, are possible without downtime, each reconfiguration is a transaction with rollback if wanted.

Network-wide Link Encryption

The SKYWAN stations offer AES-256 TDMA link encryption. TDMA link encryption encrypts everything over the satellite, concurrently allowing simultaneous TCP acceleration to be performed on TCP traffic. This is unlike other IPSec architectures, which use external encryptors that defeat TCP acceleration and are subject to severe throughput issues.

TDMA link encryption can be achieved across the network regardless of topology (e.g., in star, mesh, multistar or hybrid mode). In addition, because the SKYWAN platform is inherently a hubless system, there is no requirement for a dedicated high cost link encryption option at a central hub site.

Station Authentication and Validation

Entry of a SKYWAN station into a network is controlled by means of the station's address. Stations with invalid addresses are not permitted to access a network, thus eliminating the risk of outside network attacks from non-authorized remote locations.

To ensure consistency between the remote SKYWAN station configurations and the central SKYWAN Network Management System (NMS) database, the remote station's configuration can be synchronised with the NMS database. When this action is executed, deviations in the local stations' configurations are detected and fixed.

Free Slot Allocation

The SKYWAN platform solution utilizes a free slot allocation scheme that ensures that any empty slot in a TDMA frame is filled. An outside intruder is thus unable to observe any change in traffic activity levels at specific sites in the network, eliminating the risk of using remote station transmission activity as an intelligence-gathering mechanism.

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SKYWAN TECHNOLOGY

APPLICATIONS AND MARKET SEGMENTS

SKYWAN IS APPLIED WORLDWIDE

Each market sector and industry has its own specific communication application requirements. Being sensitive to these market dynamics, ND SATCOM has tailored specific system and support options to fit the precise needs of each individual client. Our network design engineers work hand-in-hand with the customer to design and implement the required communication solution rapidly and with ease across a broad set of verticals.

SKYWAN supports any business application – IP applications and legacy protocols – providing integrated dynamic routing & sophisticated QoS support.

SKYWAN is the most flexible, scalable and comprehensive satellite communication solution available. The unique SKYWAN platform uses IP as its convergence layer, thus serving a broad range of communication applications:

- LAN to LAN interconnection via built-in switch and/or router
- ERP (SAP) and other client-server applications
- radar, SCADA and other legacy protocols e.g., X.25, HDLC (using external FRAD)
- internet access, with all related applications
- analogue/digital voice and fax (using external FRAD)
- video Conferencing, VoIP, IP Video
- encryption of voice, fax and data over IP/Frame Relay
- support of transportable stations, SNG-based solutions, COTM in vessels and railways
- support of real-time PTT VHF/UHF radio communication for Air Traffic Control
- support of mission critical PTT (MCPTT) traffic from LTE cells for disaster relief teams
- differentiated services (DiffServ, real time & non-real time)
- applications with low jitter/delay requirements
- trunking interconnection: GRE, MPLS and SS7 (using external verified Gateways)
- cellular networks (GSM, Tetra/Tetrapol, UMTS, LTE)
- PBX interconnection: QSIG (using external verified gateways)
- GSM interconnection: A-ter, ABIS (using external verified gateways)
- 3G/LTE interconnection: GTPv1-U including compression

SKYWAN Technology is highly sought after for its live communication applications and real-time enhancements, where vehicles “on the move” provide transmissions for wide-ranging sectors from broadcast media to defence. SKYWAN also serves a role in disaster relief – where every second counts – with voice and data transmission in tactical LTE-to-LTE cell communication. As well, SKYWAN provides reliable communication for critical air traffic control services including radar, and comes with a guaranteed service level via satellite links.

Key customers range from governments (e.g., BRIC countries) to defence (e.g., Deutsche Bundeswehr, multiple MoDs in Europe and Middle East) to commercial enterprises (e.g., in South and West Africa) via service providers.

