

ND SATCOM
BY **ASTRIUM**

New Trends in Satellite Communications Networks

Presented by ND SatCom at the ICAO/SAM Workshop, Lima 18-20 July 2011

Aleksandra Civric-Heim // 18.07.2011

All the space you need



Agenda

- ND SatCom at a glance
- What is relevant for the ATC Community?
- What the *SkyWAN*[®] product family can contribute to ACT Networks?
- Hot Topics in the SatCom industry

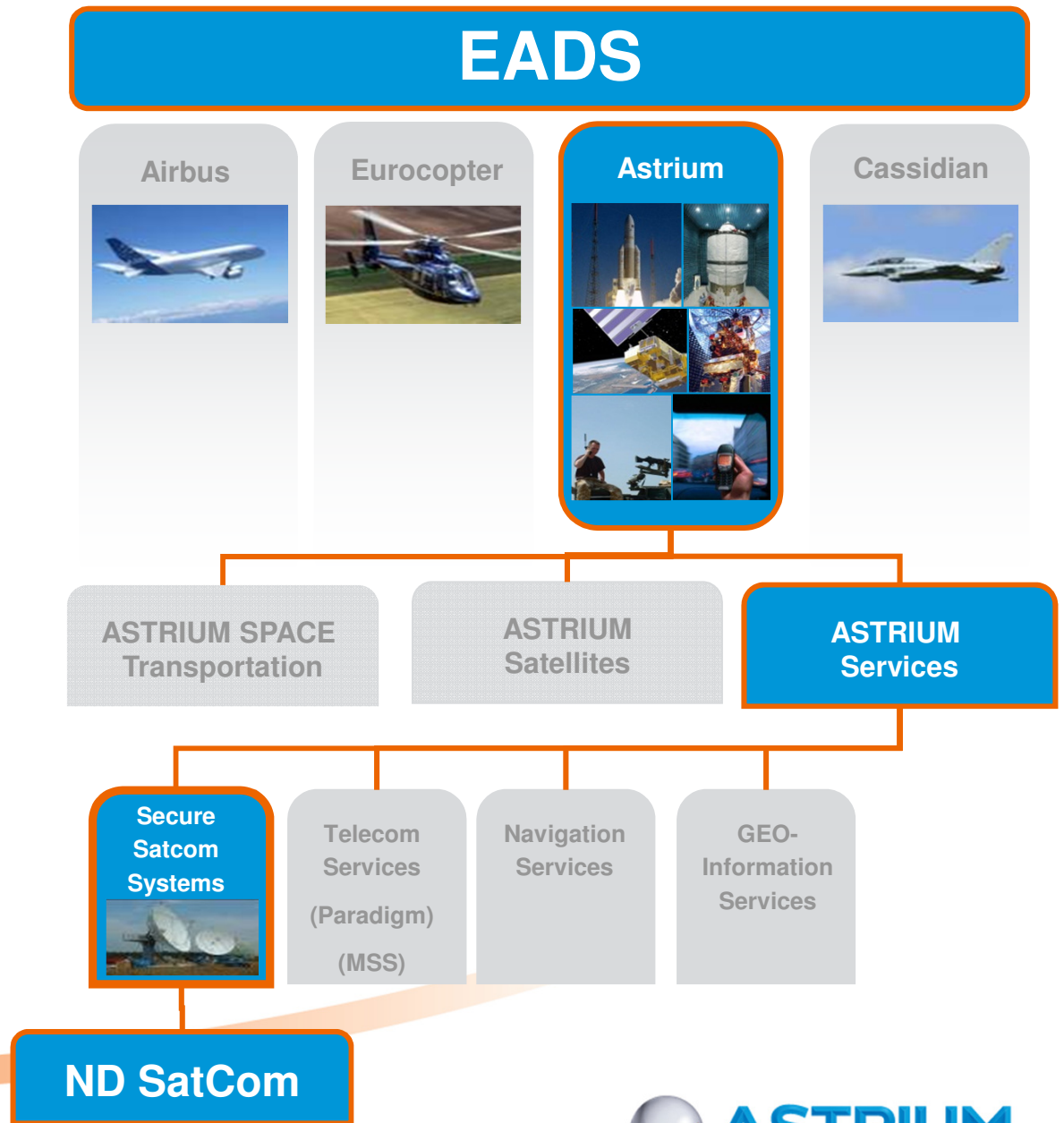
All the space you need

Agenda

- ND SatCom at a glance
- What is relevant for the ATC Community?
- What the *SkyWAN*[®] product family can contribute to ACT Networks?
- Hot Topics in the SatCom industry

The EADS Group & ND SatCom

ASTRIUM is a 100% subsidiary of the European Aeronautic Defence and Space Company (EADS)



All the space you need

ND SatCom at a Glance

// ND SatCom is a leading global system integrator providing satellite-based communication solutions enhanced with own leading edge technology //

We build on more than 30 years of experience in the satellite networks and systems businesses in the areas of:

