

MICROSENS

Efficient
fiber optic solutions
for airports



MICROSENS fiber optic solutions -
intelligent, reliable, high-performance



FIBER TO THE OFFICE (FTTO)
ARCHITECTURE



FIBER TO THE OFFICE (FTTO)
FTTO vs. SCN



INDUSTRIAL ETHERNET



HIGH SPEED OPTICAL CONNECTIONS

MICROSENS

Dear reader,

The airport industry has had to meet a plethora of challenges over the last few years. Economic decline, increasing taxation, new environmental regulations and rising fuel costs have put pressure on most of the aviation industry's means of revenues.

These circumstances have challenged airport managers to find new ways to ensure greater efficiency and establish an overall leaner cost structure. High performance networks play a major role on the way to new fields of modern airport management. Driving these high performance networks requires the use of modern-day fiber optic cable solutions.

Many situations also offer new possibilities for added value, such as using synergistic effects of a high performance network infrastructure to access new potential by selling IT-services to airport tenants. Whether IP based systems or Common Use Passenger Processing Systems, the prerequisite for maintaining the competitiveness of a modern airport is a high-performance IT infrastructure. Many airport operators have already identified the value of a well constructed network infrastructure for themselves as an investment in future competitiveness and autonomy.

MICROSENS is one such company that can support the industry in decision making to increase the profitability of network infrastructures. It can be easily achieved by installing fiber optic based systems, such as Fiber To The Office to save valuable space for wiring closets, increase non-aeronautical revenues and lower overall IT cost. As a German developer and manufacturer of high performance fiber optic solutions and components, MICROSENS has already achieved the installation of a multitude of projects with airport operators all over the world due to our reliable products and high end consulting capabilities. Start with a future-proofed Fiber to the Office in-house network architecture, through the conceptualizing of inter-building networks, based on high performance 100G+ transmission technology.

Within the following pages, it will be possible to learn more about how, for the technical or commercial decision makers of all airport business, implementation of economic fiber optic solutions with MICROSENS quality products can help.

Please enjoy reading the following informative brochure.