The SKYWAN platform has the technical capability and flexibility to be adapted to any customer’s needs. When speaking specifically, the technology forms the core of a rich and manifold solution portfolio, extended by development or integration of additional equipment to meet the dedicated requirements of specific industries, such as:

- Defence
- Government
- Enterprise
- Broadcast & Media

BILDBESCHRIFTUNG

SKYWAN FOR DEFENCE

Successful network-centric military operations require reliable broadband data transfer from strategic command centres to the front line. The underlying communication network needs to be highly secure, easily reconfigurable into a variety of topologies with support for a wide range of fixed, portable and mobile remote terminal stations. Assured access to critical information is guaranteed at all times across the network by SKYWAN's sophisticated QoS mechanism which prioritizes bandwidth needs according to application requirements, thus high value data such as field tactical updates can be given the highest transmit queue priority based on the available satellite bandwidth. The needs of the Defence market are:

- simplest logistics with one SKYWAN modem hardware device
- quickly reconfigurable into multiple topologies
- high-speed COTM support
- geographic-redundant hub configurations
- built-in security features including network wide AES encryption or strict traffic separation with VRFs from network management plane
- station interoperable with wide range of remote antennas (fixed, portable and mobile)

Defence organizations are often located in remote areas for strategic reasons – at borders or coastlines where terrestrial infrastructure is non-existent. Reliable communication to headquarters and to other posts is critical.

SKYWAN-based solution packages offer secure and highly reliable communications. With the SPT600M, for example, ND SATCOM offers a compact low weight and rapid deployable terminal with a rugged SKYWAN modem integrated. Other transportable solutions are used for missions in remote and rough terrain where low weight and rapid terminal deployment is critical. The features of the solutions are:

- transportable SKYWAN terminals
- antenna pointing assistant built-in
- high environmental demands on water, dust and mud proof
- wide temperature operating range
- wide range power supplies (AC/DC)
- IP-based Ethernet Interfaces
- various antenna dish sizes for frequency bands (C/X/Ku/Ka) with wide range of BUCs/HPAs

BITTE BILDDATEN IN HOHER AUFLÖSUNG

Skywan Defence Application

SKYWAN FOR GOVERNMENT

Due to its inherent flexibility, SKYWAN ideally supports the manifold requirements of governmental networks. All governmental institutions require highly reliable and secure network solutions. Built-in security functions as well as optimized encryption technology can be used on-demand to provide a high security level for these specialized networks. SKYWAN achieves unmatched reliability and performance for a broad range of applications, including:

- Homeland Security & Public Safety
- Border Control
- Air Traffic Control
- Comms-On-The-Move

The efficiency of military, border control and disaster relief and emergency organisations depends heavily on the ability to communicate within the organisation. Network-centric operations of these organisations require a communication network supporting today's command, control and information services. Mobile communication is one of the most mission critical assets in this structure since it enables the exchange between command and field forces. This communication is vital, like the communication between the brain and the arms, and the legs of the human body.

BITTE BILDDATEN IN HOHER AUFLÖSUNG

Transportable Solutions

Homeland Security & Public Safety Networks

ND SATCOM's SKYWAN technology is both flexible and robust, making it widely used as a backup for national terrestrial networks and for out-of-area network extensions. It provides reliable communications and interoperability between many organizations during times of crisis or other events in which a breakdown of terrestrial facilities may occur.

All kinds of traffic are supported, with guaranteed quality and prioritization. The network can be equipped with fixed, transportable or mobile stations from ND SATCOM. Various user interfaces are available for telephony, video and computer connectivity. Customer furnished equipment and applications are easily integrated. Features are:

- quick deployable network
- master can be installed in hours, not in days/weeks
- main traffic flow directions can be adapted on the fly
- allows fast reorganisation of topology structures
- modem can be used for fixed, on-the-pause and on-the-move applications
- not dependent on static TDM/TDMA outbound channels

Critical Communication

Border Control

For border control requirements, ND SATCOM offers SKYRAY Light 1200, an optimized antenna subsystem which can be mounted on any car or vehicle. Together with SKYWAN this system can be used to transmit high quality IP video files for watching and monitoring certain areas and regions. SKYRAY Light 1200 and SKYWAN feature autopointing and automatic SKYWAN network acquisition, so that users can fully concentrate on their work.

This solution cries out for a reliable and secure solution that must also feature:

- network that can start already with one single carrier
- flexible for non-constant traffic flow for inbound & outbound directions
- support of IP as well as legacy protocols
- pure TDMA-based carriers prevent foreign listeners
- SKYWAN integrates encryption technologies so that absolute confidentiality is guaranteed.

