

# Huawei GSM-R: Future proof, flexible and reliable

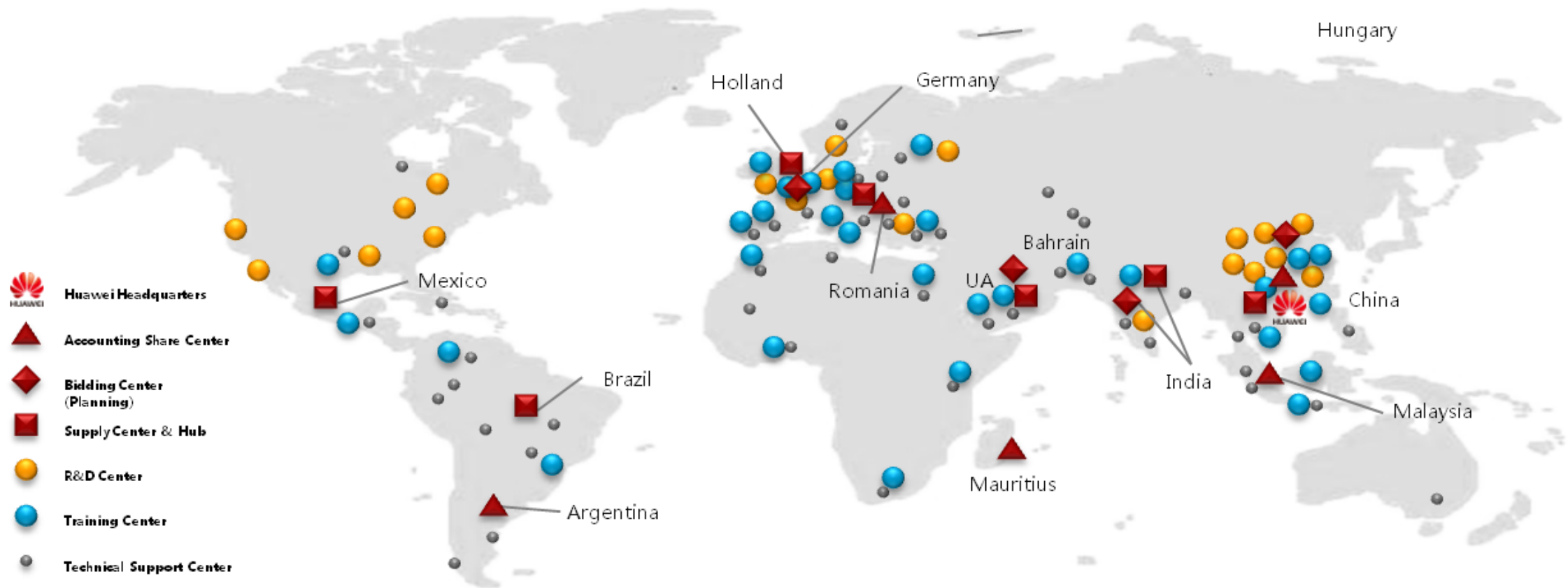
[www.huawei.com](http://www.huawei.com)

