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MOGIS

Mobile GSM Infrastructure

over Satellite

Stefan von der Heide
PSE DE

Contents

Why GSM over Satellite?

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- Capex/Opex
- Close gaps in GSM service
- Customer service
- Temporary network coverage
- Emergency situations
- Private networks
- Security considerations

GSM Backhaul over Satellite

Transportation

Big Events
Natural Disaster

Military
Government
Enterprises

MOGIS Feature Highlights

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- GSM Coverage Everywhere
  Aircraft, Ship, Car, Train, ...
  mobile, portable, stationary
- 86% OPEX reduction possible
  7 parallel Calls over one 64kBit/s satellite channel
- Fully IP based
  Re-Use of existing Infrastructure
  Possible integration with other IP Traffic (WLAN, WiMax, ...)
- Different Satellite System possible
  Inmarsat, DVB-RCS, VSAT
- Legal
  Automatic activation depending on Latitude/Longitude/Altitude
- No-Nuisance Mode
  Selective deactivation of Calls, SMS, and GPRS possible
- Mobile Deactivation
  MOGIS can remotely deactivate Mobiles booked into the System.

Applications

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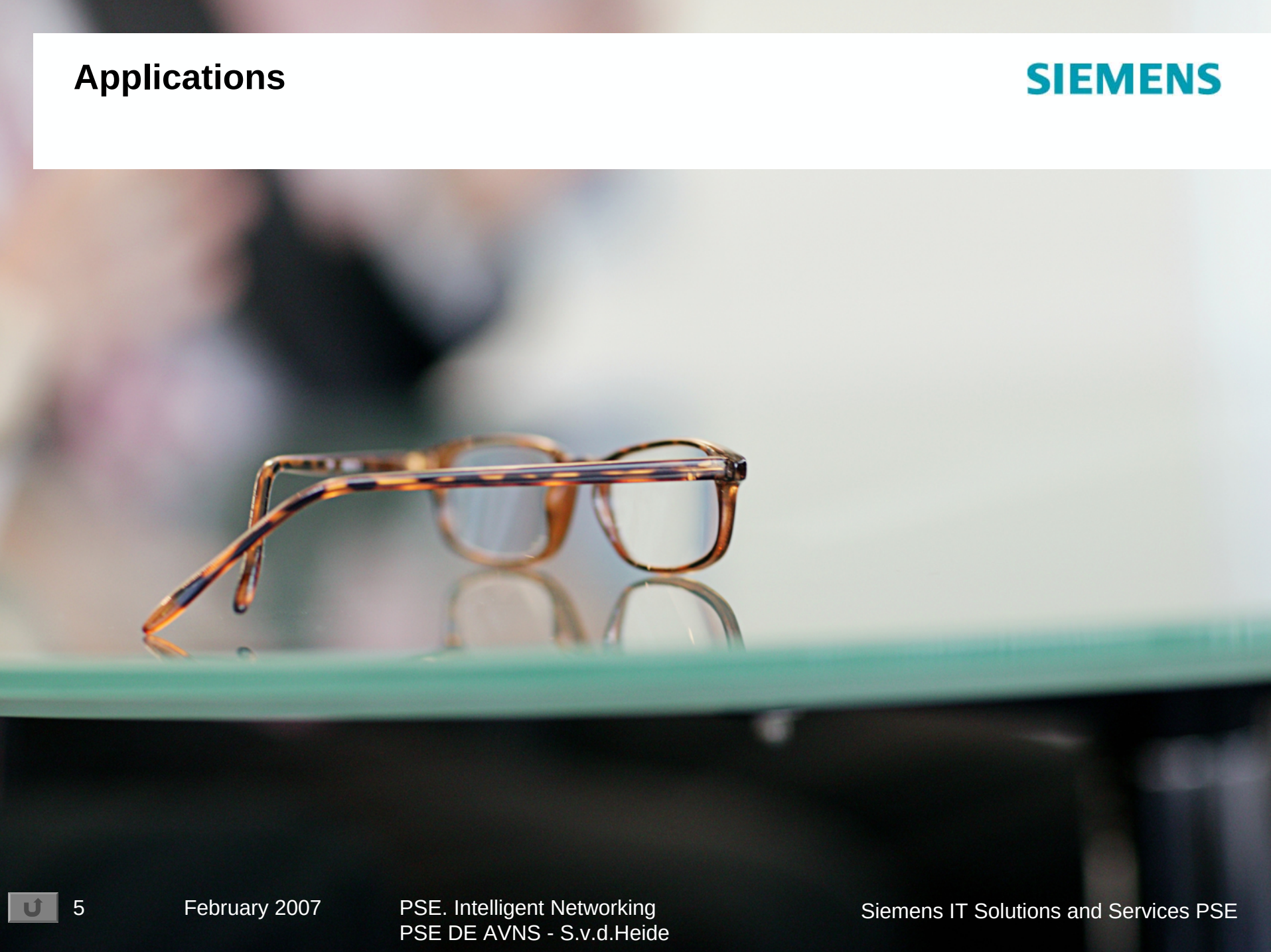

Applications

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- Business Jets
- Container Vessels
- Trains
- Cruise Ships
- Small Networks / Camps
- GSM Backhaul
- Private Luxury

Application
Business Jets 1/3

- GSM coverage
  (in cruise phase, above 10.000 ft)
- Customer surveys show prominent demand for GSM
- Increase attractiveness for Airlines
- Special features to avoid nuisance
  - Night Mode
- Safety / regulation features
  - Deactivation of mobile phones
  - local power and frequency adaptation