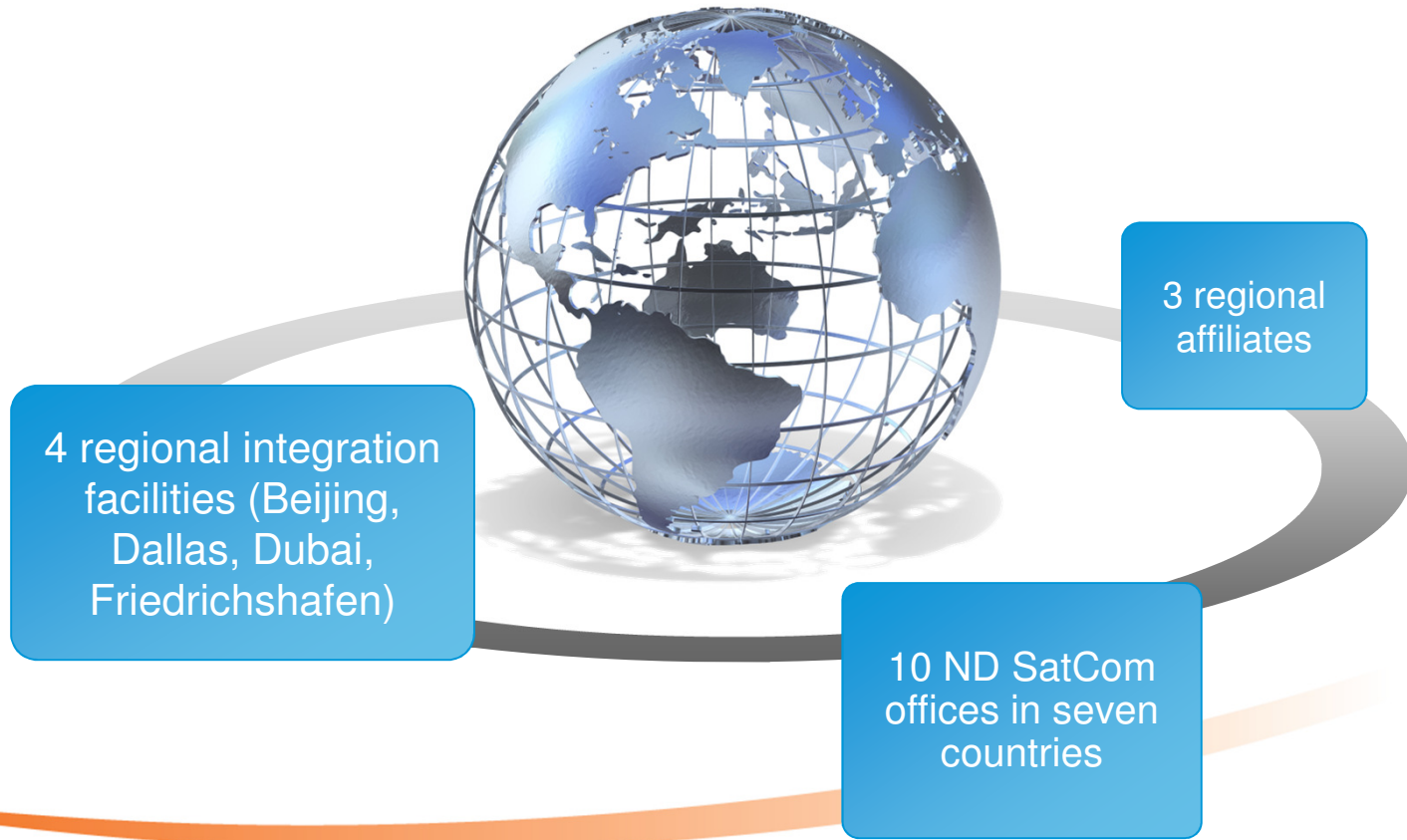
- Government & Administration Solutions
- Broadcast & Media Solutions
- Telecom & Enterprise Network Solutions
- Defence Network Solutions



All the space you need

Company Overview

ND SatCom – Global Presence



All the space you need

Sample Reference Customers (1/2)

Satellite Operators, Space Organizations

Broadcasters

All the space you need

Sample Reference Customers (2/2)

Telecom Carriers, Corporate Customers

ALFA TELECOM, STRATOS, MT, impsat, invsat, telespazio, TNS PLUS, SATLYNX, NTT Group, Streamlink, Schlumberger, Shell, HDT, T-Systems

Governmental Organizations, Defence Customers

SPT EC, Auswärtiges Amt, Bundeswehr, KEGOC, Raytheon, CapRock, Boeing, IATA, INT-SAT, Atlas Telecom, SAIC, and various national defence logos.

All the space you need

Agenda

- ND SatCom at a glance
- What is relevant for the ATC Community?
- What the SkyWAN® product family can contribute to ACT Networks?
- Hot Topics in the SatCom industry

Why are we here at the ICAO Workshop?



We commit to South America



We have something to contribute:
SkyWAN



We search for direct touch
with the market as a manufacturer



We see ATC network solutions as
an important vertical market

Winning SkyWAN® Features for ATC

- Absolute System **Reliability** and Availability
 - **Geographical** Redundancy
- Absolute System **Safety**
 - Secured **Privacy**
- **Unified Platform** with Interfaces to customer equipment
 - various types of **Radar** data served (low speed bit-synchronous to IP-based)
 - Interface for the extension of **VHF-links**
 - legacy analog **phone** equipment served
- **Good Performance** record
- **Seamless, optimized & flexible network** design possibilities to meet the requirements best
 - **Seamless** Carrier Sizing
 - **Differentiated** modulation schemes & codification **per Carrier**
 - **Optimal Filling** rate per TDMA Frame and Slot



References

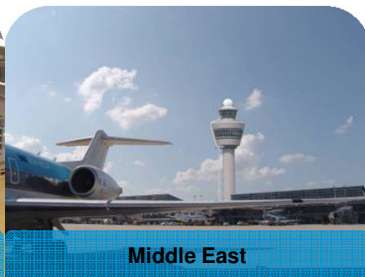
■ Customers

- National Air traffic control: local organizations
- International Air traffic control: thru IATA, ICAO, SITA

■ History

- Many years of experience
- Every generation of SkyWAN® played a major role within ATC networks
- We do not only provide SkyWAN® IDUs but also design/ integration & consultancy know how
- ATC Networks – installed prior to REDDIG I - still stable & running and supported by ND SatCom

China,
Papua New
Guinea,
Afghanistan,
Pakistan,
Iraq, Iran,
Syria,
Saudi Arabia,
Libya,
Sudan,
Venezuela,
All Africa,
.....