Air Traffic Control Networks

Flight controllers depend on reliable communications, primarily for voice traffic, between Air Traffic Control (ATC) sites. As aircraft move from one airspace zone or sector to the next, a clearly communicated handoff must be made between sites. In areas where aircraft have no human ground control in the vicinity, remote communication transmitters relay traffic control information to the skies. These Remote-Communication-Air-to-Ground (RCAG) locations must be reliably linked to ATC sites.

Radar coverage is often spotty (uneven or patchy), with some sites equipped and others not. A solution that connects all sites to radar tracking stations is required. The ND SATCOM solution based on SKYWAN offers a cost-effective network infrastructure and features:

- support of real-time PTT VHF/UHF communication signals
- remote VHF communication controller-to-pilot
- highest Quality-of-Service for voice communication
- real-time service for radar data
- intranet service TCP/IP based
- support for VHF over IP (EUROCAE WG67 ED-137 standard)

Professional Mobile Radio Networks

Tetra and Tetrapol regional networks are usually interconnected using terrestrial connections. In remote areas such as the Amazon Forest where terrestrial telecommunication's infrastructure is poor or nonexistent, the SKYWAN technology enables the interconnection of several networks over satellite with DAMA technology to share bandwidth between all the nodes.

Thanks to the scalability of the solution, a wide set of Tetra/Tetrapol services can be offered with a tactical temporary or permanent regional coverage. The satellite link also provides Internet access, video and other applications in parallel to the Tetra/Tetrapol voice communication to remote locations, rendering the data transmission. The key features of such networks are:

- extent of reach for Tetra/Tetrapol cells
- rapidly deployed
- autopointing solutions available for mobile use

The efficiency of military, border control and disaster relief and emergency organizations is heavily dependent on the communication capabilities within and beyond each entity. Their network-centric operations require a communication network supporting today's command, control and information services. Mobile communication is one of the most mission-critical assets in this structure since it enables exchange, from voice to video, between command and field forces.

Many of these organizations, such as border control, typically operate in areas with little to no communication infrastructure. The challenge is to deploy and connect cells in these areas where terrestrial connections are not available and line-of-sight communication is too inefficient due to the topography and CAPEX for large communication towers.

Portable Cells for LTE over Satellite

SKYWAN offers the ideal satellite communication solution for challenging field locations and crisis situations. The SKYWAN system's full meshed topology enables highly-efficient, dynamic and flexible communication between the LTE cells and the Core Network. It offers short set-up time of an operational LTE cell without the hassle and cost of engineering Line-Of-Sight (LOS) connections or digging in miles of cables. SKYWAN's single hop cell-to-cell connectivity optimizes the satellite backhaul to its absolute minimum, resulting in the lowest CAPEX and delay.

All cells within a professional mobile radio (PMR) network are connected together by high speed data links, which could be terrestrial fibre-optic connections, where available, line-of-sight or satellite communication links. Many of the above mentioned organisations, such as border control, search and rescue and defence organisations operate especially in areas outside the normal infrastructures. The challenge is to connect these cells, in areas with low infrastructure, where terrestrial connections are not available and line-of-sight communication is insufficient due to the ground profile and the CAPEX for large communication towers.

Most organisations rely on PMR systems. PMR works in principle in the same way as a mobile network. In deference to a legacy radio communication system, in which radio calls are established directly between two radio operators, PMR works in cells. Each radio is logged into a non-public local cell; calls are sent to the cell base station and forwarded from there by means of a controller to the cell base station of the recipient's radio.

With its well-established reputation for reliability and performance, ND SATCOM's SKYWAN remains the platform of choice for VSAT network deployments requiring a flexible, powerful and proven solution that seamlessly adapts to the evolving communication requirements of Government and Enterprise customers.