**Norman FRISCH**

Business Development Rail Solutions  
Huawei technologies



# Huawei, A Global Company with local Expertise



- **140,000+** employees with **150+** nationalities worldwide

- **23** R&D centers, **45** training centers

- **14** regional headquarters, operations in **140+** countries

**Localized Operation Powered by Global Resources**

# Huawei in Hungary



**150** employees  
and **65 %**  
are recruited locally



- 1** Europe Supply Center
- 1** Europe Logistics Center
- 1** Spare Part Center



**1000+**  
Job local opportunities  
created by ESC

**1.11 Billion USD**  
export value by ESC in 2011

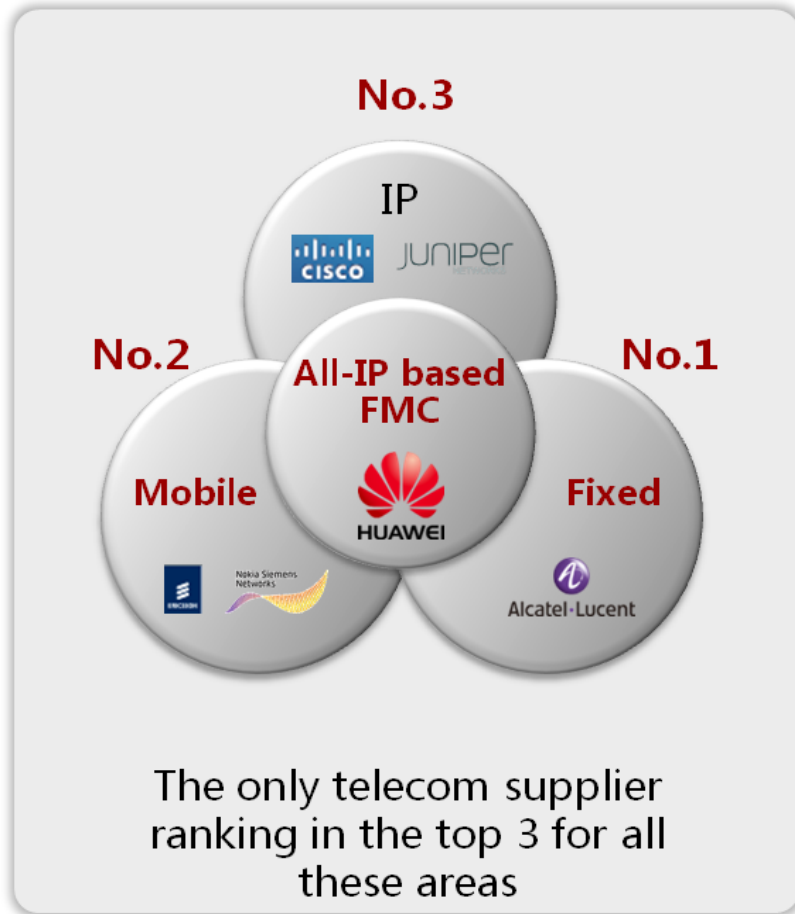


**Huawei Innovation  
Leaders of  
Tomorrow**

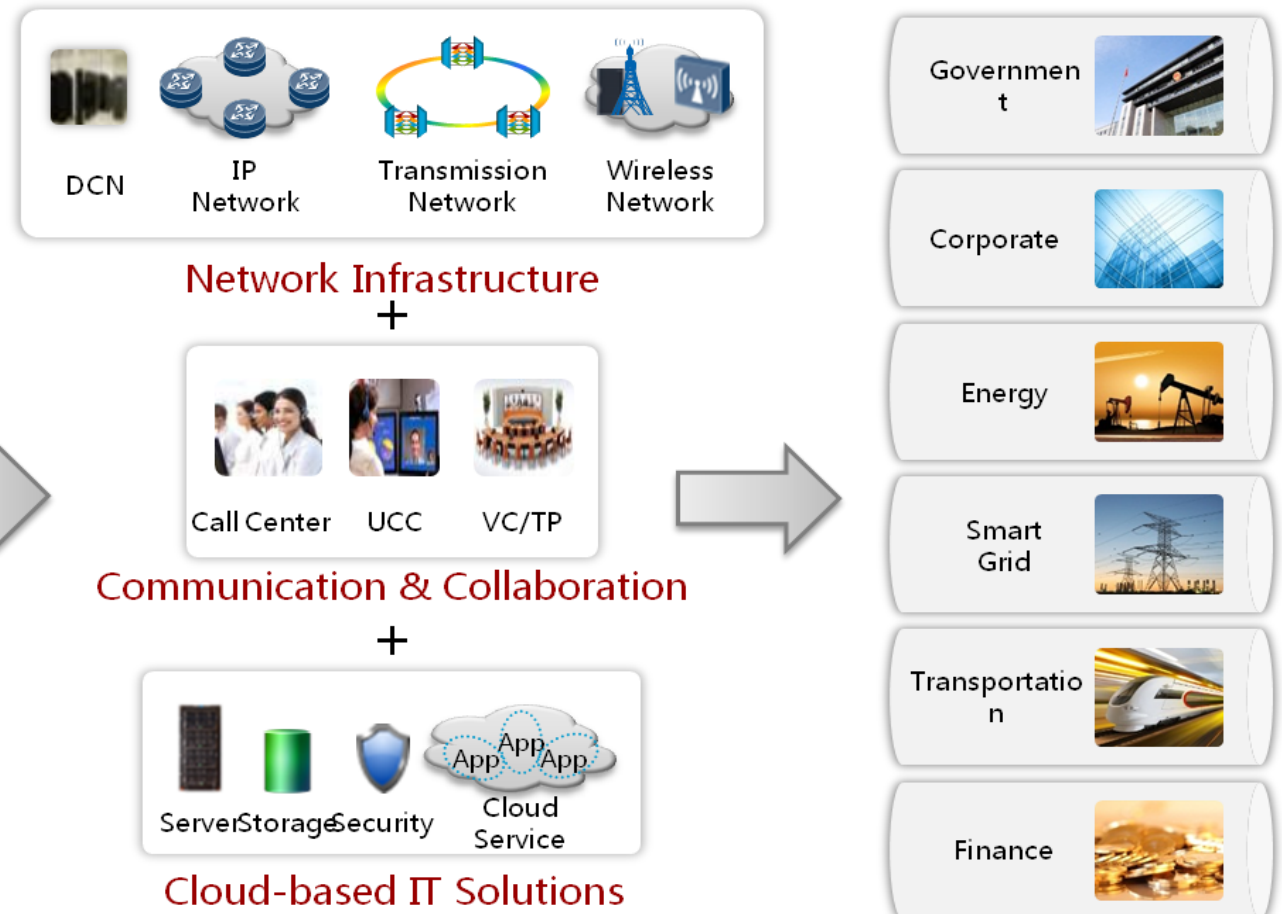
Scholarship Program supports  
**75** young talents in 5 years