Application
Business Jets 2/3

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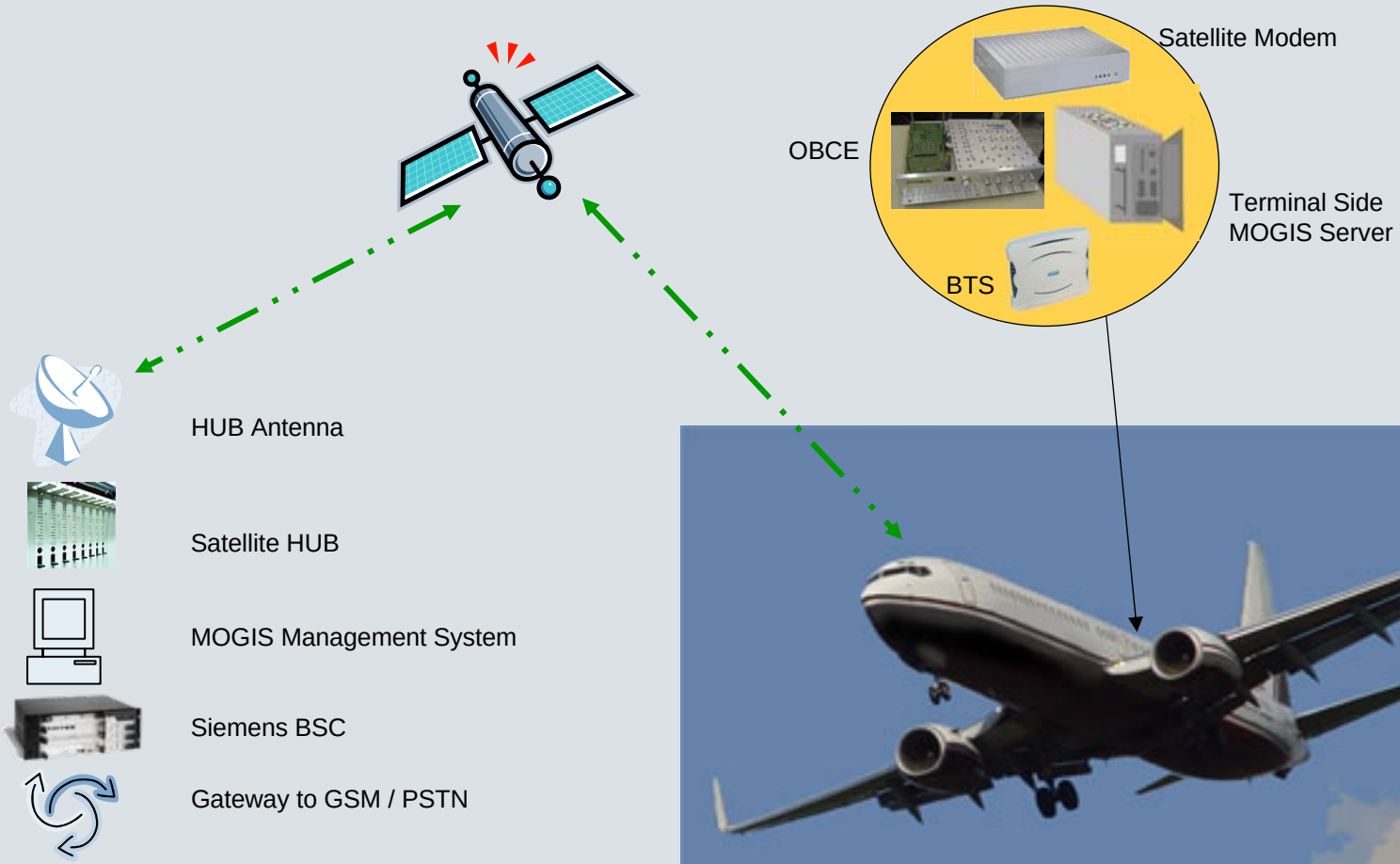
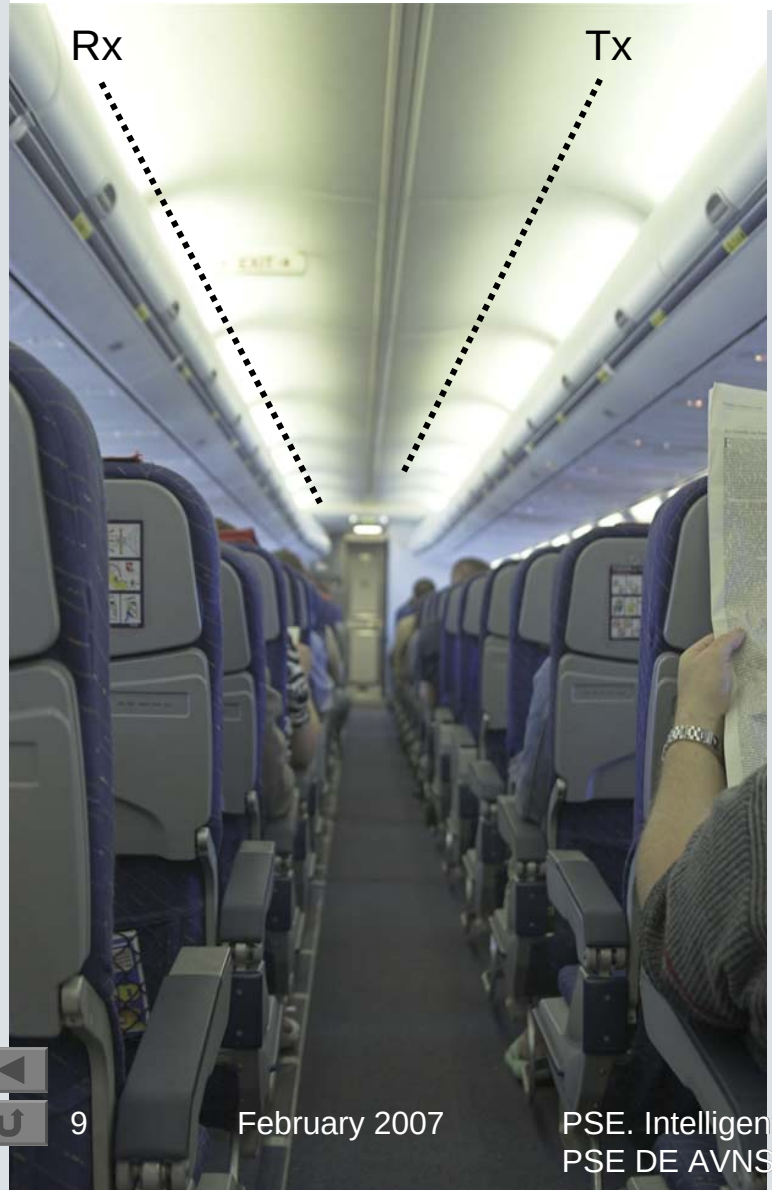
- GSM coverage (in cruise phase, above 10.000 ft)



Application
Business Jets 3/3



Invisible Installation

- All MOGIS equipment is installed in the E&E bay
- Leaky line antennas in ceiling

Application
Container Cargo Ship 1/2

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- World-wide 24x7 container tracking
  On land as well during deep sea voyage
- RFID / SMS solution to monitor container door seals and other sensors
- Monitors unauthorized access
- Compliant with DHS and CBP

  DHS = Department of Homeland Security USA

  CBP = Customs & Border Protection USA
- Compliant with EUREP GAP

Application
Container Cargo Ship 2/2

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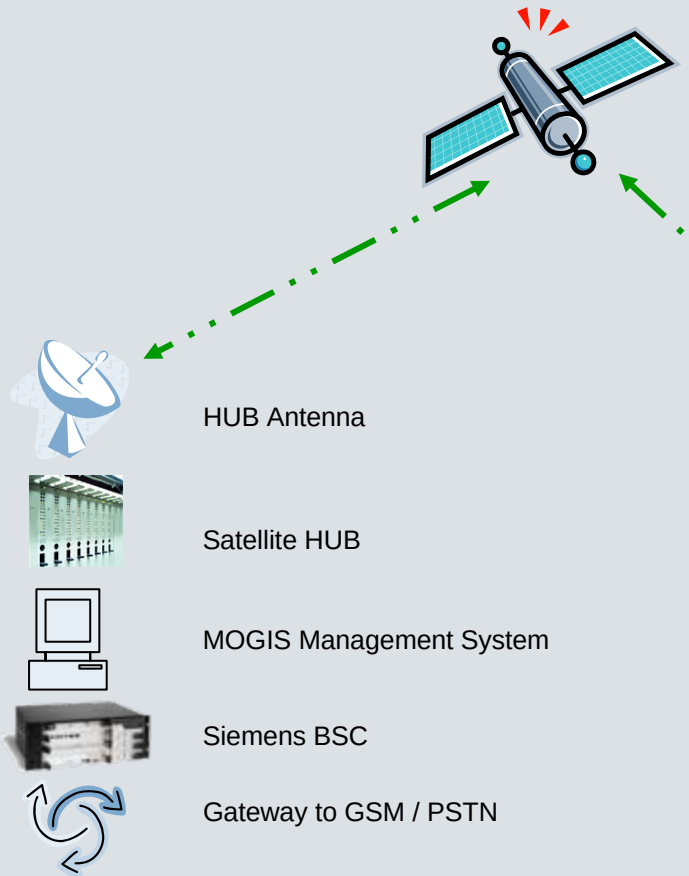
- GSM coverage for container supervision



Application
High Speed Trains 1/1

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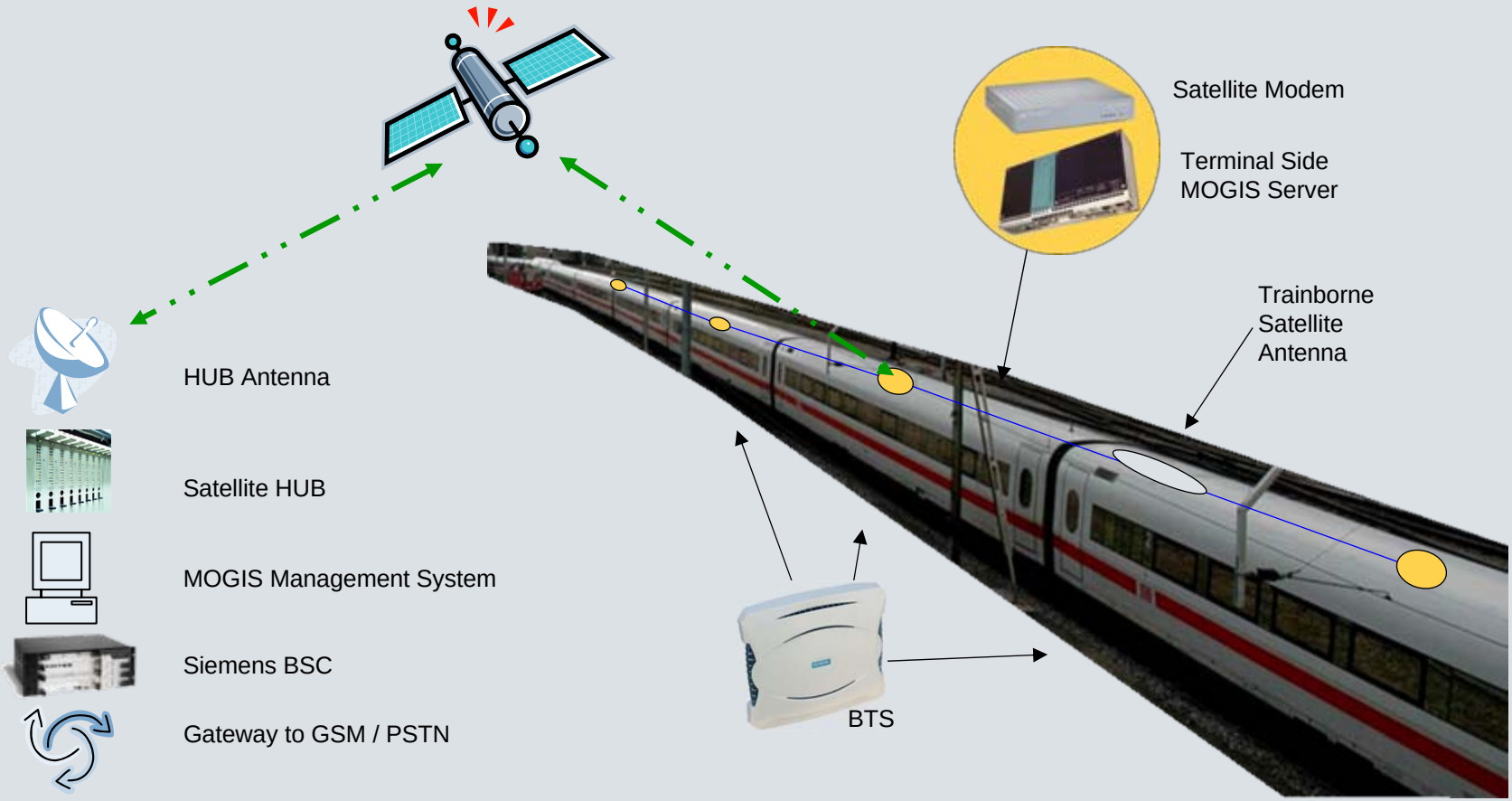
- GSM coverage in High Speed Trains