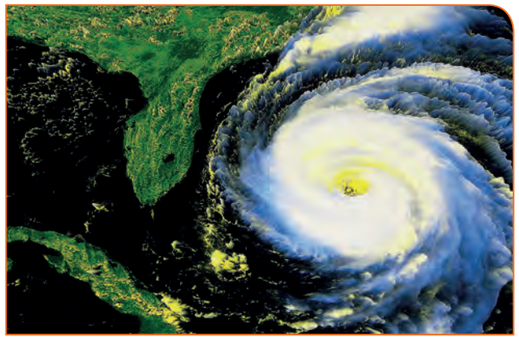
Today more organizations rely on mobile portable (backpack, vehicle) LTE solutions for local coverage of critical missions. At mission outset, local switching functionality of an initially isolated LTE cell is mandatory. When communication demand grows, more cells need to be interconnected to provide cell-to-cell communication. All cells within this LTE network are connected with high-speed data links, which could be terrestrial fibre connections (where available), microwave or satellite communication links.

SKYWAN For Isolated LTE Cells

SKYWAN's rapid deployment and mesh links easily and transparently expand the reach of an LTE network where terrestrial connections are not present or economically feasible. New cells can be seamlessly added to the network, so it grows in sync with the number of users.

A fully autonomous LTE cell is available for mobile rescue teams. This compact form – fitting in two backpacks – features a manpack SKYWAN terminal with an LTE cell. Field upgrades, such as a larger antenna or additional cells, do not require SKYWAN replacement.

SKYWAN is the perfect solution for portable LTE Networks operating in communication-challenged areas.



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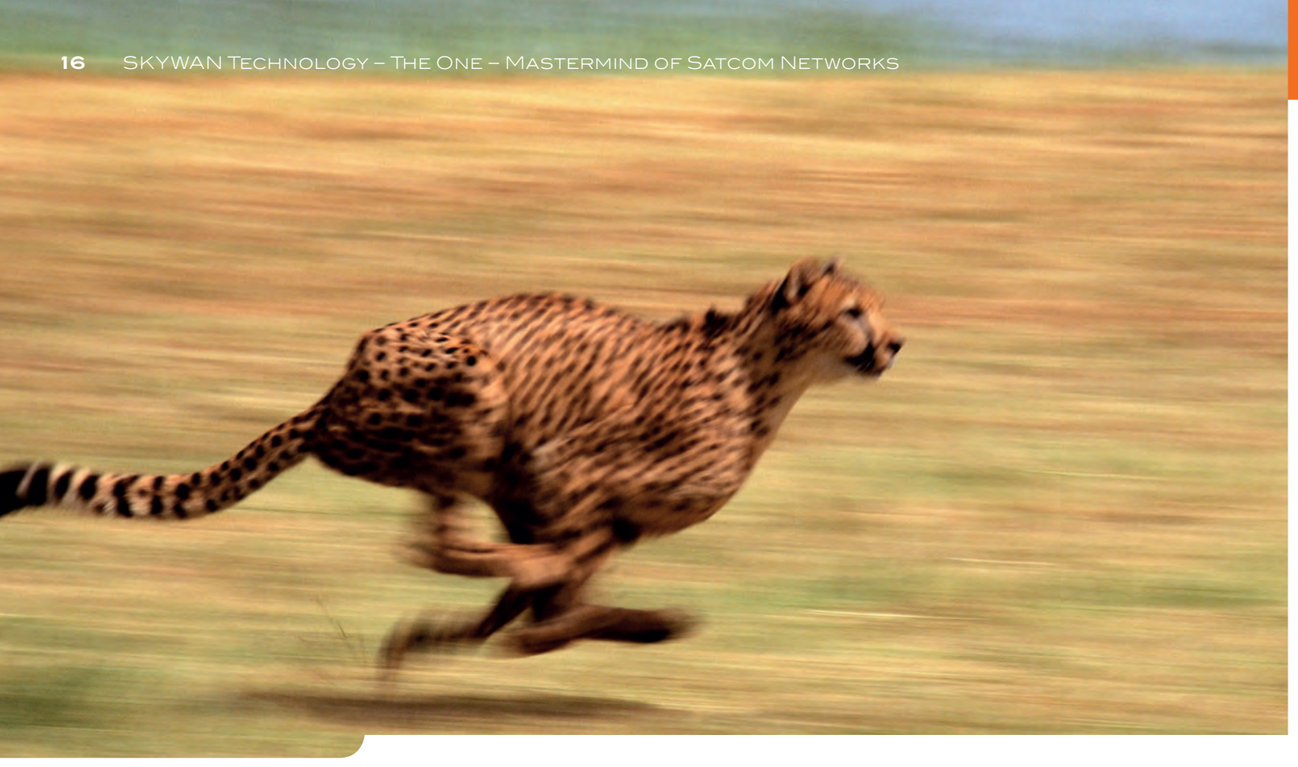


Comms On The Move

Keeping pace in a mobile world requires communication everywhere. Thanks to SKYWAN and its adapted modem technology including doppler shift compensation, reliable in-motion communication at high speed is given.