# Dominance in key technologies benefit our Enterprise customers

Advantages in the "Telecom" field

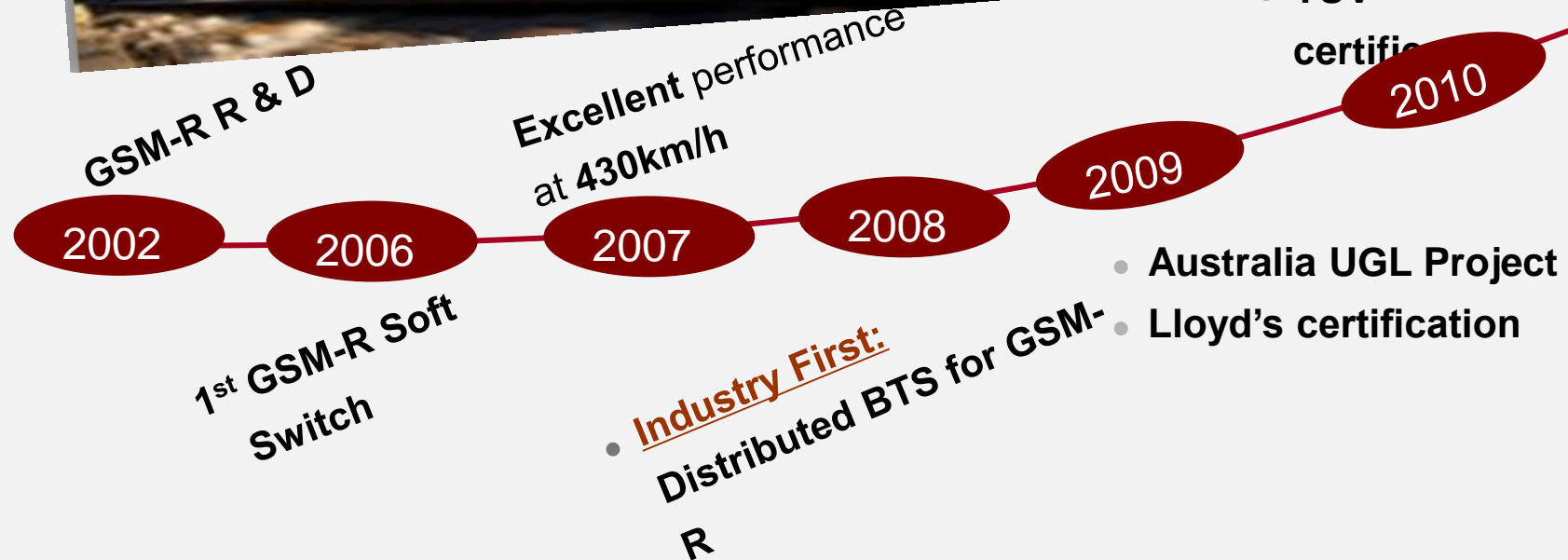


Unique position in the "Enterprise" field





# Huawei GSM-R: 10 years of rail experience



- **10000 KM+** global coverage
- IOT testing campaign in Germany
- Turkey EKB Project (ETCS L2)

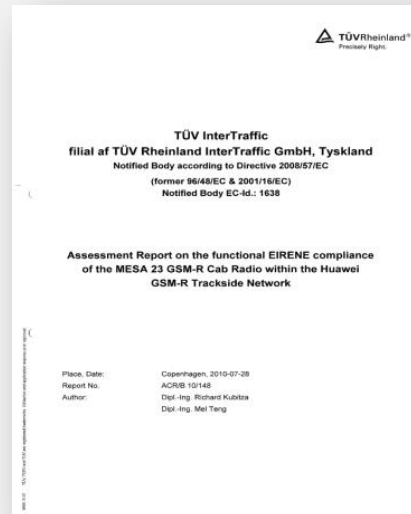
- **Multi-line for ETCS L2/CTCS-3**
- Russia Sochi, Guangzhou-ShenzhenHong Kong

# Standard Compliance & Multi-Vendor IOT

- Proven through independent third parties (Notified Bodies, experienced Rail operators)
- Performed on Test Catalogue validated by Notified Bodies



- June, 2012
- IOT between Kapsch, NSN equipment
- EIRENE FRS V7 and SRS V15

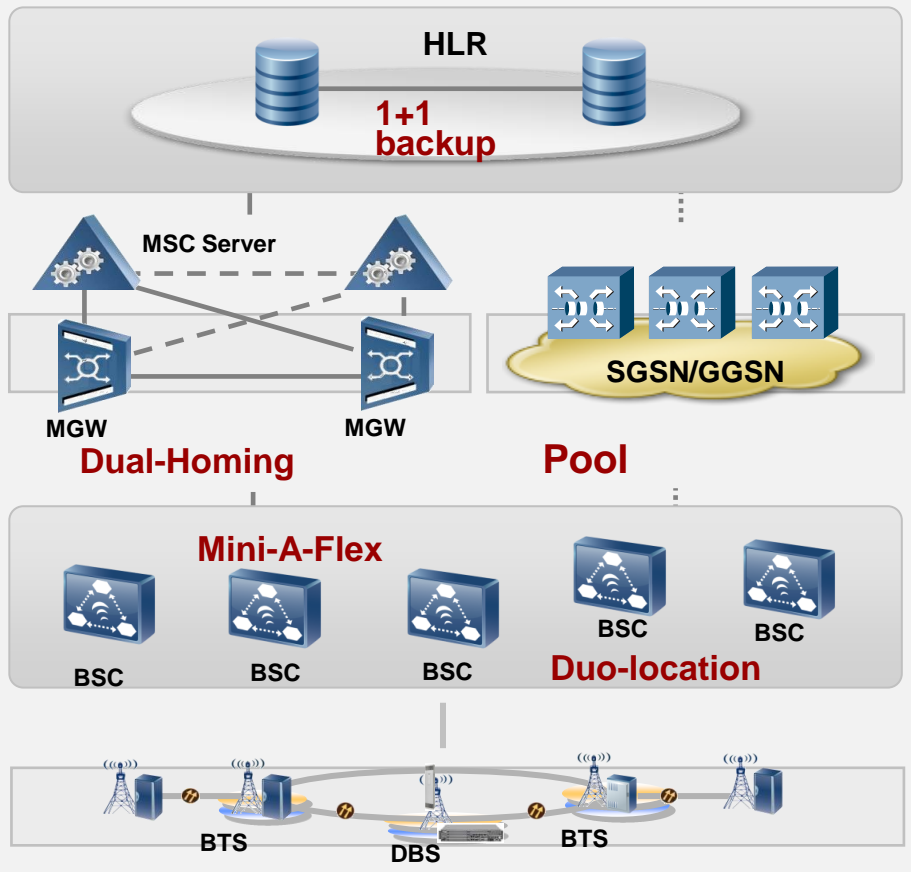


- July, 2010
- EIRENE E-FRS V7 and E-SRS V15 Compliance



- May, 2009
- EIRENE E-FRS V7 and E-SRS V15 Compliance

# Most Reliable Network Guarantees Operation Safety



- HLR: 1+1 backup



- MSC: Dual-homing
- SGSN Pool / GGSN Pool



- BSC: Mini-A-Flex
- Duo-location BSC



- BTS Ring
- Dual Coverage

Only Huawei Can Provide All NEs Geo-Redundancy Solution!