Application
Cruise Ships 1/2

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- GSM Coverage on Sea
- Comfort and added Value for Passengers and Crew members
- Optional
  - Interface to PBX on board
  - free calls on board

Application
Cruise Ships 2/2

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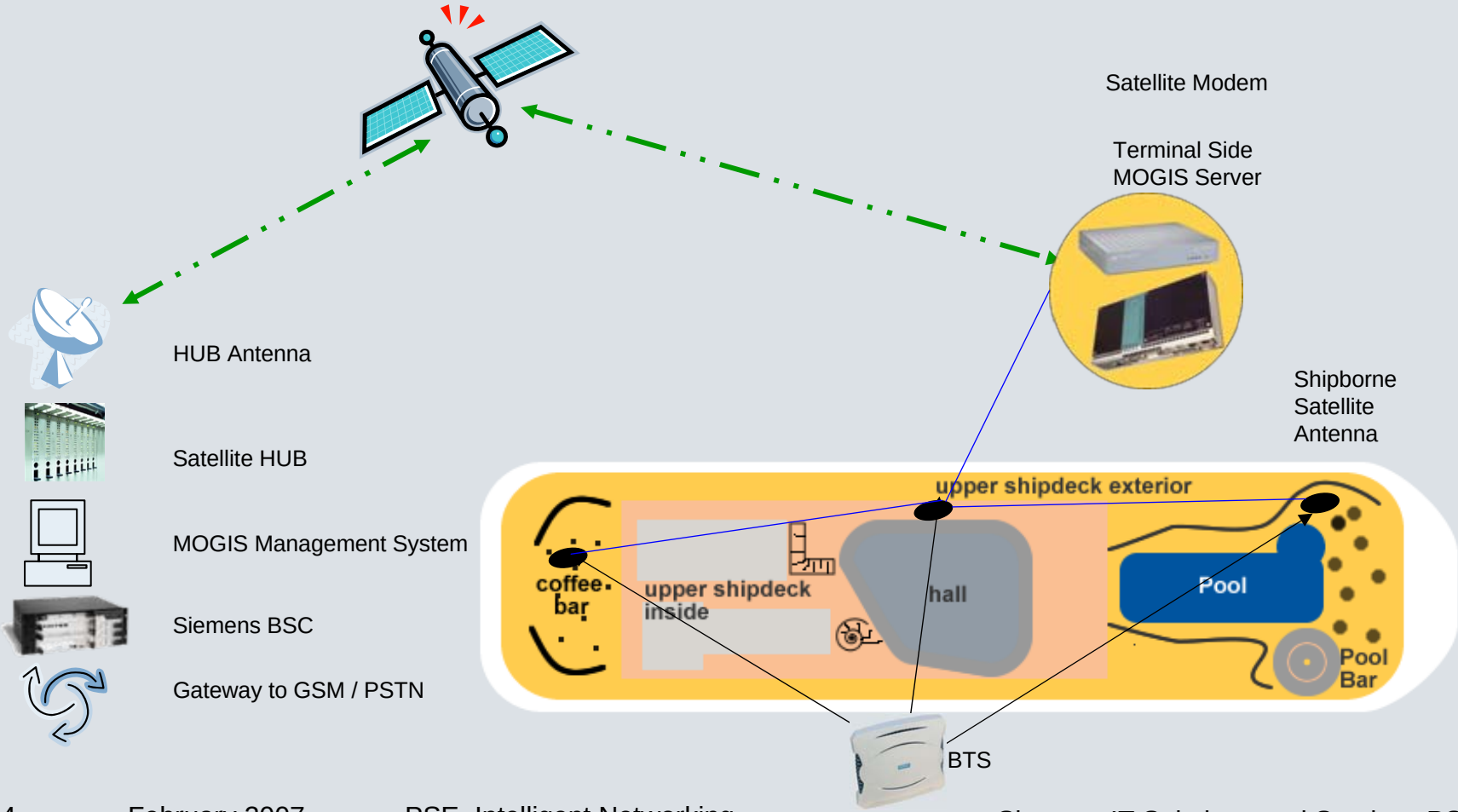
- GSM coverage for Cruise Ships



Application
Small Networks 1/1

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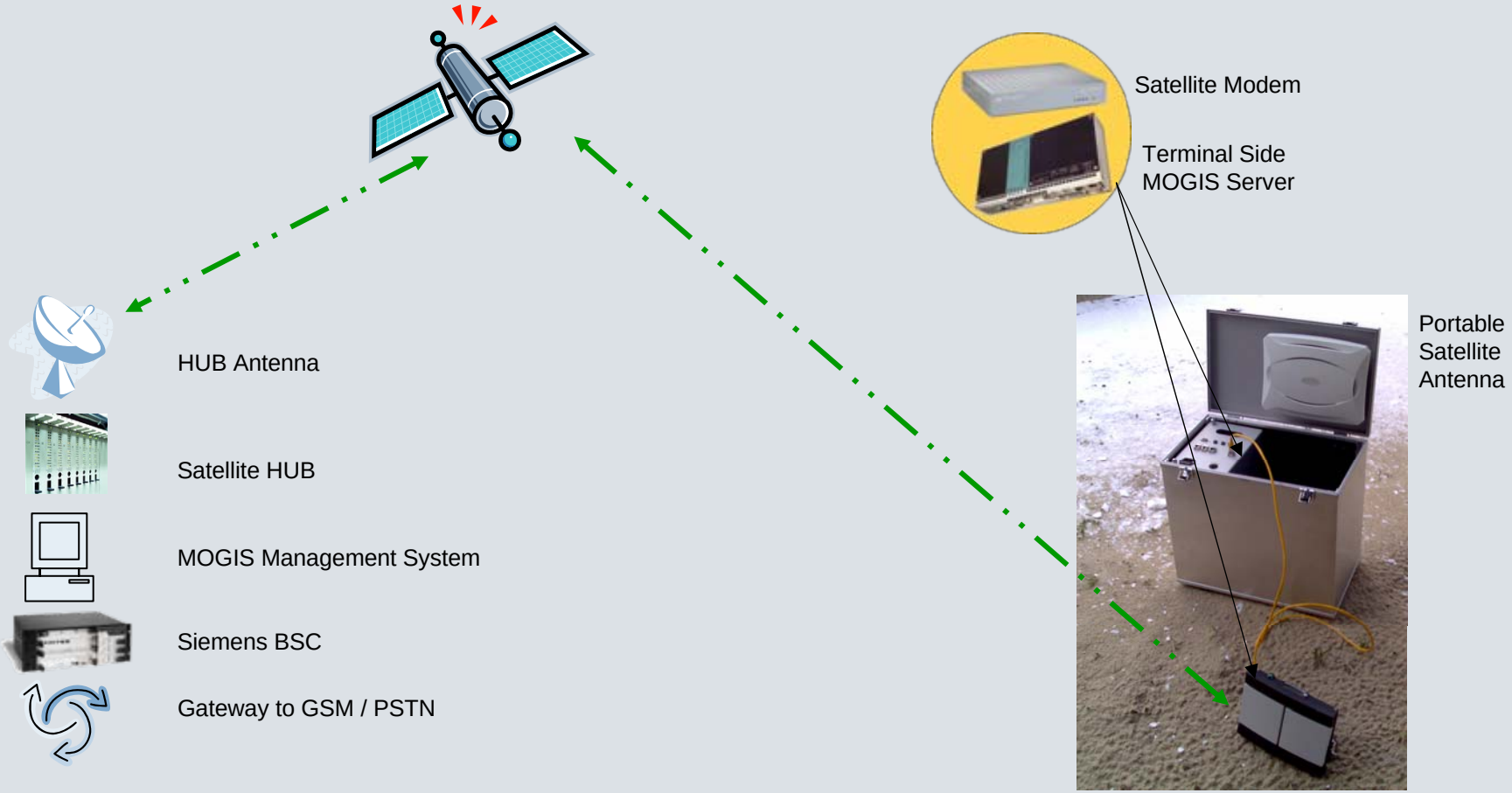
- GSM coverage for Camps or Special Networks