Thomas Kwaterski

Authorised Officer and Founder of MICROSENS GmbH & Co. KG

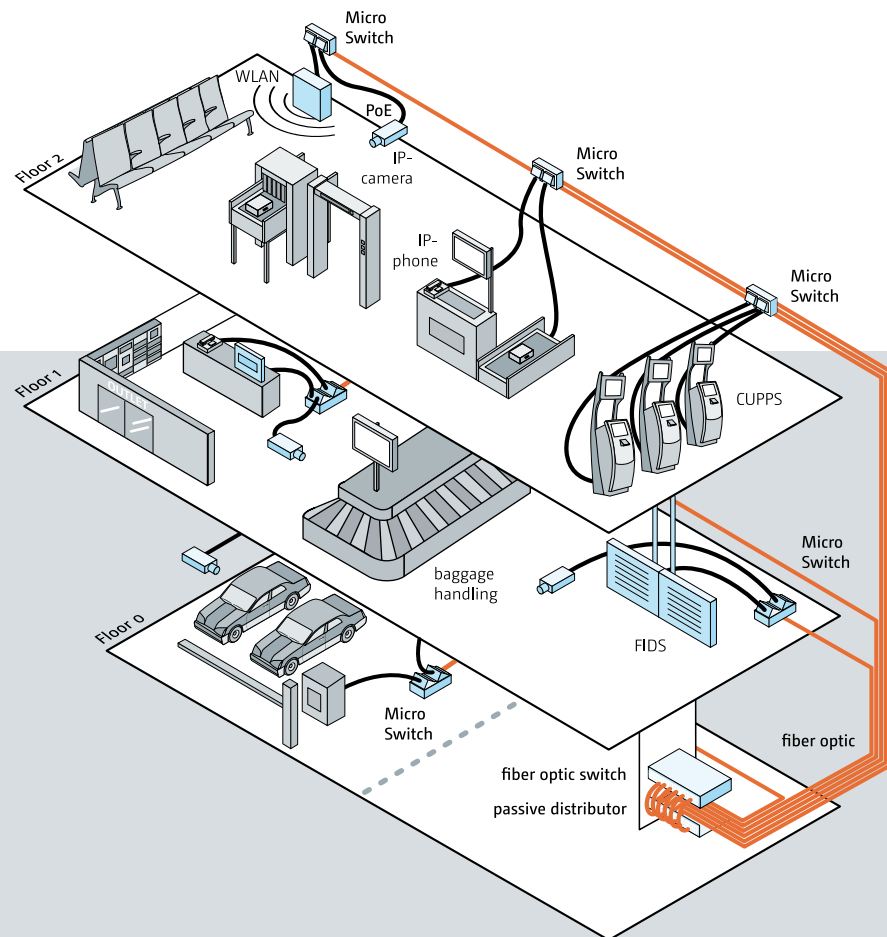


Future-proofed, predictable cost planning, excellent maintainability

FIBER TO THE OFFICE (FTTO)

Reliable in-house networking architecture for airports

The demands put on information infrastructures are increasing with added financial pressures. Therefore, long-term economic solutions with higher scalability become evermore important for airport operators. Choosing the right network architecture is the essential building block for a long-term competitive IT infrastructure with operational efficiency.



The use of MICROSENS Micro Switches permits an extension of the fiber optic backbone all the way to the tertiary level of containment (cable ducts, sub-floor boxes as well as in-wall, on-wall and desktop installations).



FTTO easily bridges the high distances of large airports with horizontal fiber optic wiring, while saving valuable space for wiring closets and cable trunks, ensuring flexibility in terms of cabling length limitations and delivered bandwidth, thus reducing overall cost for installation, operation, network expansion and future maintenance.

Achieving planning reliability and reducing follow on costs.

The Fiber To The Office concept offers the best of two worlds by using the technological advantages of fiber optics for the floor wiring in a building, e.g. hardly any length restrictions, interference resistance, future-proofing and long-term reliability. But in contrast to pure fiber optic concepts, FTTO uses the flexibility of twisted pair and brings it via the state-of-the-art concept of the MICROSENS Micro Switch close to the end user. A future change in technology would necessitate only the easy exchange of components to be modernised the fiber optic wiring itself would remain in its entirety. Thus, the FTTO concept combines the investment protection of fiber optic cabling with the ease of use of twisted pair wiring.

Fiber optic infrastructure with the flexibility of Power-over-Ethernet (PoE)

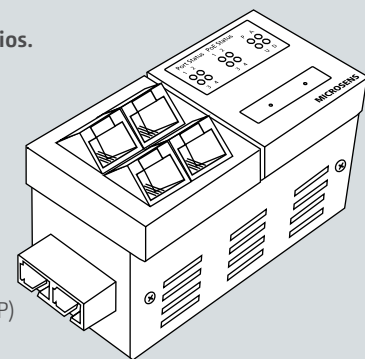
The connecting element of the FTTO concept is the intelligent engineering of the MICROSENS Micro Switches. By terminating the fiber optics into copper ports, the application of PoE (Power-over-Ethernet up to 15.4 Watts) for use with some IP based systems is possible at any time, flexibility that a pure Fiber To The Desk solution cannot provide.

FTTO is a green IT solution that cuts spending for cooling and energy

The intelligent power management of the MICROSENS Micro Switches guarantees optimal operation of the connected devices and saves spending for energy and cooling. By avoiding the high energy losses of long copper wires, the overall energy balance of the FTTO concept is much more positive, which results into significant energy cost cuttings. Additionally, the natural resources are preserved due to less material required such as limited and expensive copper.

MICROSENS Micro Switches are suitable for a multitude of installation scenarios. The switches also offer many technical advantages:

- Vertical and horizontal mounting, fast installation, no tools required
- Robust fan-less design with high MTBF (Mean Time Between Failure)
- Power-over-Ethernet functionality on all RJ-45 ports up to 15.4 Watts
- Gigabit Ethernet technology with high port density and fiber optic uplink
- Easy network expandability by using copper downlink to another switch
- Central management via intelligent management software (MICROSENS NMP)
- 802.1X, Rapid Spanning Tree, VLAN, QoS (Quality of Service) etc.