Reliable

# Continuous innovation benefits Rail customers

## BTS3900: Multi-mode BTS



- **Multimode: Supports GSM-R & LTE**
- **Cornerstone for Evolution into LTE**
- **Supports E GSM-R frequencies**
- **Full IP connectivity: Abis over IP**

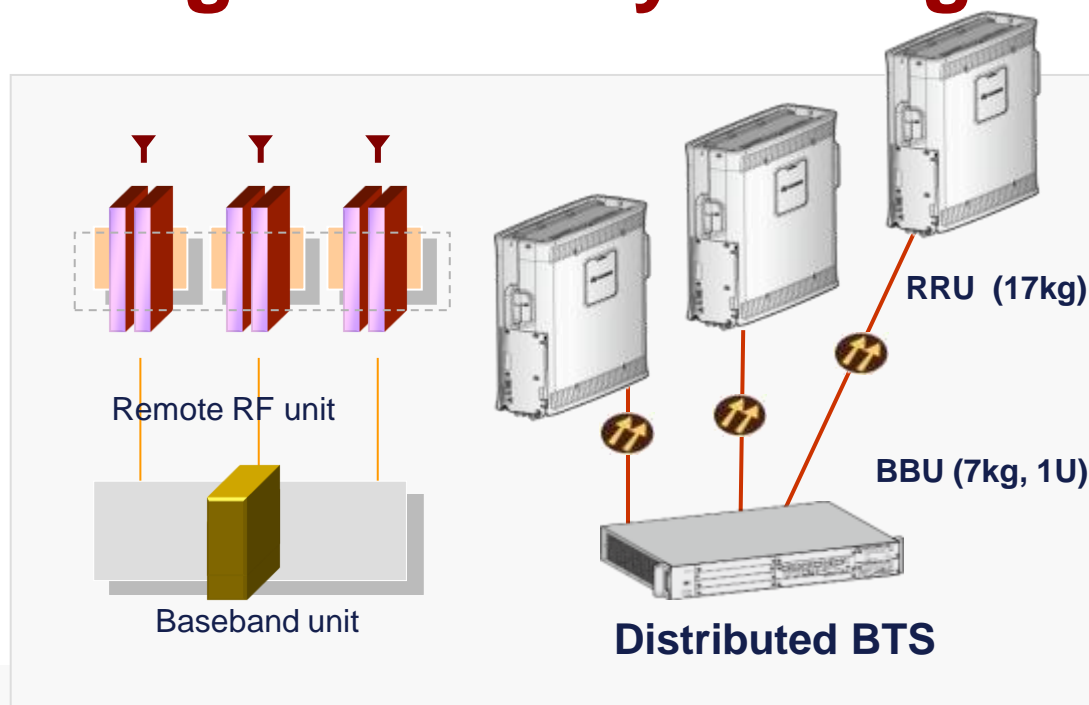
## eCNS300: Single Cabinet CN



- **All core NEs in a single cabinet**
- **ATCA platform improves performance and supports evolution to LTE**
- **Modular pre-set configurations reduce efforts for network management and maintenance**
- **SIP interface for Dispatchers**



# Design flexibility through Distributed BTS



**High Reliability:** IP65 waterproof, dustproof, salt spray-proof design

**Easy installation:** The RRU is installed close to the antenna, very compact, zero footprint required

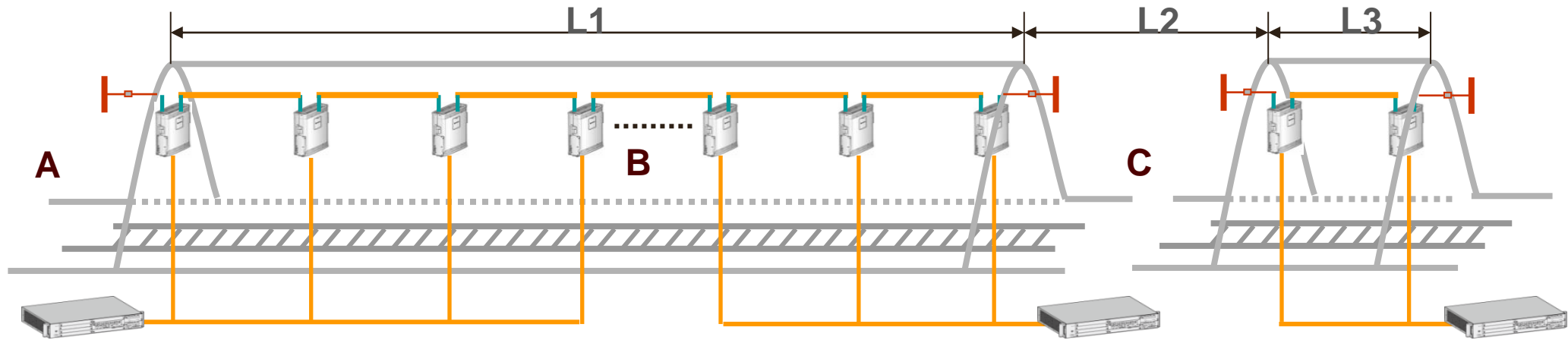
**Better radio coverage:** RRU has less cable loss than conventional BTS (3dB feeder loss..)