Application
GSM Backhaul over Satellite 1/1

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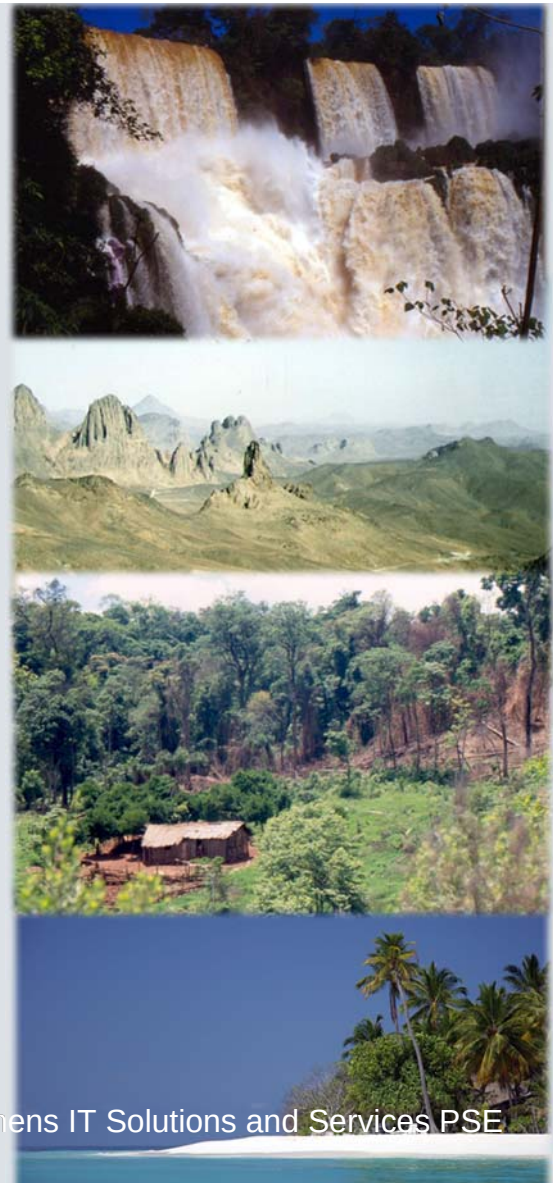
- Rural areas
- Isolated or remote locations

- Other connections too expensive
  - Long cable or fiber haul
  - No radio Line of sight

- Bandwidth sharing with other IP traffic



Application
Private Luxury 1/1

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- GSM Network for
  - Comfort
  - Pride
  - Ego-booster
  - Show-off

Product Overview

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MOGIS Product Overview

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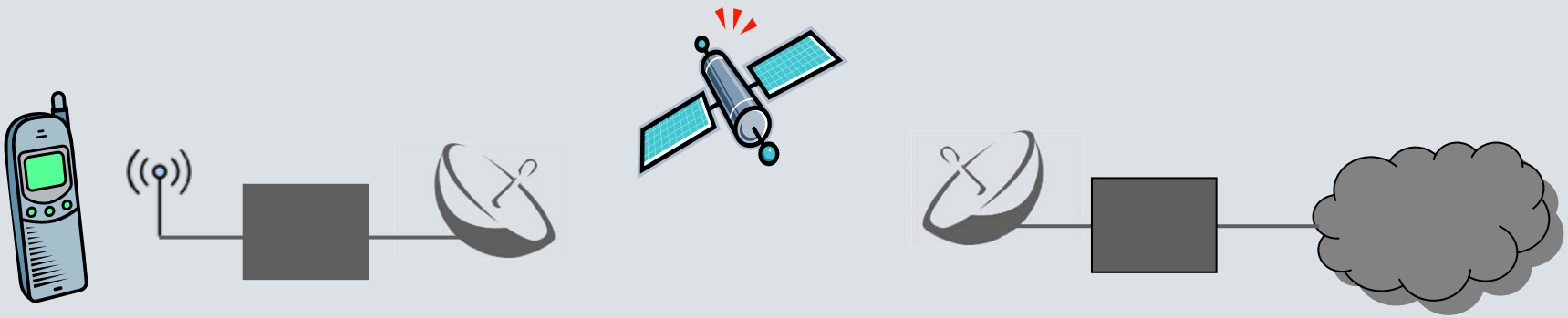
Architecture Interfaces Scalability



Terminal Side
- BTS
- TSGS
- OBCE

Satellite System
- Modem
- Antenna

Network Side
- NSGS
- BSC
- MMS

Product Overview
GSM Architecture

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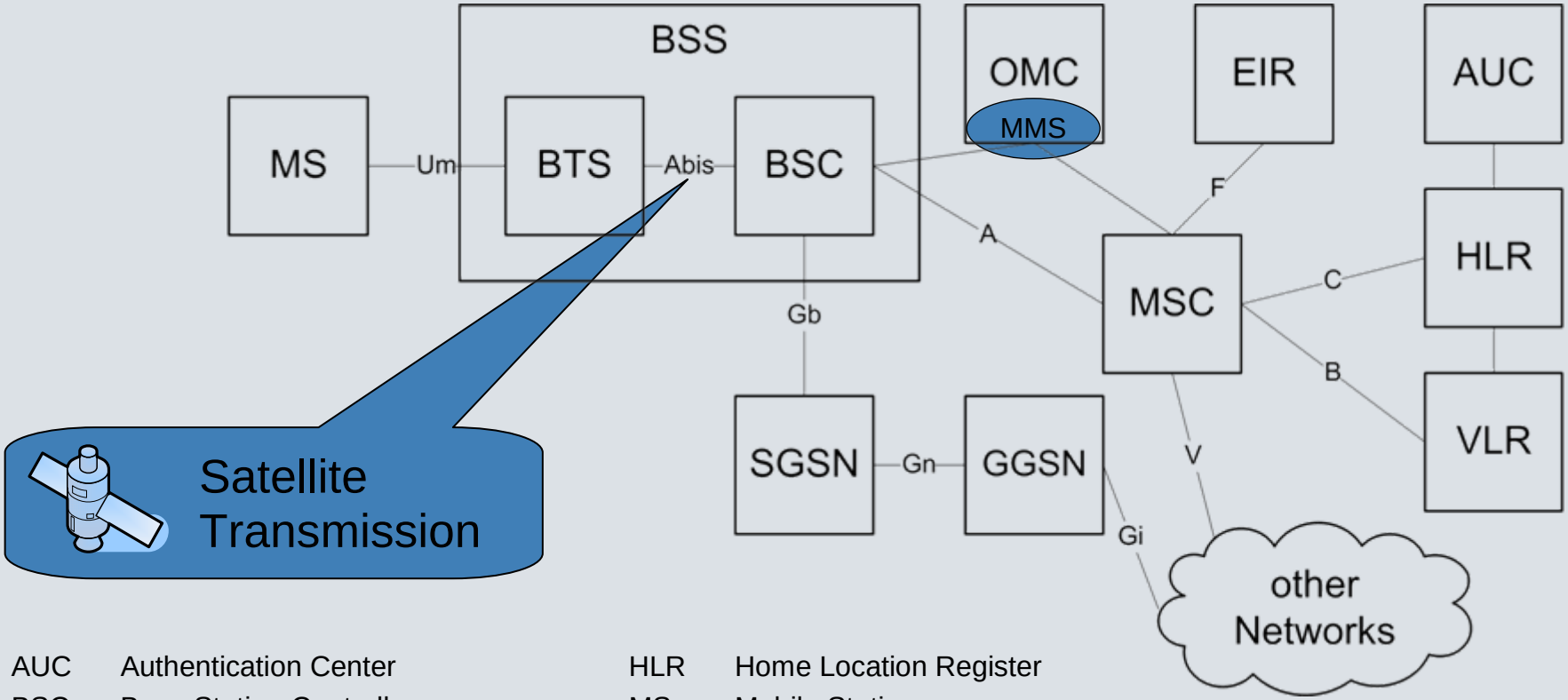
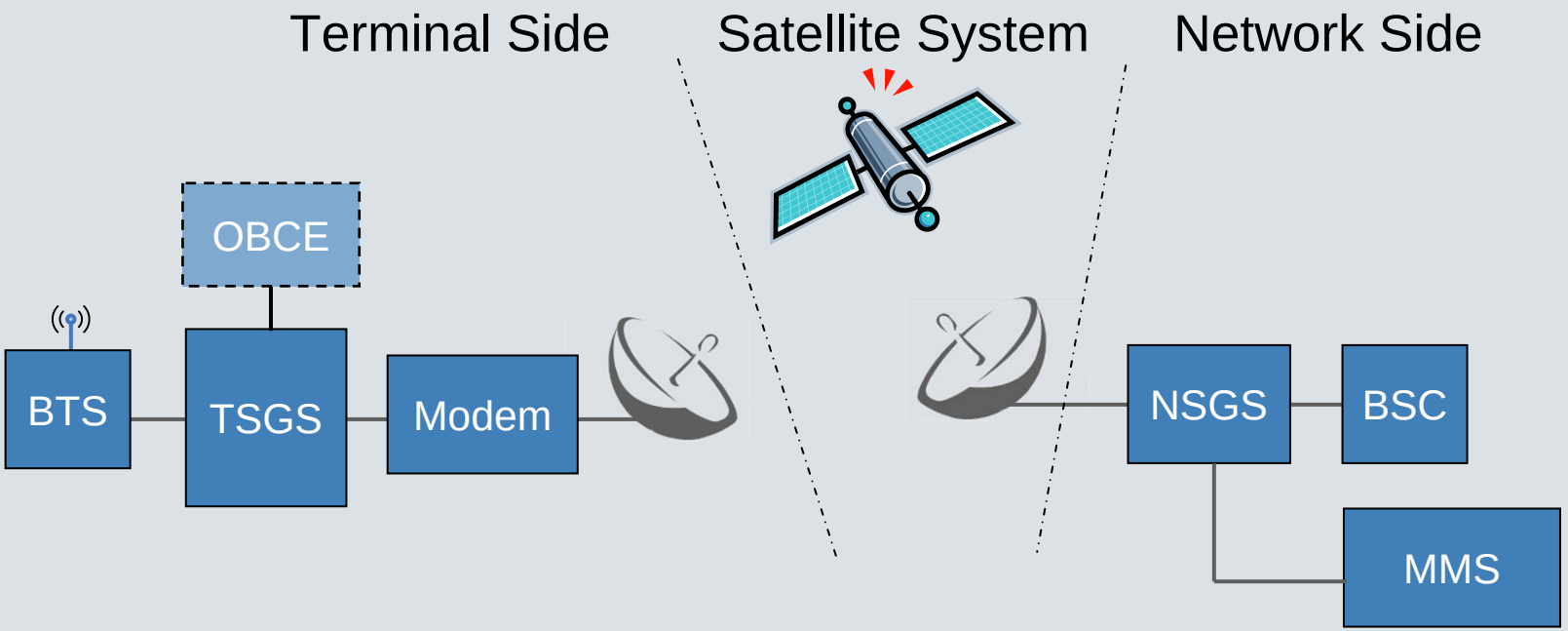