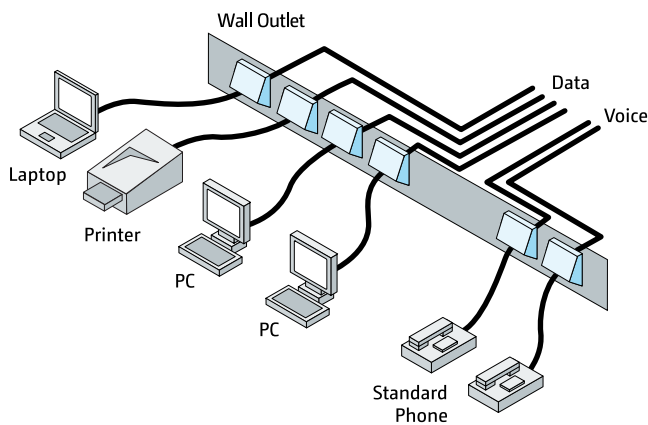
You have questions about our FTTO products? Just contact our expert consultant directly:
Mr. Dirk Herppich | Technical Consultant | +49 2381 94 52 139 | dherppich@microsens.com

FIBER TO THE OFFICE (FTTO)

A resilient and cost effective network infrastructure for the steadily increasing bandwidth needs of modern airports

Structured Cabling Network (SCN)

In a modern airport environment, the shortcomings of the commonly used Structured Cabling Network become apparent. The use of copper cable for horizontal wiring leads to a number of disadvantages including but not limited to the following: copper wiring cannot overcome the high distances of modern airport architecture within one building level (restricted to 90 m only). This leads to high cost for cable trunking, increased fire load from jacket material, and loss of commercial space for the consolidation of the wiring in technical rooms.



- ✗ Strict lengths limitations (90 m)
- ✗ Many wiring cabinets for cable consolidation needed (more than 100 per floor), wasting valuable commercial space
- ✗ Thick cable trunks with high fire load and susceptibility to EMI (Electromagnetic Interference) have negative impact on overall network reliability
- ✗ High demand for network hardware leading to low energy efficiency, high cost for cooling and maintenance and average network resilience
- ✗ Average bandwidth per user. One central switch port is shared by up to 24/48 users.

FTTO provides the ideal basis for the increasing bandwidth needs of modern airport operations.

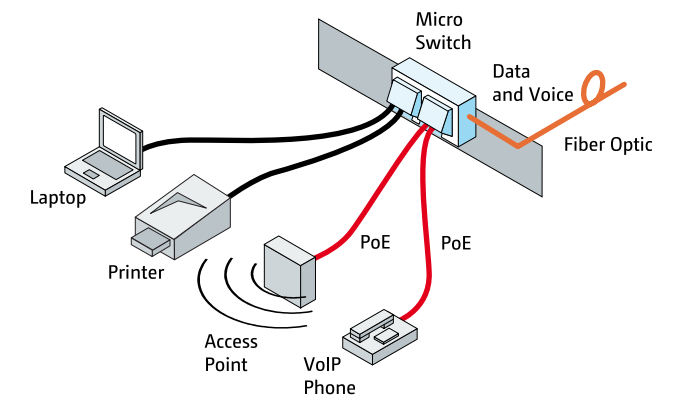
All modern IT based airport information systems are heavily relying on a resilient network infrastructure. In addition, new demands like IP based systems are steadily increasing and growing data volumes have to be handled

by the network infrastructure. Through the use of extended fiber optic cabling, the FTTO solution ensures enhanced life cycle, maximum performance and an excellent cost-per-bit ratio.



FTTO - Fiber To The Office extended backbone architecture

FTTO uses the highly efficient standard compliant extended backbone architecture that uses fiber optic wiring for the horizontal wiring. The technical advantages of fiber optic technology, like extended network reach and immunity to electromagnetic interference, making it the ideal choice for the requirements of modern airport installations: Saving cost for installation and IT operation, higher availability and maximum bandwidth for seamless converged networks (IP based systems).



- ✓ Almost no length limitations (typical 10 km for single mode fiber)
- ✓ Only one or two wiring cabinets needed, leaving more potential space for commercial facilities
- ✓ No cable trunks needed, no EMI susceptibility, very high network reliability
- ✓ Less and only core switches needed (number depending on the design and requirement of redundancy), leading to high energy efficiency, low cost for cooling and maintenance and excellent network resilience
- ✓ High bandwidth per user. One central switch port is shared by only four users per FTTO Switch.