**Protect future investments:**

- Single RAN (GSM-R & LTE for railways)
- Many geo-redundancy options
- Can be set to "BTS" or "repeater" mode (no-handovers)

**Only HUAWEI can provide the Distributed BTS in GSM-R**

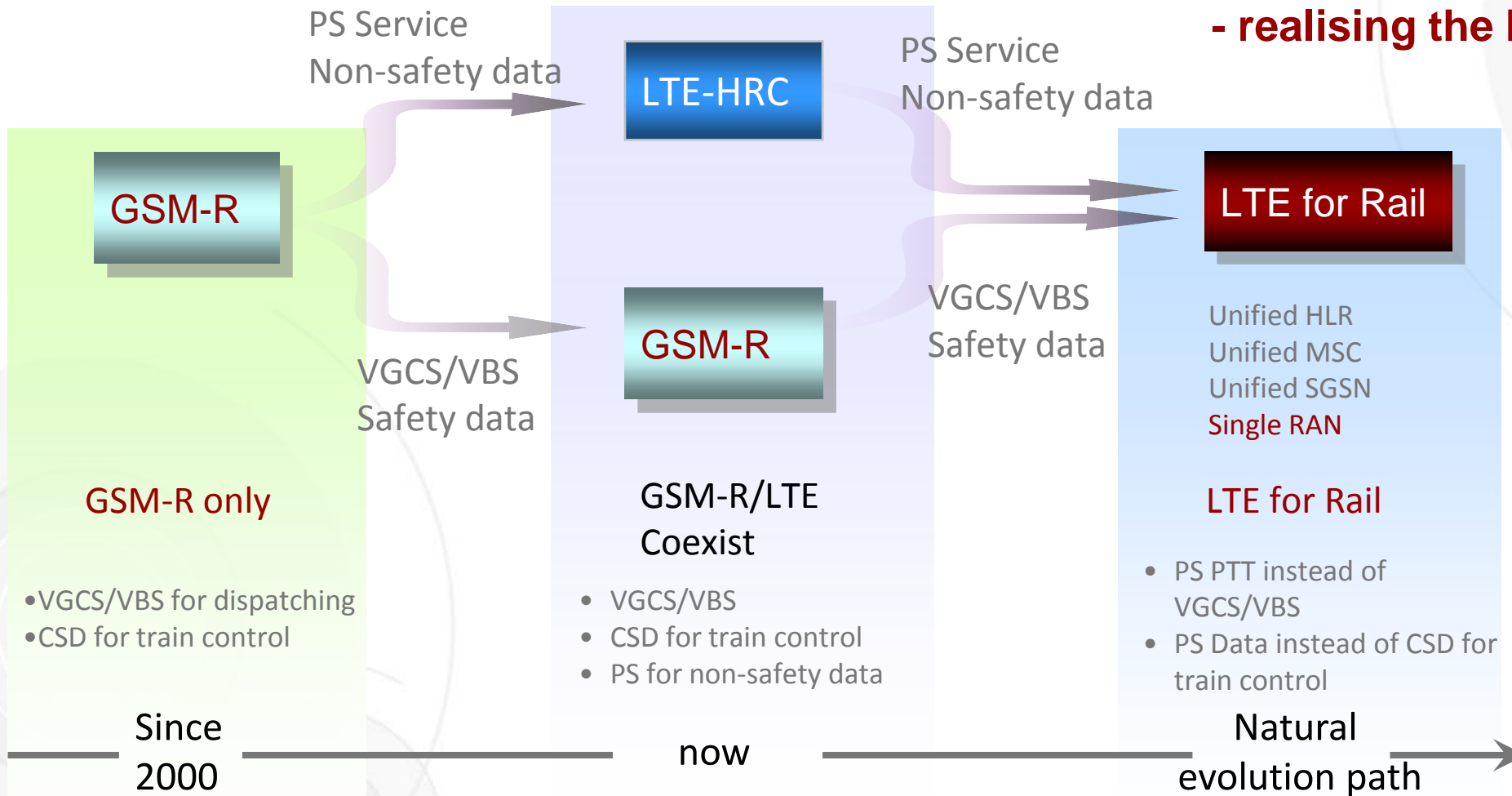
# GSM-R design for Railway Tunnels through D-BTS



- Distributed BTS allows engineers more flexibility for “in tunnel” GSM-R design
- Even most difficult scenarios can be designed without any need for RF repeaters
- Location Dependent Addressing and Frequency management (i.e. no handover) purely based on rail operational demands