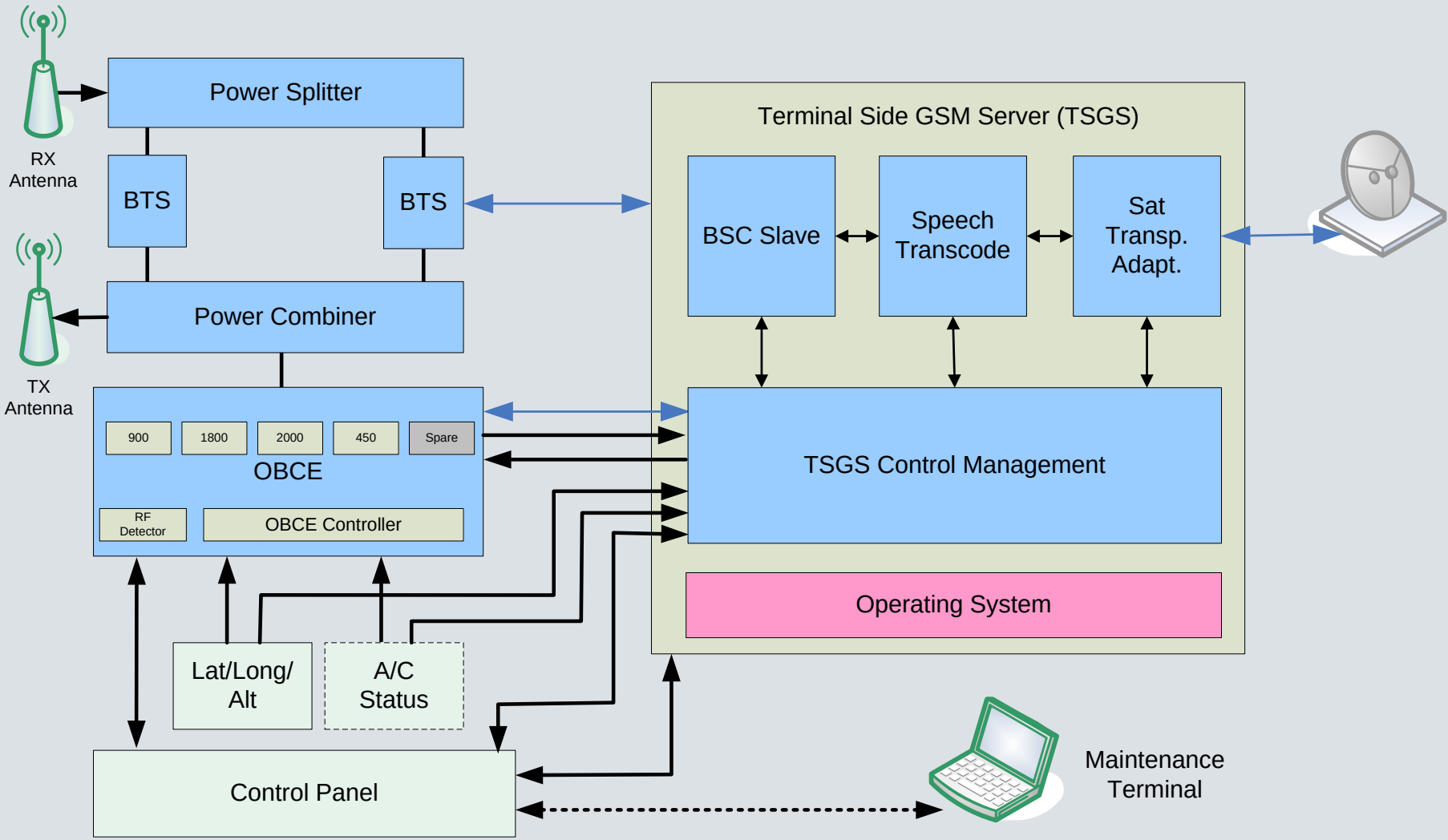
AUC	Authentication Center	HLR	Home Location Register
BSC	Base Station Controller	MS	Mobile Station
BSS	Base Station Subsystem	MSC	Mobile Service Switching Center
BTS	Base Transceiver Station	OMC	Operation and Maintenance Center
EIR	Equipment Identity Register	SGSN	Serving GPRS Support Node
GGSN	Gateway GPRS Support Node	VLR	Visitor Location Register