Whether it's live reports from sports events, emergency services like search & rescue, police, fire brigade, homeland security, or in-defence for troop communication, convoy protection – the full range of applications looking for "always-on" communications is supported.

However, this is not the only advantage of SKYWAN in a SOTM network. Some of the disadvantages the standard systems have, such as SCPC and Star-TDMA, can be overcome with the SKYWAN modem technology.

SKYWAN and Comms On-The-Move

SKYWAN FOR ENTERPRISE

SKYWAN provides independence from terrestrial infrastructure. It offers fail-safe communication that supports critical IP applications across the enterprise like voice, video, VPN, streaming media, internet access or data backup. SKYWAN is one platform for all applications. Typical applications include:

- energy networks
- cellular networks
- business continuity

Energy Networks

Large petroleum companies explore for oil and gas all over the world, generally operating from platforms constructed in remote areas such as the ocean, the desert or other regions with limited accessibility. Here, terrestrial infrastructure for communication purposes simply does not exist – yet the importance of communication is increasing.

A satellite-based SKYWAN network is the ideal solution, which allows geophysicists to remotely assess exploration fields without travelling. Our SKYWAN-based solutions package forms the cornerstone for high bandwidth, cost-effective corporate networks.

Network availability and reliability is extremely important in the utilities field (i.e., power plants, grid providers, water suppliers). Frequently, existing terrestial infrastructure is not completely reliable, therefore satellite networks are installed in parallel as a backup. SKYWAN is capable of offering a seamless integrated network solution and therefore ideally suited to these kind of scenarios.

Cell-To-Cell Communications in One LTE Network via Ground or Satellite Links

Cellular Networks

As we have said, mobile network operators try to extend their reach to remote areas using satellite communication. With its new high performance and efficient air interface SKYWAN is capable of serving GSM backhaul and LTE backhaul, but also LTE Cell-2-Cell applications, with great efficiency. The MF-TDMA infrastructure enables significant savings on bandwidth capacity.

Due to its advanced Quality-of-Service mechanism, SKYWAN is very well suited to mixed voice and data scenarios as required by GSM up to high-bandwidth-demanding LTE networks. With the latest 3GPP activities, local operation of LTE cells in special bands allows the interconnection of enterprise operated LTE islands by SKYWAN to a larger company-wide network.

For the growing Internet Protocol television (IPTV) market ND SATCOM offers a transportable IPTV solution package. This enables cost-effective IPTV Video contribution and IP video streaming based on the MPEG-4/H.264/H.265 coding standard. An IP data rate up to 20 Mbps per TDMA channel can be achieved ensuring highest video quality levels.

Media companies can use this solution package on any vehicle to produce IPTV content with comparable high quality and availability. This easy-to-use system includes an automatic pointing system and can therefore be used by any journalist without need for technical expertise.

Business Continuity

Backup connectivity can be compared with insurance: when you need it you'd better have it! Our SKYWAN solution connects your enterprise site LANs and telephone exchanges seamlessly.

Should your primary connection be interrupted, your traffic is automatically routed via SKYWAN; no manual intervention is required.

Use your SKYWAN network for extra capacity during normal times or join a shared network to save operational expenses.

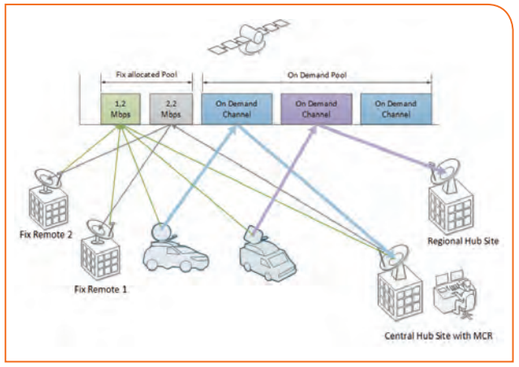
Oil & Gas Networks

SKYWAN FOR BROADCAST & MEDIA

Broadcast Networks

ND SATCOM's SKYWAN Broadband Media Network solution is ideal for the high-speed contribution and exchange of any video or data content, live or on demand. This solution offers various choices for transmitting video or streaming data in combination with telephony and production intercommunication.