Nothing stays the same, e.g.

Demand for more capacity in all areas

Analogue (e.g. 4W E&M) becomes more and more an obsolete technology

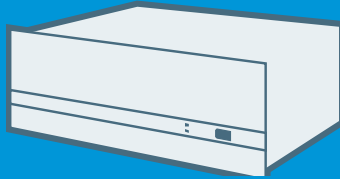
Standards are continuously enhanced (e.g. EuroCAE WG 67), Regulations situation changes

Leads to Changes
within ATC Networks

All the space you need

ModCods ... higher & more powerfull

**DVB S2 Overlay
on SkyWAN
Roadmap**



**SkyWAN
provides a
8PSK
modulation
scheme**

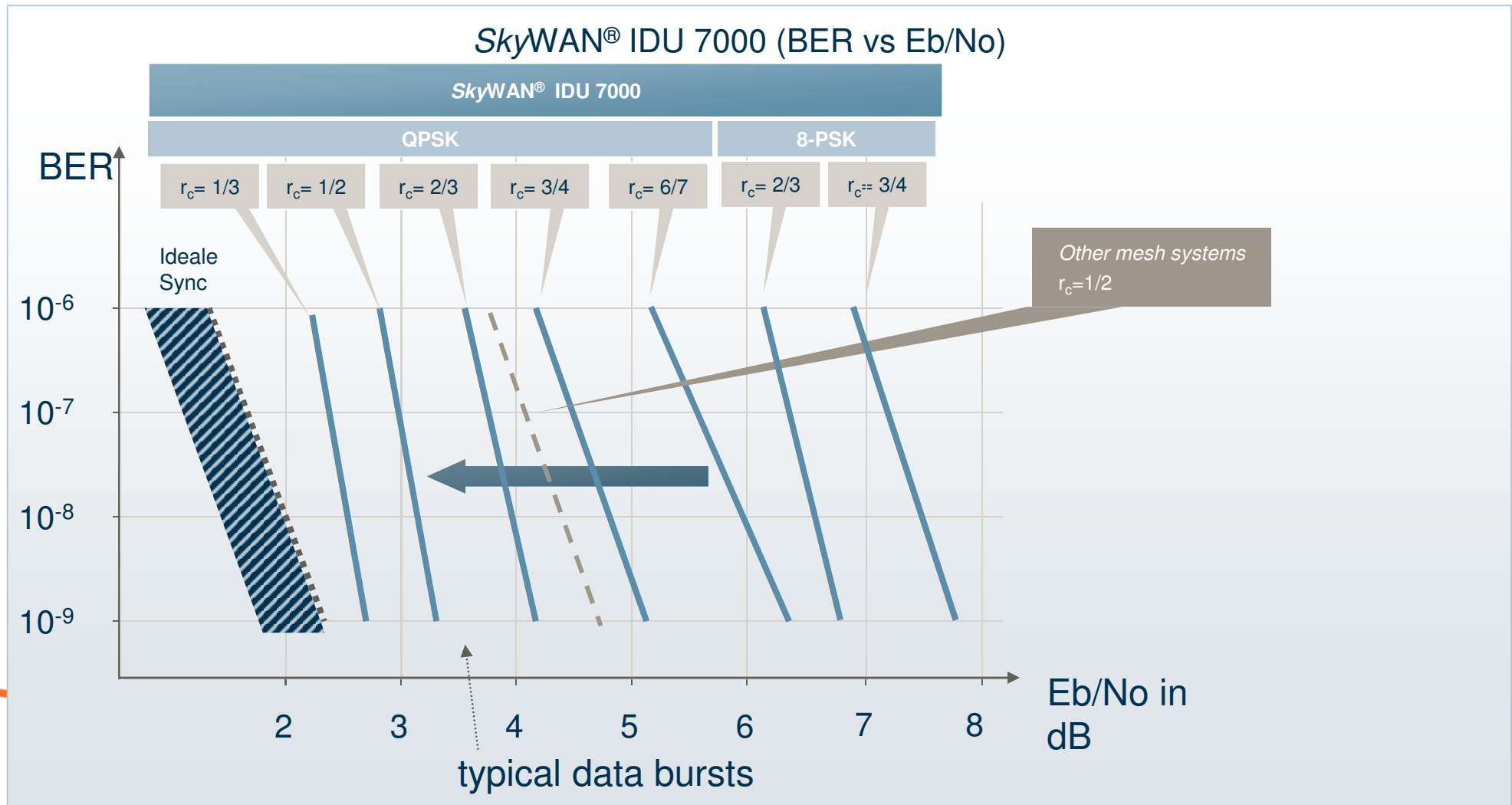
**State of the art for DAMA MF
TDMA modem technology
SkyWAN Roadmap: higher
modulation schemes**