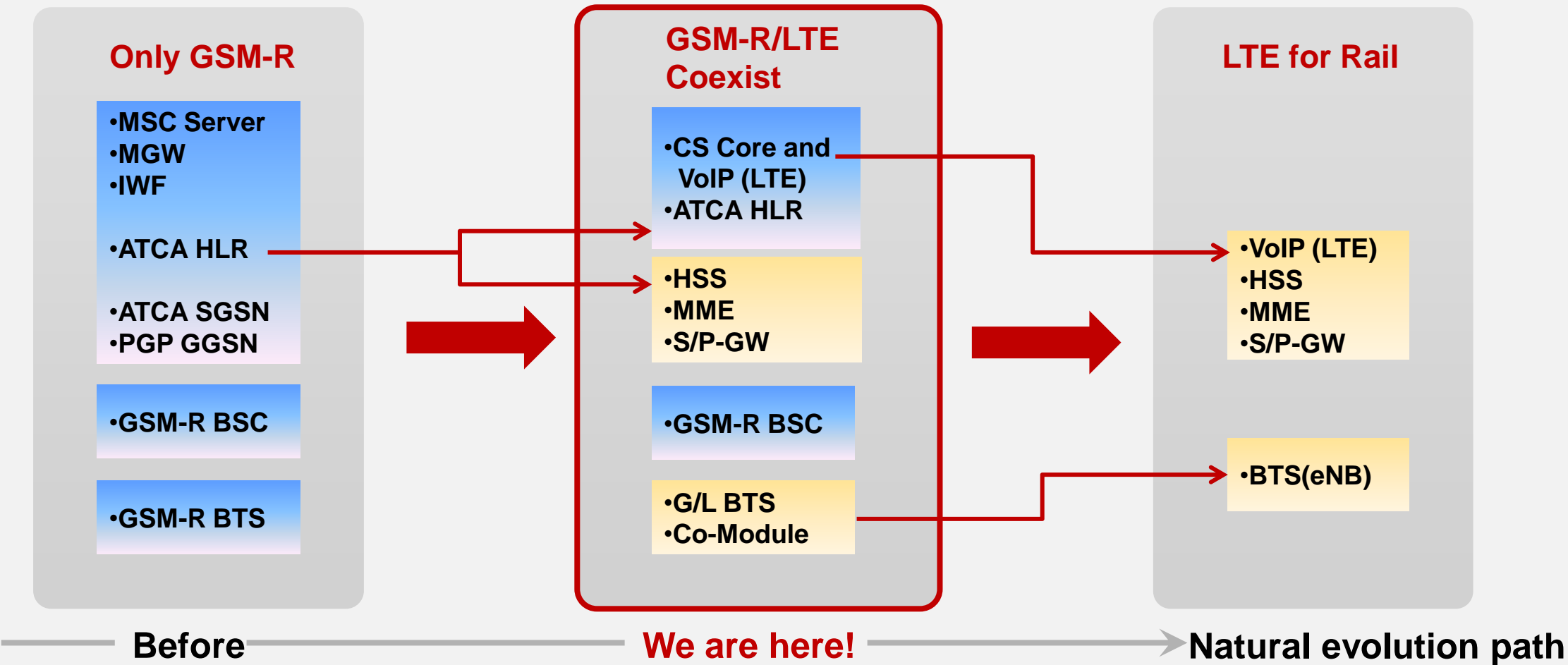
# GSM-R Technology Trend

- realising the benefits of synergy



**GSM-R and LTE share the same access network through singleRAN**

# Evolution to LTE Protects Customer Investment



**Huawei GSM-R solution is ready for Evolution into LTE for Rail !**

# GSM-R for Turkey EKB line

- **Customer:** Turkish Railways TCDD
- **Where:** Eskisehir - Balikesir ERTMS Line
- **Awarded:** June 2012
- **What: GSM-R & ICT equipment end to end solution**
  - GSM-R BSS for over 466 km
  - Macro BTS and Distributed BTS
  - Mobile and fixed GSM-R terminals
  - outdoor track phones and PBX
  - Challenging design (42 tunnels) and ETCS L2 compliancy
  - Full SDH network



## PRESS RELEASE

18 September 2012

### Huawei to supply Turkish Rail's upgraded passenger line with its 'Smart Railway' Solution

**Huawei awarded to supply GSM-R system for Turkish Rail TCDD ERTMS signaling network. Huawei, as the GSM-R and ICT supplier will support ALSTOM in delivering a turnkey ERTMS signaling solution.**

Huawei, a leading global information and next-generation telecommunications network supplier for operators around the world, today announced that Alstom Transport, a world leader in systems, equipment and services in the railway sector, has selected Huawei as the sole supplier of GSM-R and ICT equipment for Turkish Rail's Eskisehir - Balikesir ERTMS (European Rail Traffic Management System) Line.

Huawei will provide operational voice and data services based on its innovative, flexible and highly stable GSM-R technology, along this important section of TCDD's rail network along the cities of Eskisehir, Kutahya, Afyon and Balikesir.

After sensitive and detailed technical evaluation of Alstom Transport as one of main signaling system supplier in ETCS (European Train Control System) Level2 region, Huawei has been awarded with this important contract with its high tech products and services. With the outstanding performance of the multi-country bidding teams setup in France, Spain, China and Turkey, Huawei's GSM-R system will be used as bearer service for Alstom Transport's market renown ETCS Level 2 train signaling solution along a rail section totaling over 466 km of ERTMS track and 42 tunnels.

Huawei, as the sole telecoms supplier to this project, will supply a fully integrated GSM-R wireless network including mobile and fixed GSM-R terminals, SDH, a telephony system (PDH multiplexers + PBX) as well as various indoor / outdoor track phones.

Huawei's GSM-R radio network has been engineered using a mix of conventional GSM-R BTS and Huawei unique Distributed BTS allowing highest Quality of Service with maximum flexibility during design phase. Huawei's Distributed BTS product has demonstrated its flexibility in radio design for GSM, GSM-R, UMTS and LTE networks globally.