Product Overview
BSS Architecture

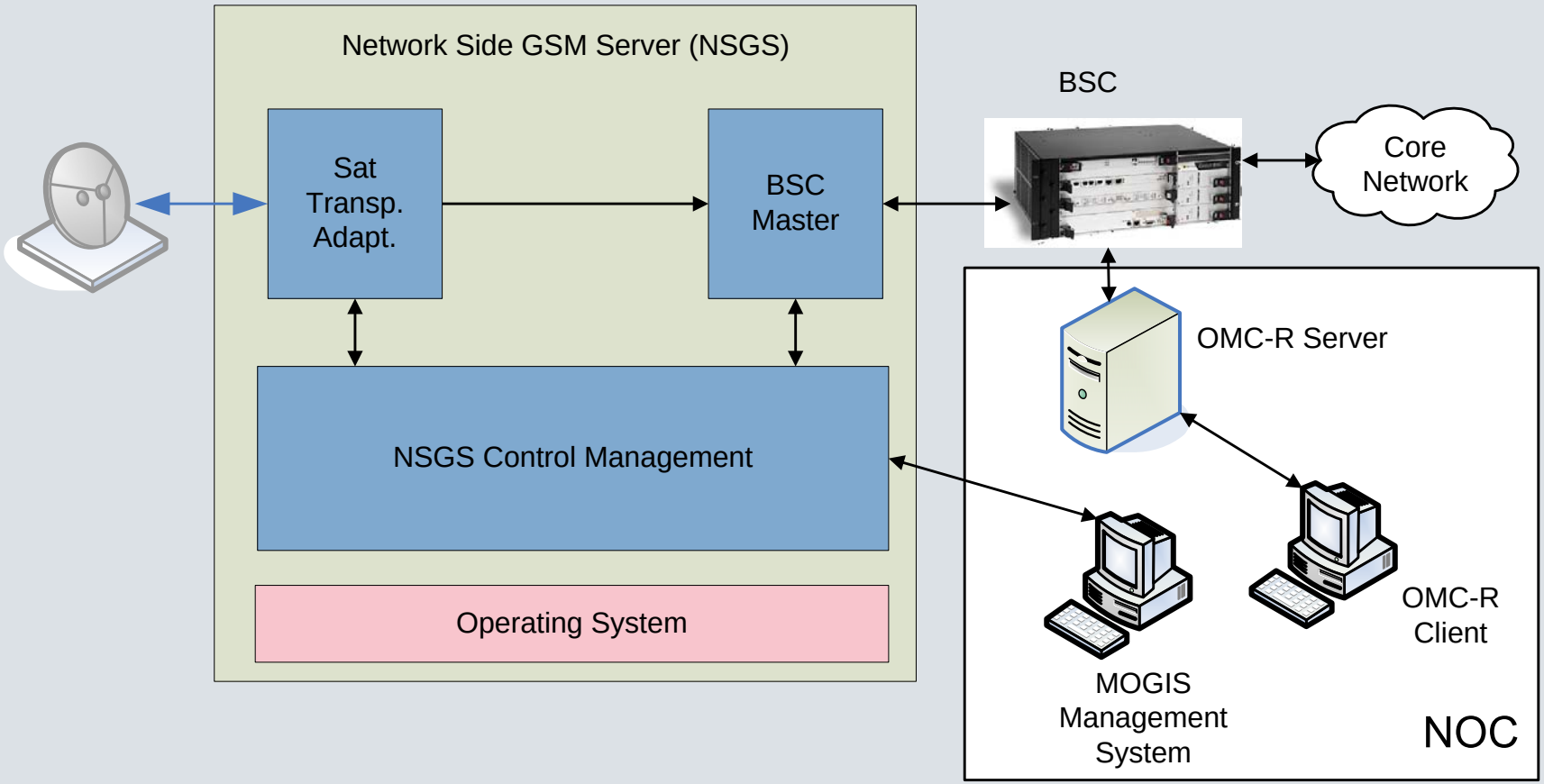


NSGS	Terminal Side GSM Server
TSGS	Network Side GSM Server
MMS	MOGIS Management System
OBCE	On Board Control Equipment (Aircraft use only)

Product Overview
TSGS Architecture



Product Overview
NSGS Architecture



Product Overview
Scalability

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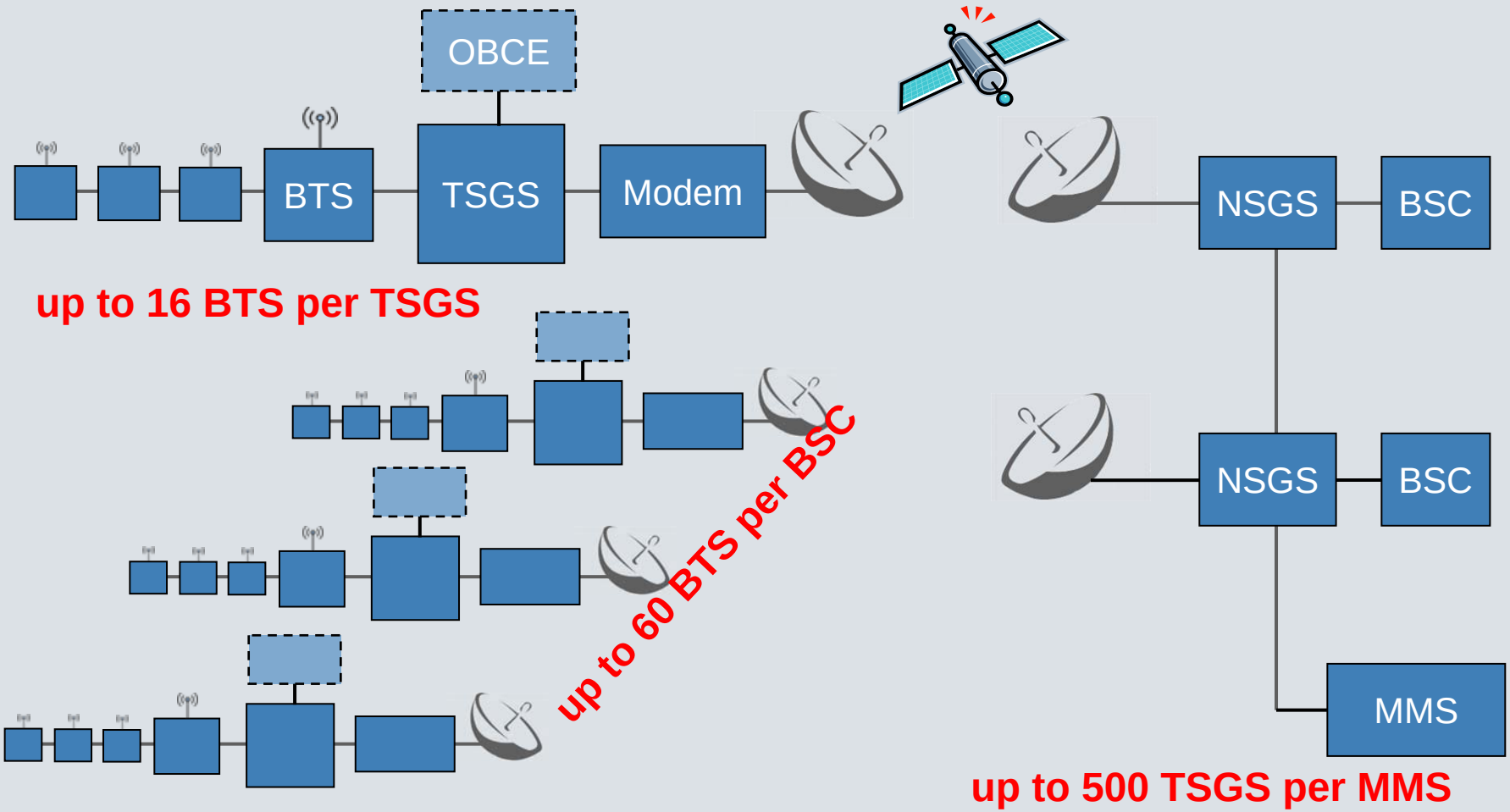
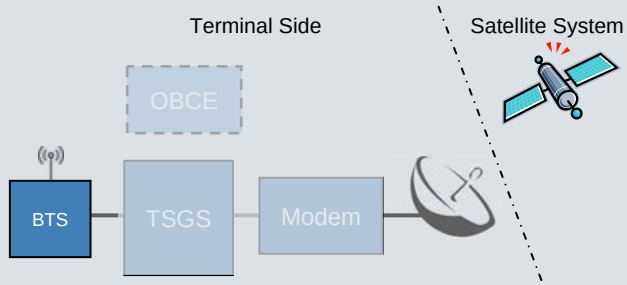


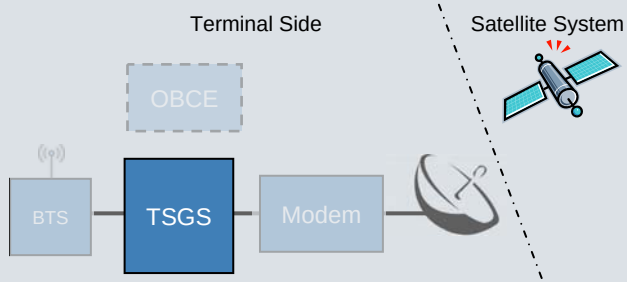
- internal
  - all internal interfaces are Ethernet
    Existing network infrastructure may be used

- external
  - Terminal Side
    - 230 or 110 VAC
    - optional: IP Interface to existing Satellite System
  - Network Side
    - IP interface to satellite system provider
    - Standard A and Gb interface

Product Overview
BTS



- nanoBTS is the world's smallest pico-cellular basestation
  GSM, GPRS, EDGE
- Available for 900MHz, 1800MHz, or 1900MHz bands
- Up to 700 meters coverage
- Up to 14 concurrent active calls
- Antenna included
- Avionic version is available



- Management
  - Up to 16 BTS, GSM1800/1900 mix
  - OBCE
  - local frequency and power management
  - modem management
- Compression
  - Speech : <8 kBit/sec per active call over satellite
  - GSM protocol
- Satellite Transport Adaptation
  - Different QoS queues for voice and GPRS data
  - Transport optimization using header compression and multiplexing
  - TCP acceleration