**SkyWAN
offers a
powerfull
Turbo Phi
coding**



All the space you need

SkyWAN® IDU 7000 Modem Performance



Legacy Protocols ... IP

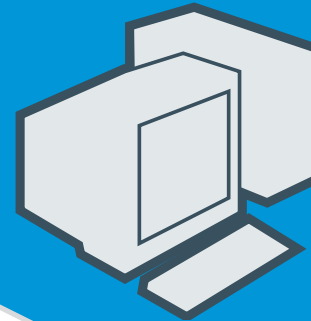


SkyWAN is prepared for IP in ATC networks

First tests in ATC network environment successful

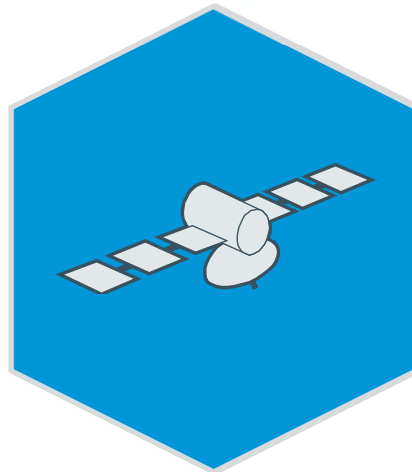
Seamless switchover whenever IP technology ready for ATC (e.g. VoIP Radios)

SkyWAN offers both, support for IP & legacy protocols on one platform



All the space you need

C-Band ... Ku-/ Ka-Band



Role of C-Band jeopardized (frequencies assigned e.g. to WiFi)

Ku-/Ka-Band have to be considered

Strong rain fading to be overcome: adaptive coding & modulation

Seamless switchover possible whenever needed

SkyWAN already is C-/Ku-/Ka-Band ready

ACM for SkyWAN on the roadmap

All the space you need

Agenda

- ND SatCom at a glance
- What is relevant for the ATC Community?
- What the *SkyWAN*[®] product family can contribute to ACT Networks?
- Hot Topics in the SatCom industry

Solution benefits

Flexibility



Supports any network topology:
mesh, partial mesh, star, multi-star

Versatility



Supports any business application:
IP applications and legacy protocols

Scalability



Inexpensive start-up configuration

Availability



No single point of failure

Performance



Up to 10 Mbit/s bi-directional per node

Efficiency



Reduce Bandwidth Consumption by > 50 % with common bandwidth pool

Security

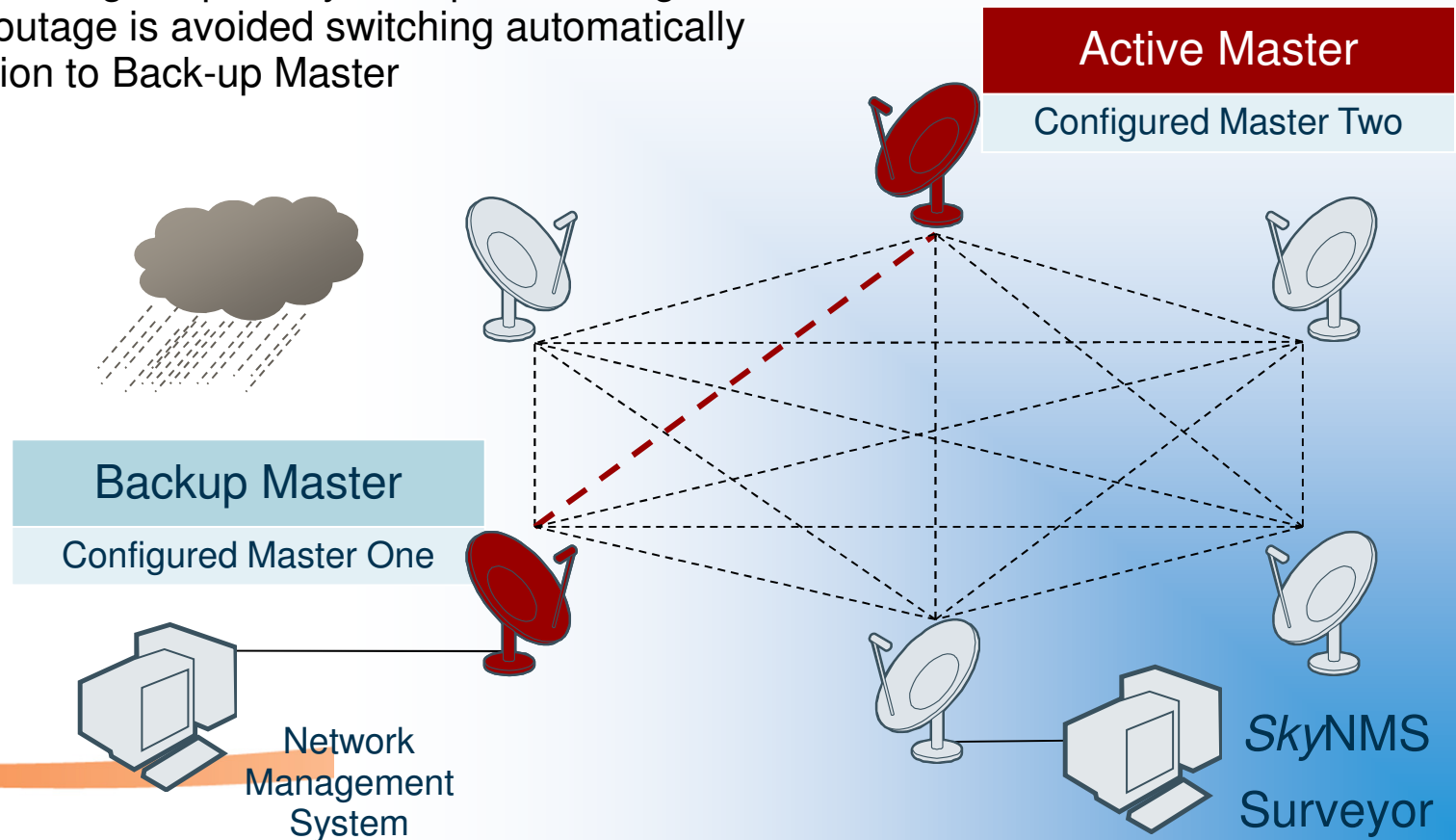


Authentication procedures, Proprietary TDMA structure

Unique Reliability & Availability (Backup-Master)

- / Utmost network reliability and availability
- / Back-up Master can be allocated to any station within the network
- / Potential network outage implied by local power outage, rain fade or sun outage is avoided switching automatically from Master Station to Back-up Master and vice versa

→ There is no service disruption for ongoing traffic!