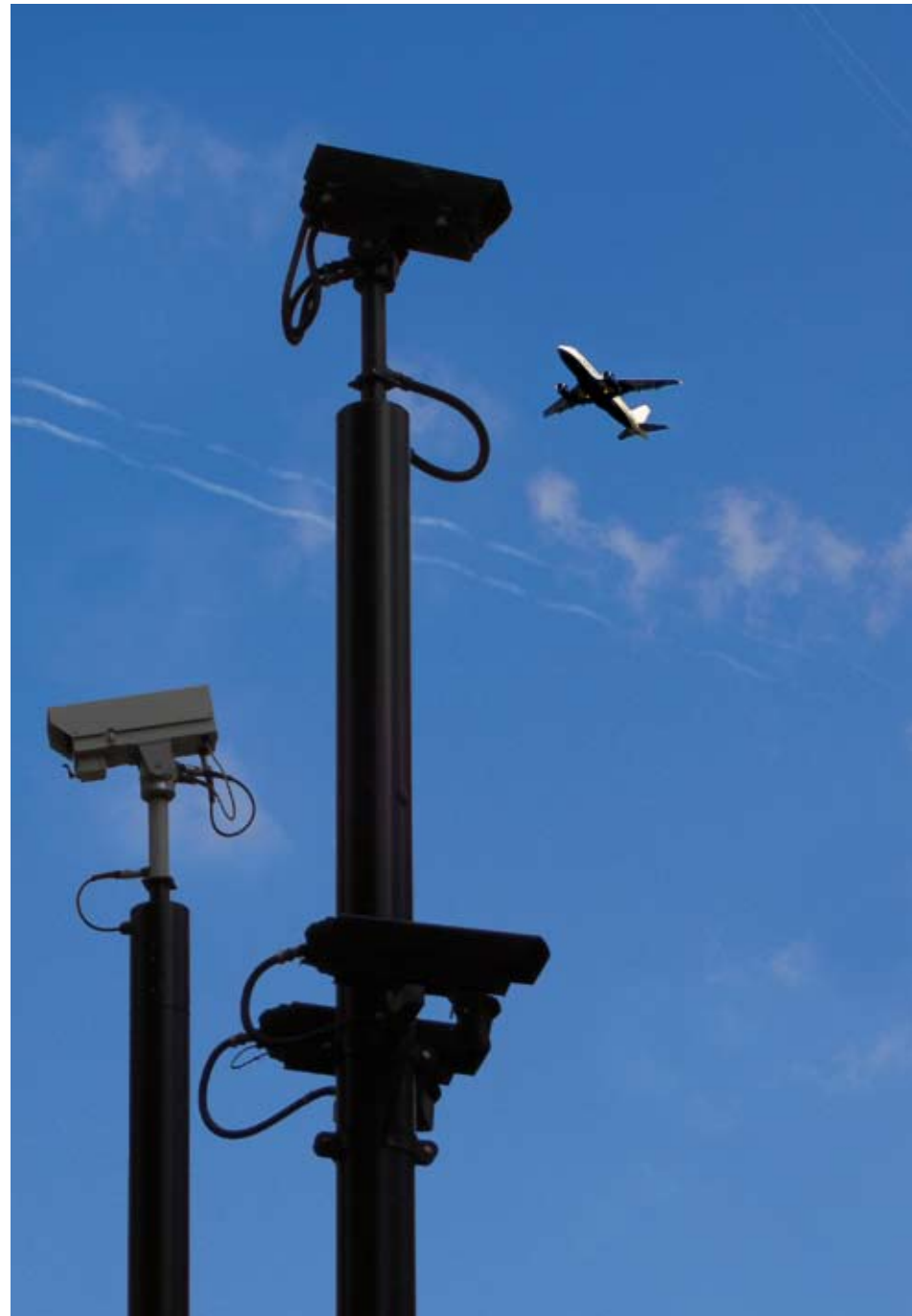
Industrial Ethernet

Monitor, control, capture

Reliable data transmission as the foundation for tomorrow's economic decisions

The Industrial Ethernet solution of MICROSENS helps airport managers to keep operational costs at balance while ensuring service excellence