# Turkey: Ankara- Eskisehir High Speed Line

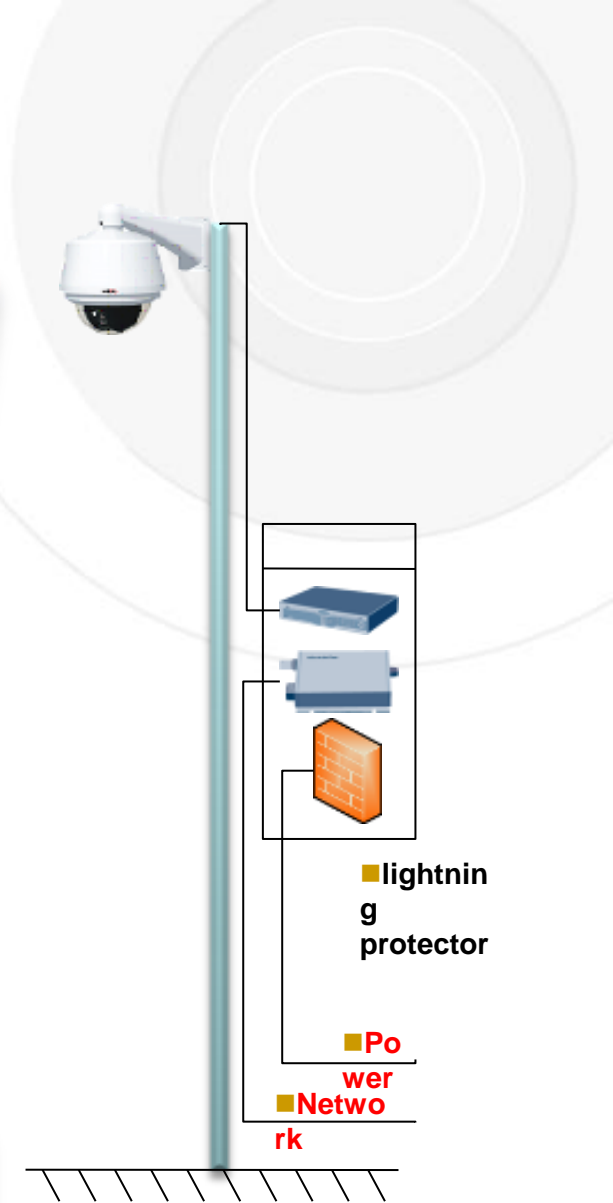
Press Release **October 2011**



- Supply of the **first video surveillance system for high speed trains in Turkey**
- Contract with Savronik to provide **DWDM and video surveillance** system for Turkish Railways' high speed train project
- Geo-redundant data centres and control centres

## Smart CCTV

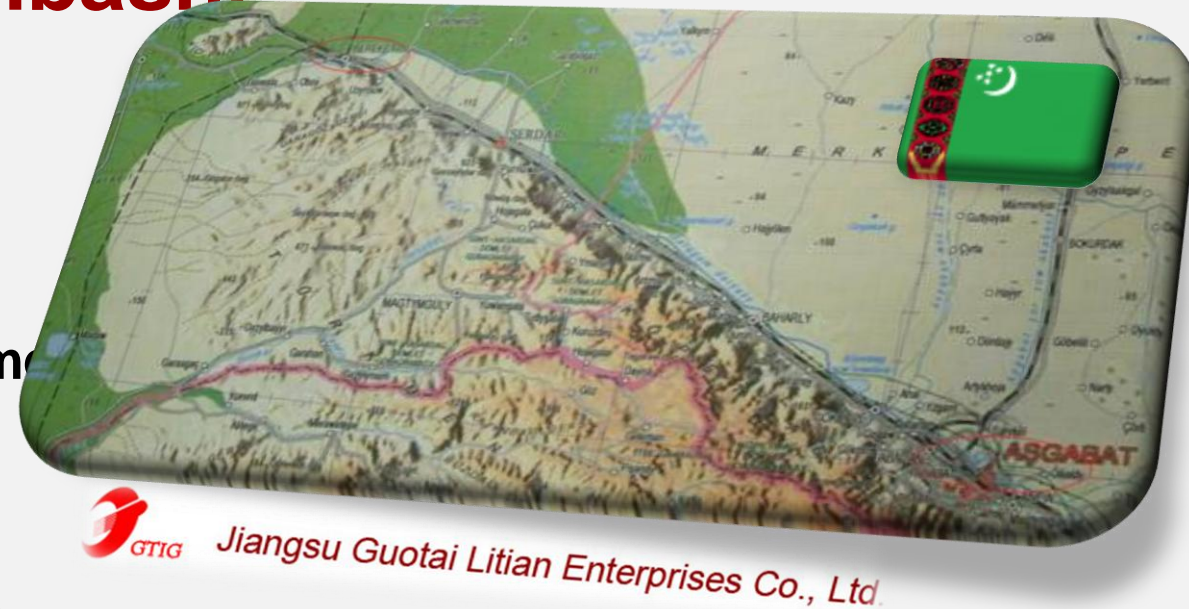
Combination of CCTV, analytical tools, control centers and storage solution



# Turkmenistan GSM-R contract

## Ashkhabat-Bereket-Turkmenbashi

- Contract Signature: **7<sup>th</sup> September 2012**
- Customer: **Turkmenistan Railways**
- General Contractor: **Jiangsu Guotai**
- Line: **Ashkhabat-Bereket-Turkmenbashi**
- Rail Operational Voice and Data network
  - GSM-R network (590 km of length):
    - GSM-R BSS (Macro BTS and distributed BTS)
    - OMC
  - Transmission network:
    - SDH network (STM-16 / STM-4 levels)
    - Datacom network
    - OMC
  - Train Control Communication System
    - Telephony Exchange
    - OMC