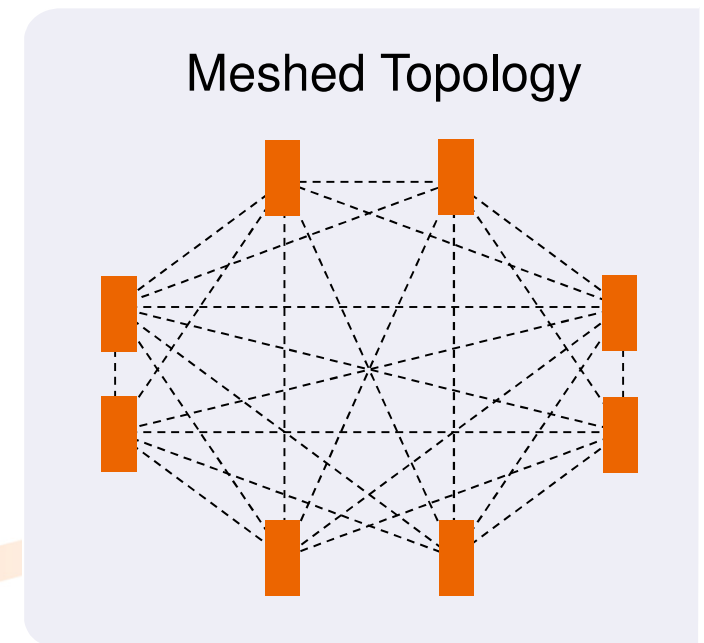


All the space you need

Fully meshed connectivity

Mesh capability support single satellite hop connections without limitations

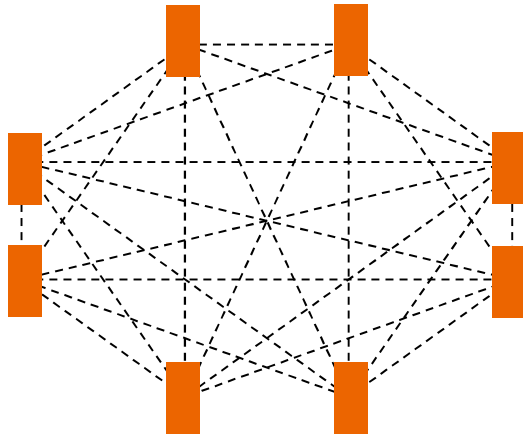
- Any to any hubless communication.
- Minimum latency (< 1 sec.).
- Minimum transmission cost.
- High flexibility regarding network changes.
- Has no limitation for any configuration (e.g. number of connections, services, channels, data rate, ...).
- Requires no Signaling nor Signaling Channel.
- Requires no set-up times.
- Provides full routing and switching capabilities with minimal configuration and operational effort.



SkyWAN® MF-TDMA Concept & Topologies

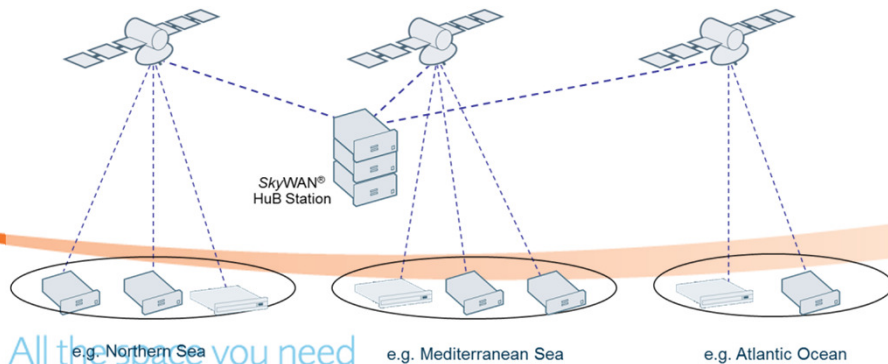
Topologies

SkyWAN® MF-TDMA Concept & Topologies
Fully meshed connectivity



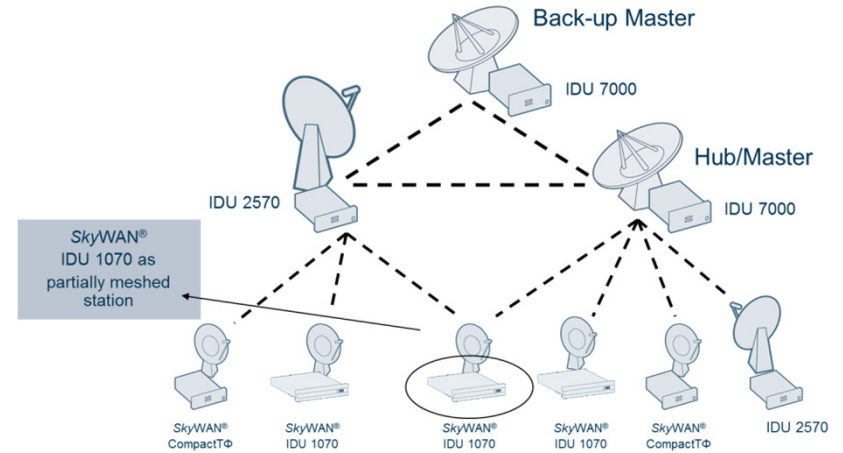
SkyWAN® MF-TDMA Concept & Topologies
Multi Star Networks