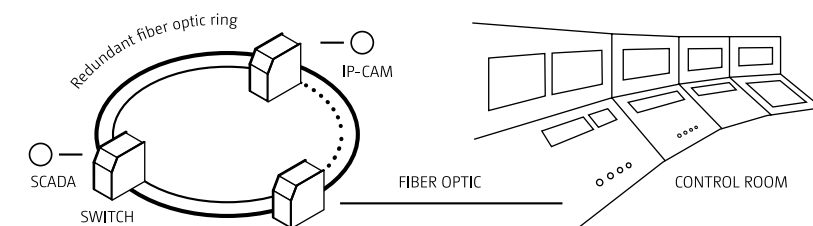
More and more technologic solutions all over the airport currently control and consolidate tens of thousands of process data daily. Particularly systems in rough environments like baggage handling, outdoor surveillance and moving aprons for passengers have high requirements regarding technical stability. Also for facility management reliable supervisory and data acquisition is essential to ensure maximum availability of air conditioning and power supply systems.



Industrial Ethernet solutions from MICROSENS offer maximum stability for rough environments. The excellent temperature-resistance makes it highly eligible for the interconnection of airport infrastructures in harsh environment or IP surveillance in outdoor areas.

Continuous flow of information

The availability of real time data of critical facility infrastructures via SCADA systems are at the core of every airport operations. To ensure a continuous flow of data is significant to issues like security and safety, service quality and economic viability. The Industrial Ethernet solution of MICROSENS offers the necessary bandwidth and resiliency to reliably transmit the continually increasing volumes of data both now and in the future.



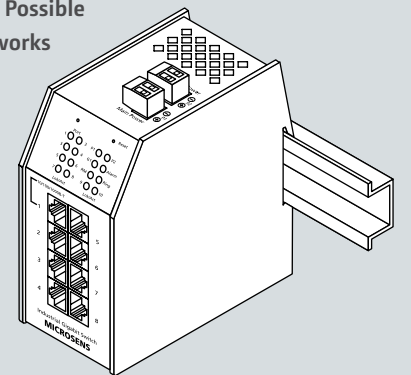
Technical stability from German manufacturing

Due to the rising need of real time data, networking components are more often being implemented into rough environments. Conditions which were not foreseen when the Ethernet protocol was initially conceptualized. In order to create reliable solutions for these new areas of application which put particularly high demands on product quality, MICROSENS is therefore focusing on development and manufacturing in Germany.

Central management and maximised reliability

MICROSENS Industrial Ethernet components with high shock and vibration resistance provide the most modern manufacturing quality and premium semiconductor technology. Possible areas of application therefore range from key energy and communication networks to airfield ground lighting, baggage handling, and aircraft power handoff.

- Patented and ultra fast (20 ms) self-healing fiber optic ring topology and a redundant power supply guarantee maximum availability for critical applications
- High temperature resistance (-40 to +75 °C operating temperature)
- Power Substation Certification (IEC 61850-3/IEEE1612), Railway Certification (DIN EN 50121-4)
- Power-over-Ethernet, VLAN, QoS, IGMP-Snooping, STP/RSTP, central management (NMP) etc.



