



INSTALLING
RELIABILITY



www.ndsatcom.com

AIR TRAFFIC CONTROL

VSAT COMMUNICATION
NETWORKS POWERED
BY SKYWAN TECHNOLOGY

OFFERING SEAMLESS CONNECTIVITY AND RELIABLE COMMUNICATIONS

Flight controllers depend on reliable communications for voice, radar and messaging traffic between ATC sites. As aircrafts move from one airspace zone or sector to another, the transfer must be clearly communicated and seamless. Terrestrial infrastructure may not be available anywhere and anytime to connect radar signals or messaging traffic.

Being cognizant of these critical application requirements, our teams of dedicated engineers have designed a high-performance, satellite communications networking solution that provides maximum reliability and availability, is fast to deploy and is independent of terrestrial infrastructure.

ND SATCOM is the number one supplier of ATC networks in service since 1998 around the world in over 65 countries. The company has firmly established a record of accomplishment in highly reliable ATC telecommunication networks with its proven SKYWAN technology and through fulfilment of ICAO recommendations.

ND SATCOM'S SOLUTION

Our solution provides the following:

- **Extremely high voice quality** with minimal delay (due to unique single hop mesh technology)
- **Field-tested proven technology** for more than 20 years, with ND SATCOM technology deployed and operational in more than 65 countries
- **Renown engineering excellence** connecting satisfied customers for decades in the most challenging conditions
- **Flexible connectivity** with no limitations for on-the-fly adaptations to changing network topologies and varying traffic patterns during whole network life-cycle
- **Simplified logistics** by using one hardware for all roles and features
- **High reliability** for network operation and link continuity (i.e., seamless Master/Backup-Master switchover in geographic redundancy, local modem redundancy concepts, smart uplink power control and adaptive coding selection)
- **Long-term service guarantee** to secure customer's investment for >10 years.

The ND SATCOM VSAT network provides an intelligent and reliable communication shell, securing the operational communication links for the customer applications over the wide area network between the connected facilities and their sub-systems.



KEEPING AIR TRAFFIC FLOWING SAFELY –
A GREAT RESPONSIBILITY WITH HUMAN LIVES AT STAKE

THE TECHNOLOGY

Critical for both radar and voice is the error-free transmission and jitter-optimised forwarding of such data. Typically, delays tolerated by radar applications are in the milliseconds. Voice communication from pilots in approaching aircraft to ground personnel – when relayed via satellite – involves no extra delays or additional jitter. The VSAT is the SKYWAN 5G satellite router that forwards the IP-encapsulated traffic to its peer station.

SKYWAN FEATURES

- Highest availability and OPEX optimization without compromising air traffic safety procedures
- Network and link availability, connectivity and reliability, in both the terrestrial and satellite spheres
- Lowest transmission latency
- Redundancy for transponders, satellites and VSATs
- Multiple network topologies & capabilities

The ATC traffic from sources such as radar systems, user voice communication systems and numerous applications (e.g., messaging between ATC sites) uses the IP layer as convergence. IP traffic is routed with no additional delay, apart from the single satellite hop from source to destination.



CHALLENGE OF THE ATC/ATM MARKET

The growing complexity and responsibility inherent in aviation's vast control network – from ground to air all around the world – require the most reliable and secure communication systems where human lives are at stake. Aviation authorities recognize the priority of the continual modernisation of the communication infrastructure to address this challenge. Use of wide area network connectivity over satellite links still provides an important advantage in this environment and the SKYWAN VSAT network is such a solution with its secure and intelligent communication shell.