SkyWAN® is ideally suited to severe multiple small star network configurations



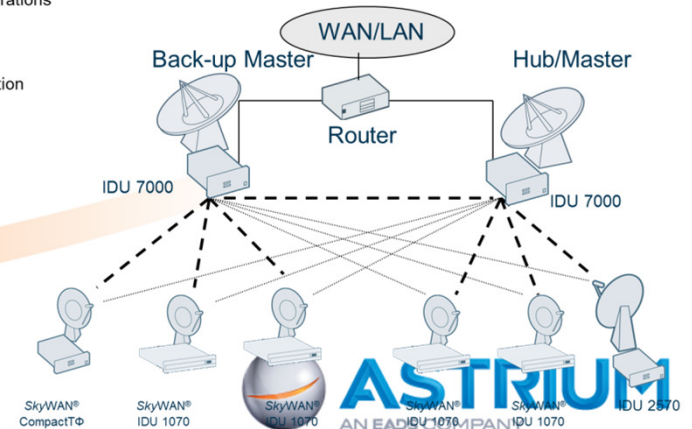
All the space you need

SkyWAN® MF-TDMA Concept & Topologies
Hybrid Topology



SkyWAN® MF-TDMA Concept & Topologies
Double Hub Configuration

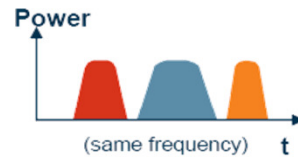
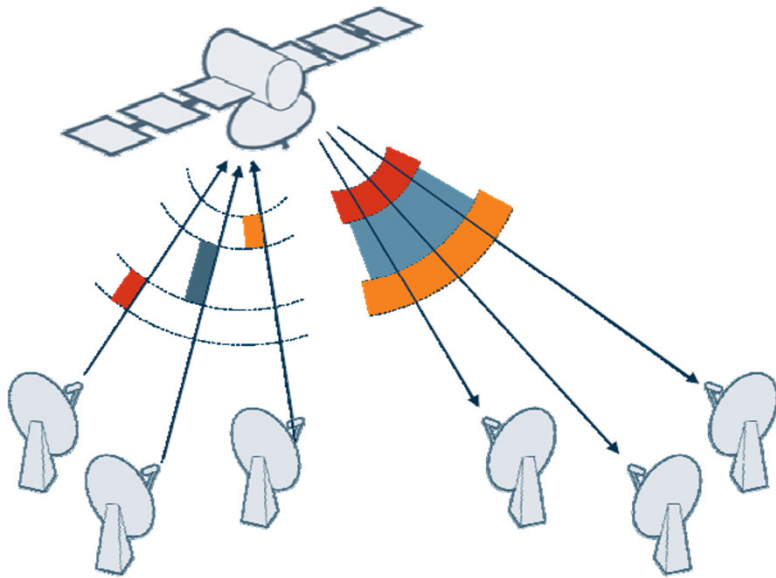
- Dual hub configurations with remote redundancy
- Each remote station can send to both master stations



TDMA Principle

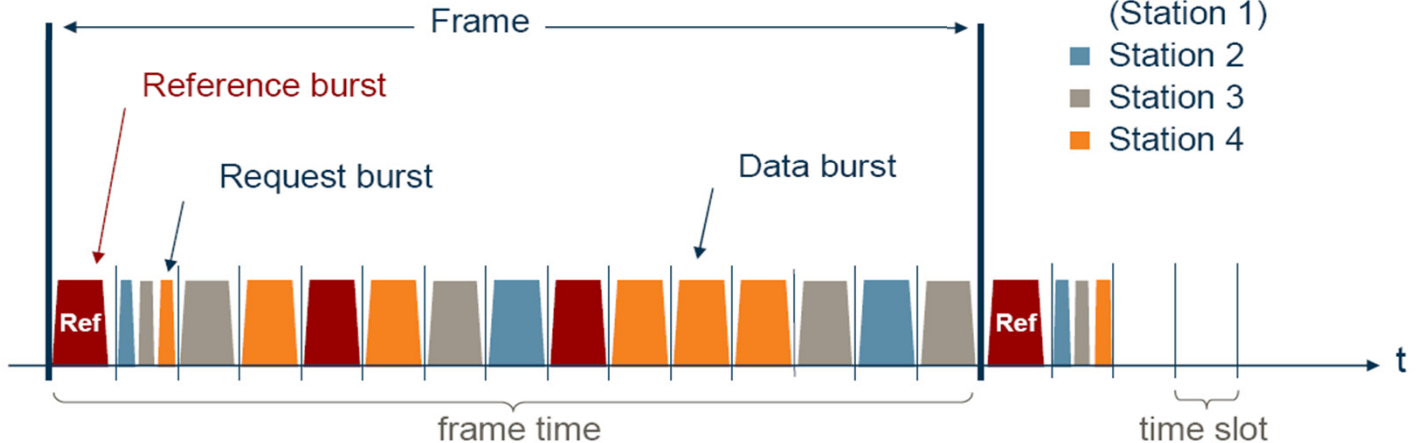
TDMA
Time Division Multiple Access

- Packet switched transmission
- Bandwidth on demand
- Meshed networks with any to any connectivity