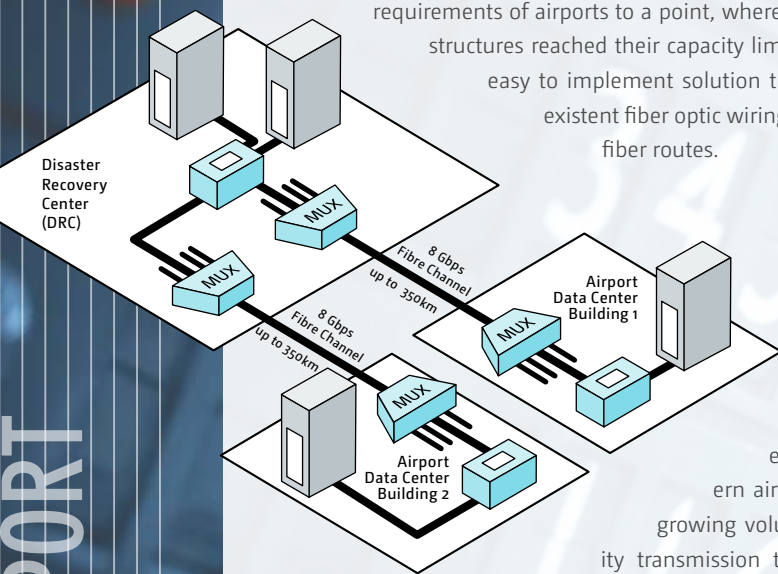
High speed optical connections

New cost effective bandwidths capacities for existent fiber optic routes

With the optical multiplexing solutions of MICROSENS, airport operators can safeguard their productivity by delivering the data volumes needed for modern converged networks with ease.

Safeguarding productivity with enhanced bandwidths for converged networks

New technologies such as IP surveillance and VoIP telephony have driven the bandwidth requirements of airports to a point, where traditional Gigabit Ethernet (1 Gbps) backbone structures reached their capacity limits quickly. The optical transport network is an easy to implement solution that multiplies the bandwidth capacities for existent fiber optic wiring at a fraction of investment costs of laying new fiber routes.

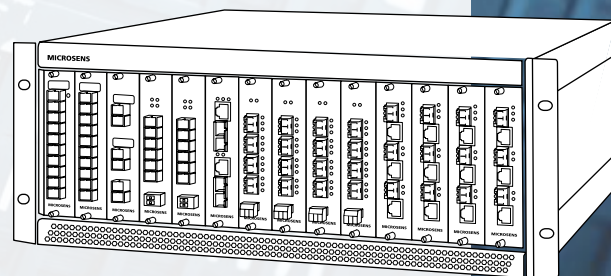


Ensuring Geo-Redundancy with high performance data center replication

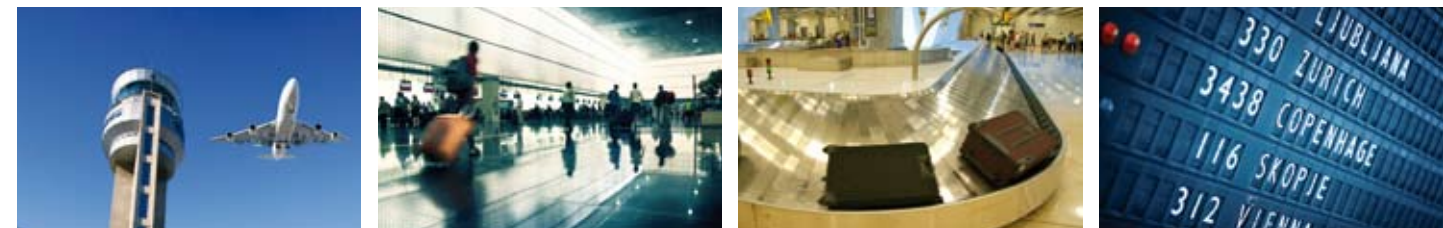
Consolidation and centralisation are the key factors of a cost efficient data center environment. The multitude of systems in modern airport management to be consolidated and the growing volume of data are demanding new high capacity transmission technologies. Furthermore, risk management considerations increasingly challenge IT directors of airports to assure Geo-Redundancy for critical data. With their modular design, scalability and protocol transparency, MICROSENS' optical multiplexing systems are the perfect basis for the cost efficient interconnection of main and backup data centers.

High reliability, redundant design, scalability

- Protocol transparency (SONET/SDH, ATM, Gigabit Ethernet, ESCON/FICON, Fibre Channel)
- Video Multiplexing (SDI, HD-SDI-PAL, HD-SDI-NTSC)
- CWDM / DWDM Systems (also in mixed operation)
- For bandwidths from 100 Mbps - 40 Gbps
- Up to 160 separate channels, range up to 350 km



MICROSENS fiber optic solutions - intelligent, reliable, high-performance



MICROSENS

MICROSENS
fiber optic solutions
euromicron group

MICROSENS GmbH & Co. KG
Küferstr. 16
59067 Hamm / Germany
Tel. +49 2381/9452-0
Fax +49 2381/9452-100
info@microsens.com
www.microsens.com

www.microsens.com/airports