Product Overview
TSGS

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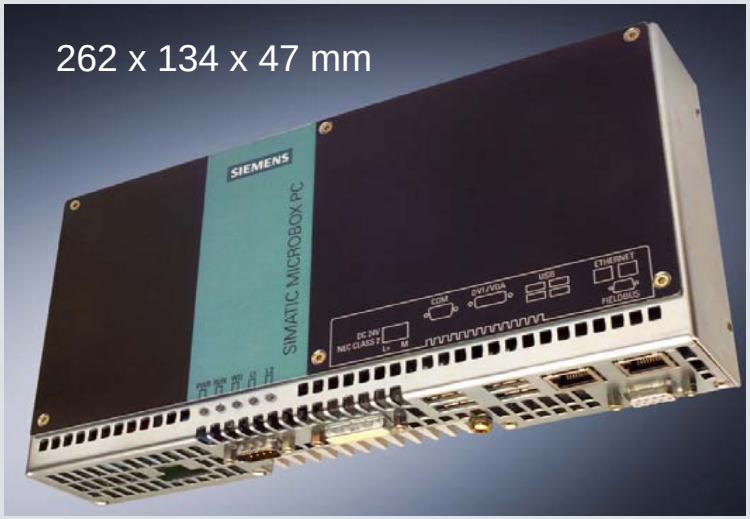

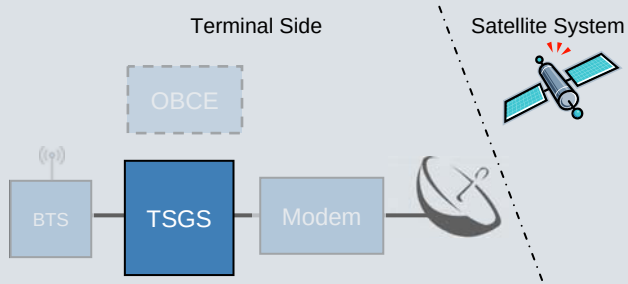

Avionics

ARINC 600 4MCU

Naval & Car

Rackmount

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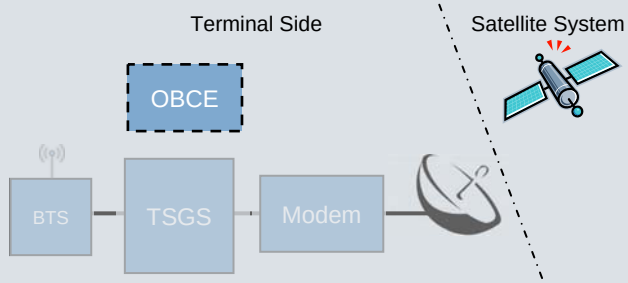
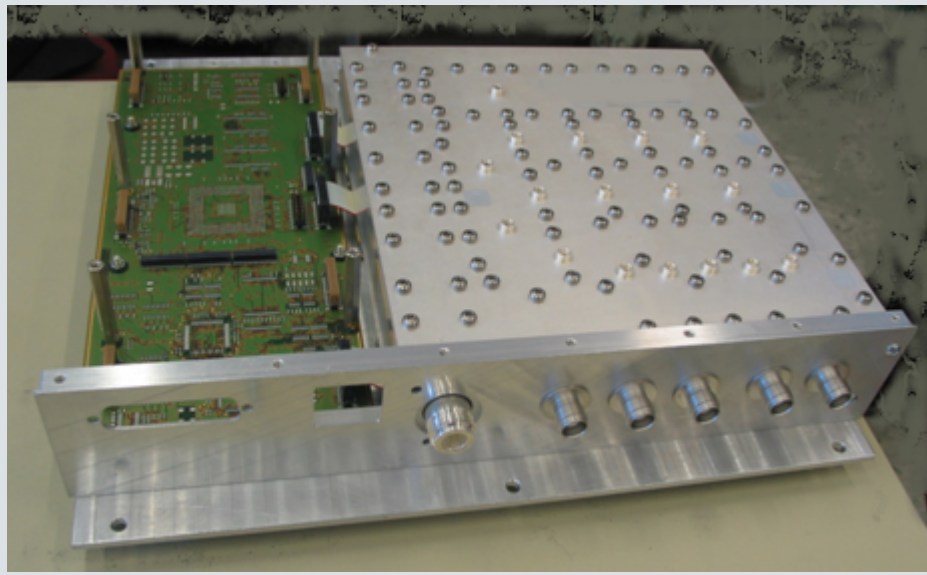
Required only for aircraft application

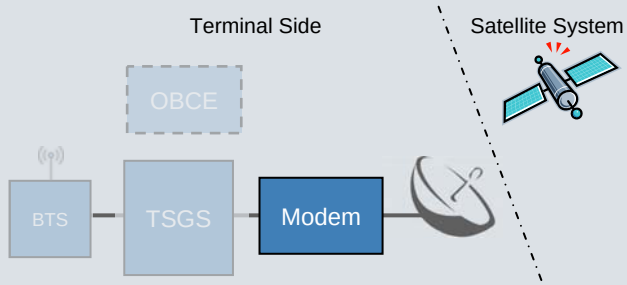


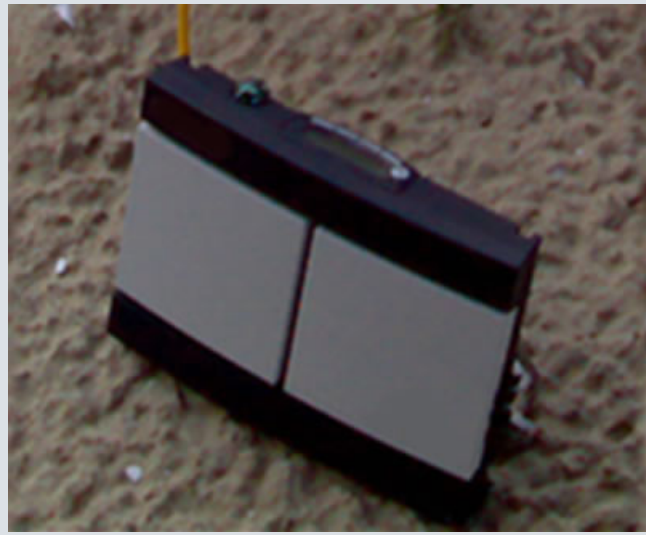
- Prevents mobile station from accessing ground networks
- Limits RF emission of mobile stations on board
- other control mechanisms are available for maritime



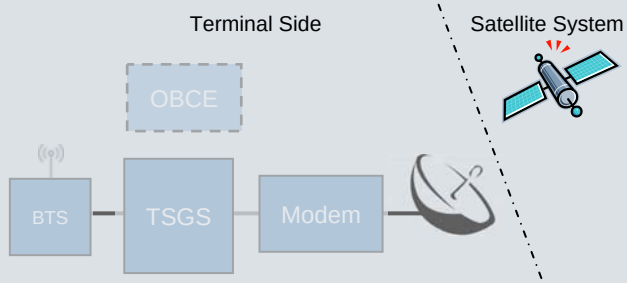
Product Overview
Sat Modem Features

- TSGS supports several satellite standards:
  - Inmarsat:
    - BGAN (land mobile)
    - Swift-64 (aero)
    - BGAN on Wings (aero)
    - Swift Broadband (aero)
    - Fleet 77 (maritime)
  - DVB-RCS
    - NERA
    - others
  - VSAT standards
    - iDirect
    - others





Product Overview
Sat Antenna Features



- Different packages:
  - fixed installations for aero and maritime
  - fly-aways for governmental, land-mobile

- TS-GS supports antenna pointing
  - land mobile
  - maritime
  - aero
  - trains

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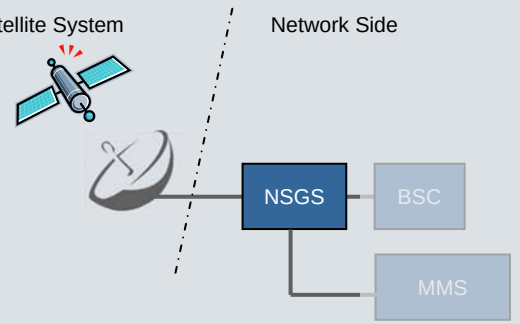
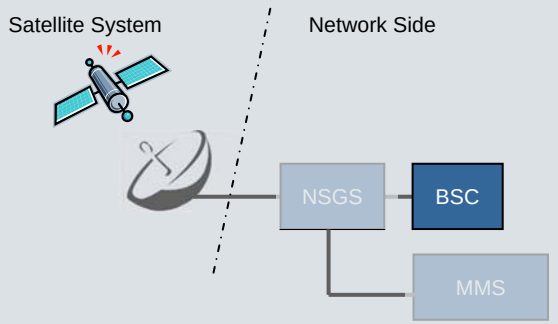


- Satellite Transport Adaptation
  - Different QoS queues for voice and GPRS data
  - Transport optimization using header compression and multiplexing
  - TCP acceleration
- Management
  - Up to 60 BTS
  - SNMP Interface to MMS
- Compression
  - GSM protocol

Product Overview
BSC



- Scalable unit capable of supporting up 60 of BTS.
- Handles the traffic and signaling between the nanoBTS and the Mobile Switching Centre (MSC).
- Includes TRAU (Transcoding Unit)
- MSC and SGSN are connected by standard E1/T1 interfaces.