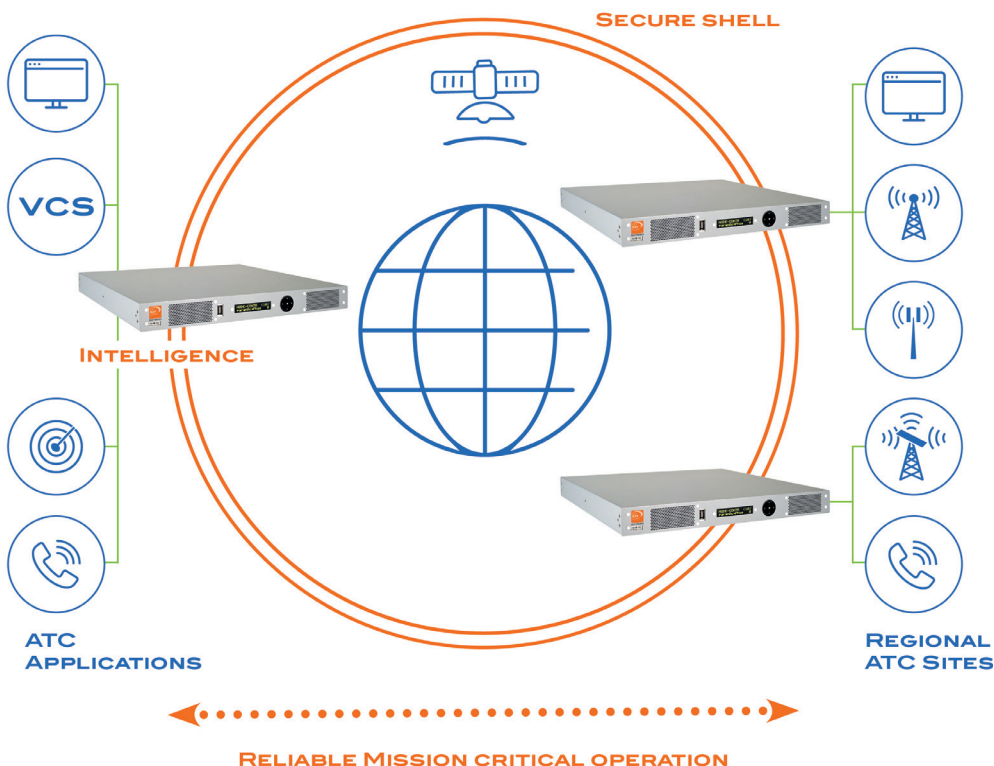
ND SATCOM has met these International Civil Aviation Organization (ICAO) expectations:

- High quality voice service
- Low delay in communication
- Reliable service with 24/7 availability
- Flexible communication topology (one-to-one, one-to-many, any-to-any)
- Reliable data rates for critical application
- Smooth interworking with all ATC specific applications
- Secure link for sensible data

ND SATCOM SOLUTION ADVANTAGES

- **Multi-service platform** supporting manifold applications, protocols & baseband interfaces for challenging customer requirements and securing customers' long-term investments for the connected sub-systems
- **State-of-the-art IP technology** with numerous built-in routing functions, guaranteeing seamless integration
- **Unique Quality-of-Service (QoS) types** securing mission critical traffic handling and prioritising. For example, the "MF-TDMA constant delay" feature, especially for radar data transmission and VHF-radio air-to-ground speech, ensures the lowest jitter
- **Outstanding modem performance** (highest data rates especially for meshed and return links, most efficient usage of satellite bandwidth, lowest link latency for call set-ups)
- **Secure network communication** through crypto-graphic transmissions, physical security layers and the independency of shared hubs – "only for you"

TRUSTWORTHY AIR TRAFFIC TECHNOLOGY



EXAMPLES OF ATC IMPLEMENTATION

- 2017 African regional ATC network covering 17 countries in hybrid topology, including ADS-B service
- 2019 Latin American National Air Traffic system including radar, VHF-radio, voice and integration into terrestrial alternate network
- 2019 African national ATC network involving a redundancy set-up with full mesh topology
- Other installations include:
 - Networks in China and India
 - Latin American and North American networks
 - As well as Southeast Asian networks



ATC INSTALLATIONS BY ND SATCOM WORLDWIDE

SUMMARY

The continual growth of air traffic and its complexity place high demands on more powerful and secure communication solutions. ND SATCOM invests in engineering innovation and scaling resource capacity to meet such demands and will be a key player in advancing the future of aviation communication systems.

Your ATC communication solution is with ND SATCOM and SKYWAN 5G technology: We install reliability!

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.

HEADQUARTERS

ND SatCom GmbH
 Graf-von-Soden-Strasse
 88090 Immenstaad
 Germany
 PHONE: + 49 7545 939 0
 FAX: + 49 7545 939 8780
 E-Mail: info@ndsatcom.com

CHINA

ND SatCom (Beijing) Co. Ltd.
 PHONE: +86 10 6590 6869/6878

MIDDLE EAST

ND SatCom FZE
 PHONE: +971 4886 5012