The network may consist of multiple sites supporting several transmissions in parallel. Transmissions can be effected ad hoc utilizing the fully automatic bandwidth allocation of SKYWAN or can be scheduled by our Media Fleet Manager (MFM). These possibilities extend production workflow, such as intercom, email, internet, SAP, and editing, into the mobile world. ND SATCOM's COTM solution Satcom-On-The-Move was adopted by the South Africa Broadcasting Corporation (SABC).



Application of SKYWAN for SABC

This solution features:

- fast, first-rate satellite communication everywhere
- integration to existing SKYWAN networks
- supports even high-speed movements (up to 2,500 km/h)
- unmatched link re-acquisition after shadowing (<1 s)
- support for various low profile antennas

Media Networks

The broadcast industry is changing more and more from classical content contribution (DVB) to IP. With SKYWAN and the Media Fleet Manager, ND SATCOM offers an end-to-end solution, from encoding, streaming over SKYWAN and planning of live-feeds.

SKYWAN TDMA offers high throughput up to 20 Mbps, dedicated quality of service and dynamic bandwidth allocation. For additional IP bandwidth demands, new SKYWAN TDMA carriers can easily be temporarily activated. SKYWAN in SNG vehicles enables the operators to communicate via VoIP with the broadcast centre and gives full access to Intranet, email and office applications.

The integrated solution based on SKYWAN and SKYRAY autopointing antennas offer fast setup times and ease of use.

ND SATCOM's SKYWAN meets the requirements for an integrated transmission and management system which processes diverse bi-directional traffic types while automatically controlling the complete fleet of SNGs and ENG vehicles. The key features of such networks are:

- IP streaming with guaranteed throughput
- integrated end-to-end solution for broadcasting and media networks
- dynamic channel management
- one-button operation
- MFM to manage full production chain:
  – scheduling live-feeds
  – configure encoders and decoders

Media Applications

SKYWAN Technology

Tailored Satellite Communications Solutions

OUR MISSION

Successful network-centric operations require reliable command and control structures. Communication and data transfer need to be secure, dynamic, interoperable and independent of any local infrastructure. That's why satellite communication plays a major role in providing information superiority and helps you to make the right decision.

ND SATCOM is your premium partner for satellite network solutions. One of our core competencies lies in our proven system engineering abilities and extensive experience. We support our customers, from the consulting stage, through the design, development, implementation and well into the operation stage.

We at ND SATCOM are committed to excellence and our promise to provide tailored satellite communication solutions to fit the precise needs of each individual client and provide:

- Engineering excellence
- Technical innovation
- Next generation networks

ABOUT THE COMPANY

With over three decades of experience, ND SATCOM is the premier supplier of and integrator for innovative satellite communication equipment systems and solutions to support customers with critical operations anywhere in the world. Customers in more than 130 countries have chosen ND SATCOM as a trusted and reliable source of high-quality and secure turnkey and custom system-engineered communication solutions. The company's products and solutions are used in more than 200 transnational networks in government, military, telecom and broadcast environments.

ND SATCOM's flagship product, the SKYWAN platform, enables international users to communicate securely, effectively and quickly over satellite.

BITTE BILDDATEN IN HOHER AUFLÖSUNG

Bildbeschriftung

SKYWAN TECHNOLOGY HAS BEEN NOMINATED FOR VIA SATELLITE'S 2018 SATELLITE TECHNOLOGY OF THE YEAR AWARD

- The SKYWAN platform brings military technology to the commercial sector
- The modem features a hubless architecture, whilst allowing multiple topologies
- Network connectivity requirements are adapted seamlessly to the customer's needs
- Transmission capacity is assigned to stations dynamically and automatically, as and when they need it
- ND SATCOM integrated SKYWAN with LTE as the forerunner to the 3GPP 5G cellular telecommunication standard

Via Satellite
SATELLITE TECHNOLOGY
of the Year 2018
★★★ OFFICIAL NOMINEE ★★★

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