Product Overview
MMS

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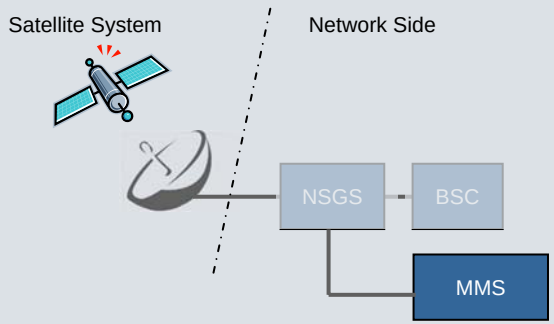
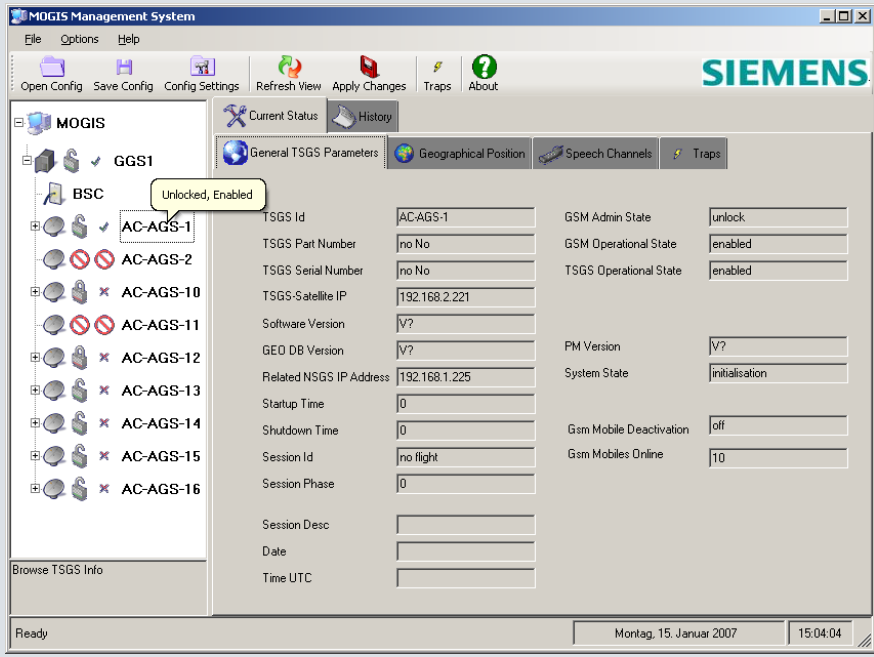


- Management and configuration of
  - TSGS
  - NSGS
  - OBCE
  - Modem
- Error and Event Log
- Standard .NET application, can be installed on existing management station or on separate PC



References

- Wireless Cabin
- GSM on Board Airbus
- Container Tracing

References
Wireless Cabin

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- Concept was proven in Aircraft
  - September 2004
  - Airbus A340-600
  - GSM, W-LAN, Bluetooth
  - GSM Picocell (Siemens), OBCE

Company References
- Siemens
- Airbus
- DLR
- KID
- TriaGnoSys
- University of Bradford
- Inmarsat
- Ericsson
- Esys Consulting

References
Airbus

Siemens is the partner of *Airbus* and *OnAir* to enable mobile phone use in-flight

TriaGnoSys is the partner of *Airbus* and *OnAir* for satellite communication

Entry into service in 2007.

OnAir is jointly owned by SITA INC and Airbus

References
Container Vessels

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TriaGnoSys and *Siemens* are partner of *MobinTele* to enable mobile phone use for container tracking via SMS

Entry into service 2007.

In post-9/11 America, the Container Security Initiative (CSI) extends the zone of security outward so that American borders are the last line of defense.

One of the Core elements is the use of smarter and tamper-evident containers

Thank you for your interest
We look forward cooperating with you

SIEMENS

Your contact

SIEMENS

Siemens Programm- und Systementwicklung GmbH & Co. KG

Harburger Schloßstraße 18
21079 Hamburg / Germany

Dipl.-Ing.
Stefan von der Heide
Vice President Division
Audio Video Network
Solutions

Phone +49 40 7678 -1232
Fax +49 40 7678 -1298
Mobile +49 170 562 87 11

Stefan.von_der_Heide@siemens.com
http://www.siemens-pse.de

MOGIS Speech compression 1/2

AMR Compression and Header Compression

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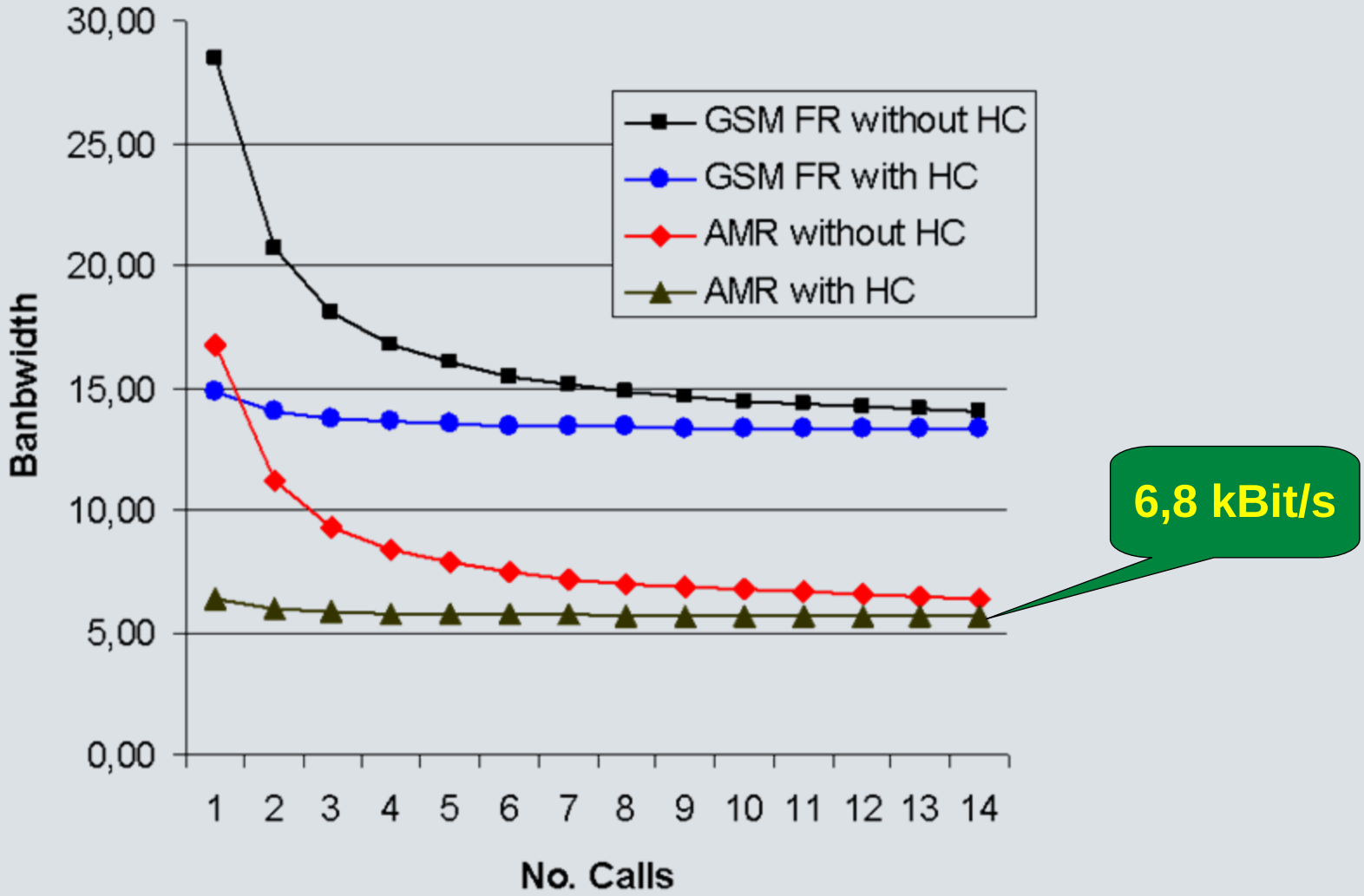

MOGIS Speech compression 2/2
Speech Channel Multiplexing

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