# Turkmenistan GSM-R contract

## ASPMK

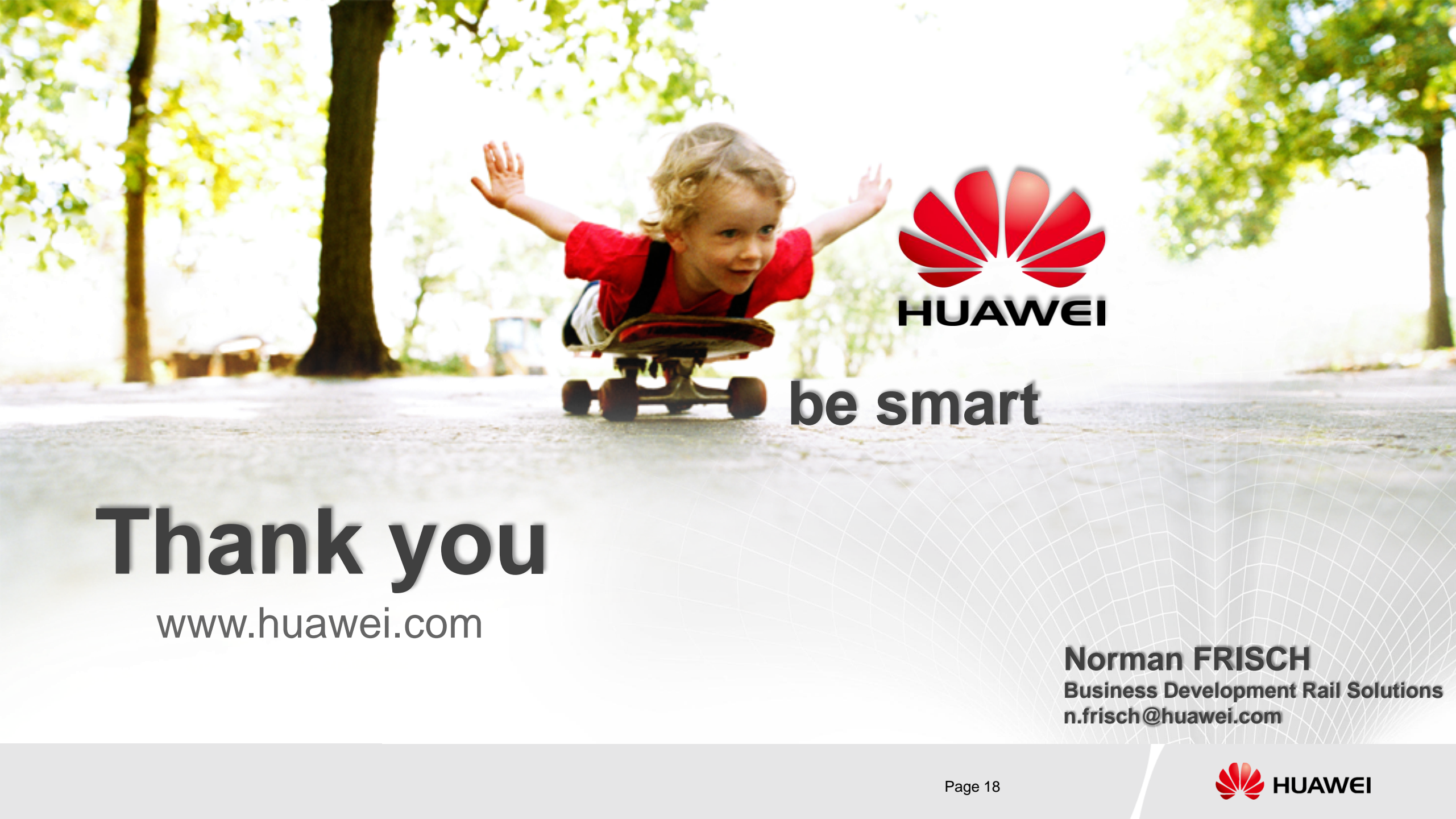
- Contract Signature: **26<sup>th</sup> September 2012**
- End Customer: **Turkmenistan Railways**
- Partners: **ASPMK / KEC**
- Line: **Cilmammet and Bu**
- Rail Operational Voice and Data network end to end
  - GSM-R network (288 km of length):
    - R4 IP core network
    - GSM-R BSS (Macro BTS and distributed BTS)
    - Handhelds: GPH, OPH..
    - Dispatcher core and terminals
  - **Public Announcement system, PA**
  - **Telephony Exchange**
  - **SDH Transmission network**
  - **End to End OMC**



# Huawei GSM-R benefits

Enhanced <b>Single Cabinet IP Core</b>	<ul style="list-style-type: none"> <li>- less OPEX, less CAPEX,</li> <li>- <b>future proof design</b> for LTE migration</li> </ul>
<b>Geo-redundancy</b> throughout (NSS, BSS)	<ul style="list-style-type: none"> <li>- Rail operation even in case a site is lost;</li> <li>- <b>return to rail operation quicker</b> than with conventional GSM-R</li> </ul>
<b>SIP Dispatcher</b> interface	<ul style="list-style-type: none"> <li>- Latest technology allows higher flexibility in Dispatcher communication, significantly <b>reduces demands on transmission resources</b></li> </ul>
Connect BTS <b>via Abis Over IP</b>	<ul style="list-style-type: none"> <li>- <b>Reduce OPEX</b> by simplifying transmission demands</li> </ul>
Complete portfolio carry <b>GSM-R and LTE</b> (Co-module design)	<ul style="list-style-type: none"> <li>- <b>Secure capital investment</b> through future proof design for LTE migration</li> </ul>
More frequencies for GSM-R customers (multimode BTS): <ul style="list-style-type: none"> <li>➤ GSM-R (4MHz)</li> <li>➤ <b>E GSM-R</b> (3MHz)</li> <li>➤ LTE for Rail</li> </ul>	<ul style="list-style-type: none"> <li>- Operates <b>more trains</b> than with conventional GSM-R; increase your GSM-R capacity by 75%</li> </ul>





**be smart**

**Thank you**

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