Sending Station:

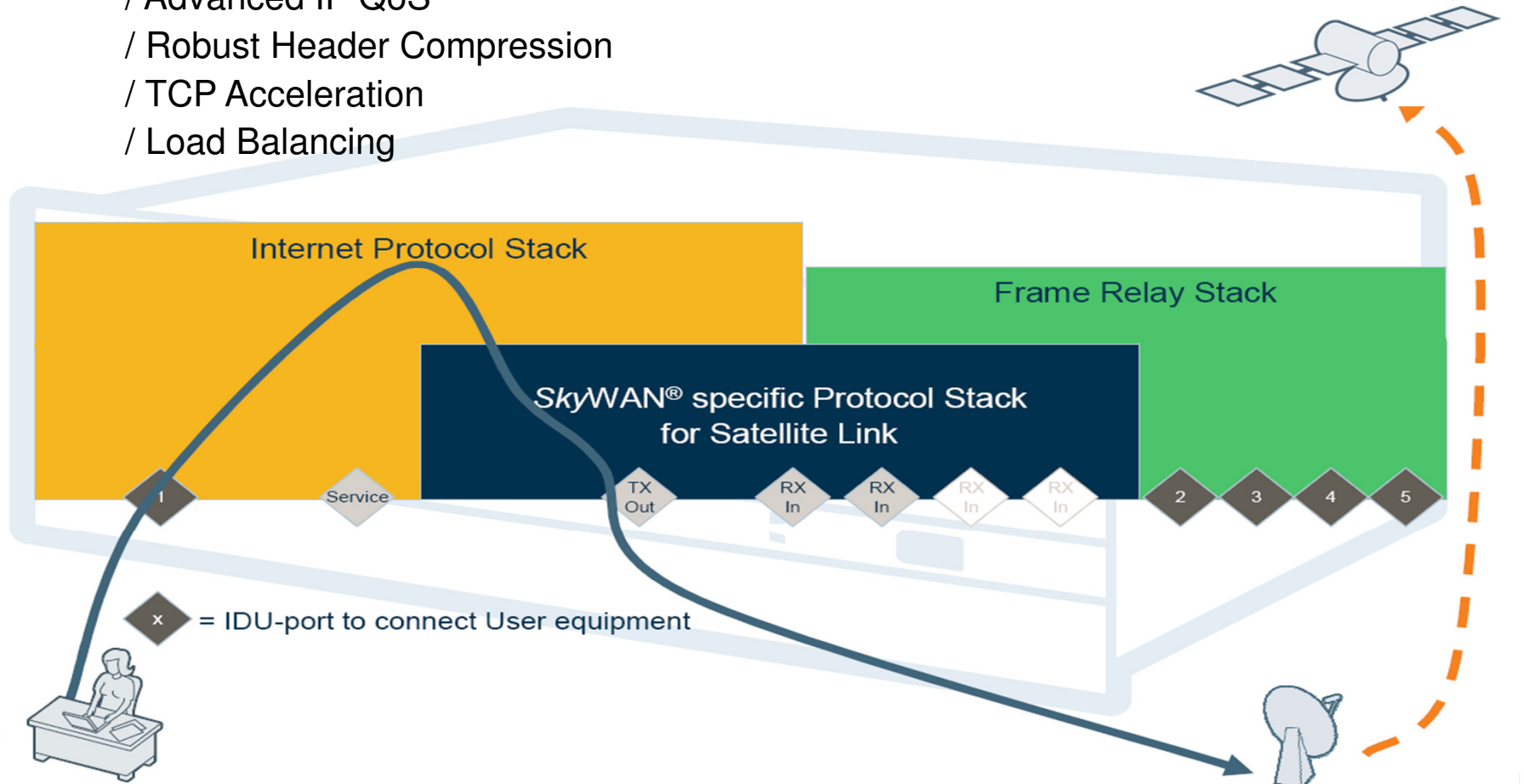
- Master Station (Station 1)
- Station 2
- Station 3
- Station 4



All the space you need

SkyWAN® Protokoll Stack

- Complete IP feature set including
- / Static and dynamic IP Routing
 - / Advanced IP QoS
 - / Robust Header Compression
 - / TCP Acceleration
 - / Load Balancing



All the space you need

SkyNMS - Network Management System

- SkyNMS shows the **current network status** in different views:

- Geographical View
- Zoom-in and -out

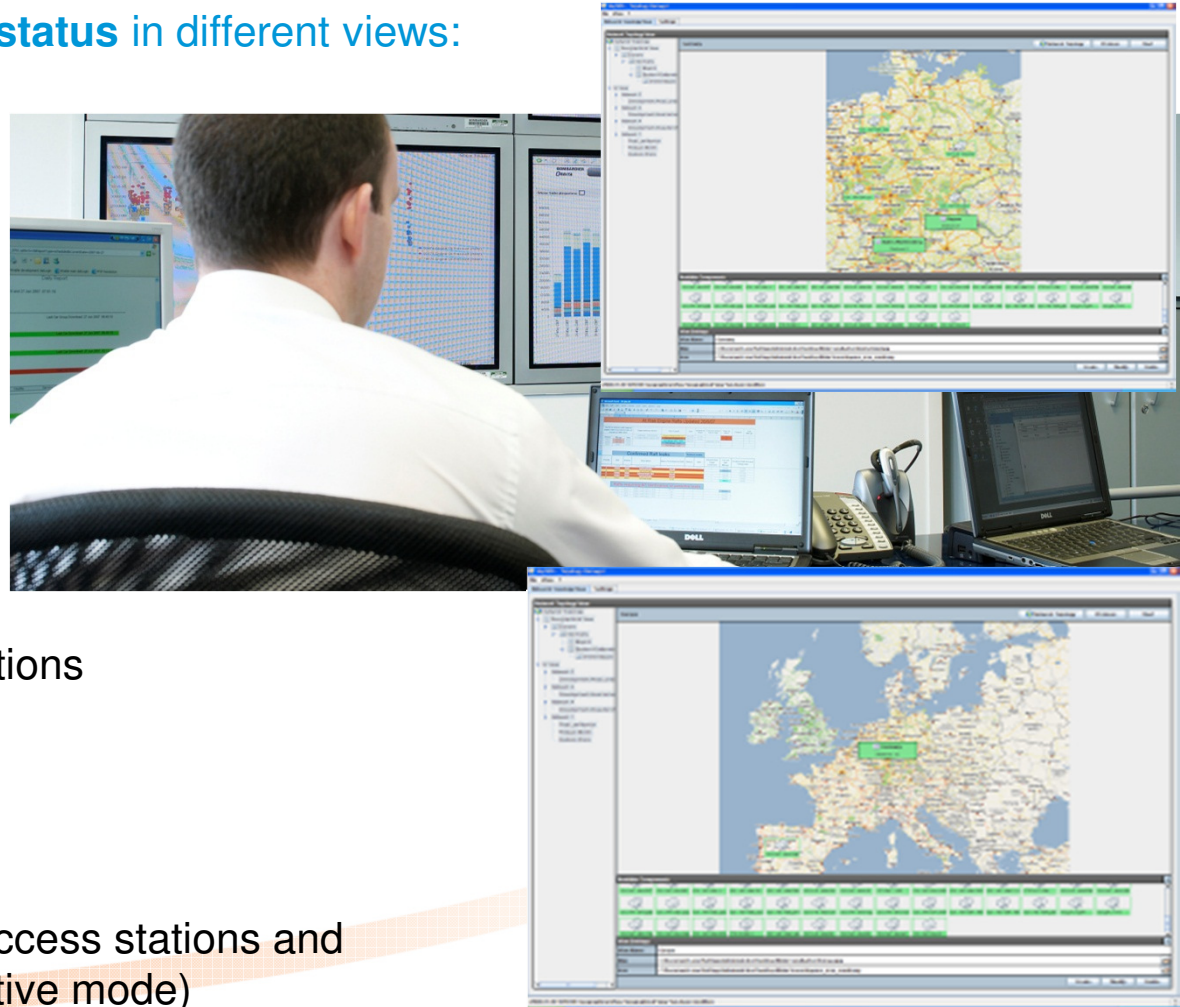
- Administrative and Monitoring functions:

- Network-wide **configuration** data
- Station configuration data
- Initial **startup** support
- Runtime configuration **changes**
- GUI-based **access** to stations
- **Event** Monitoring and Follow-on Actions

- Security functions:

- Network **Access Control**
- Continued **configuration checks**
- Administrator **roles and rights** to access stations and to execute functions (surveyor & active mode)
- Geographical **Redundancy**

All the space you need



Agenda

- ND SatCom at a glance
- What is relevant for the ATC Community?
- What the *SkyWAN*[®] product family can contribute to ACT Networks?
- Hot Topics in the SatCom industry

Ever thought about...

Latency Problem over Satellite?



How can I access latency critical online applications from any place in the world...

...with an "in-house LAN" user experience?
...without high bandwidth requirements?

THE XWARP® FACTOR:
the only „CITRIX ready“ satellite solution
low OPEX, up to 70% bandwidth savings
„Zero Latency“ experience for high user satisfaction and increased productivity

All the space you need

Ever thought about...

Mobile Air Traffic Control Stations?



Who says a Tower or a Control Center has to be fixed?



For disaster management in case an airport is broken you could use mobile infrastructure to mitigate your problem...

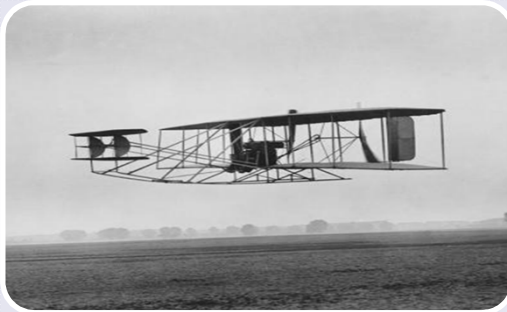


...and e.g. move to a smaller airport and enhance it with mobile infrastructure

All the space you need

Ever thought about...

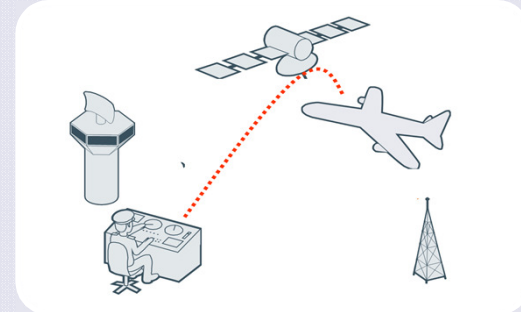
Satellite Communication on the Fly?



As satellite communication on the move is becoming available for higher speeds...



...not only the consumer market in aeroplanes (e.g. on board entertainment) will participate...



...we see the trend to setup the communication from aeroplane to the particular control station(s) directly

All the space you need

Thank you for your attention!