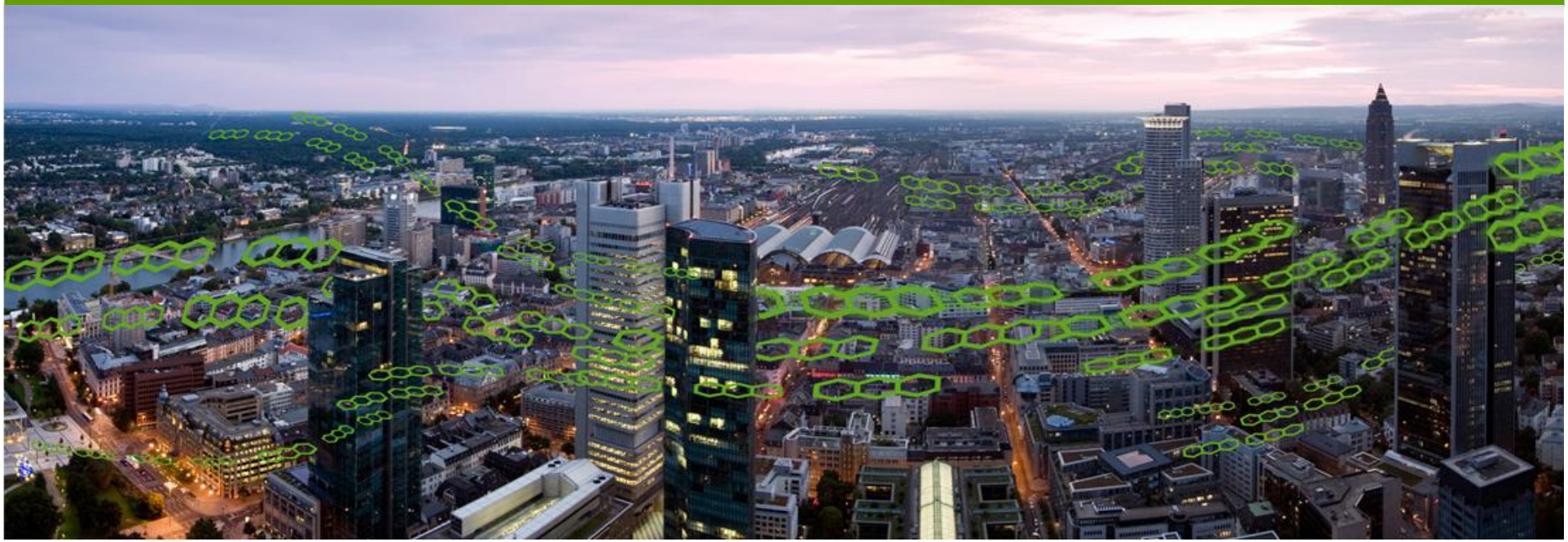
TetraFlex® in Moscow Metro



Louise Falster-Hansen
Area Manager – US and Canada

DAMM
– Stay in touch

Worldwide Projects

- Gorgon Oil & Gas Project, Australia
- Sct. Petersburg City Network, Russia
- Frankfurt Airport, Germany
- Formula 1 Racing Team
- FMG Mining Project, Australia
- DONG Energy Power Plants, Denmark

- Moscow Metro Project, Rusia

DAMM
– Stay in touch

Evaluating The Implementation of TETRA in Moscow Metro

USTTELECOM

Commercial Director

Alena MELNIKOVA

Underground Secure Communications

Moscow Metro

Moscow Metro Opened in 1935.

- 12 lines and 182 stations, covers 301.2 km.
- Expanding by 2 – 3 stations per year

- Passenger throughput is up to 9 million people per day
- 2005 – Unified Radio Communication System

Challenges for TETRA system

- Notification of people:
  - Terrorism
  - Fires
  - Emergency
  - Daily coordination
  - Etc.
- Equipment and Staff coordination
- Interoperability

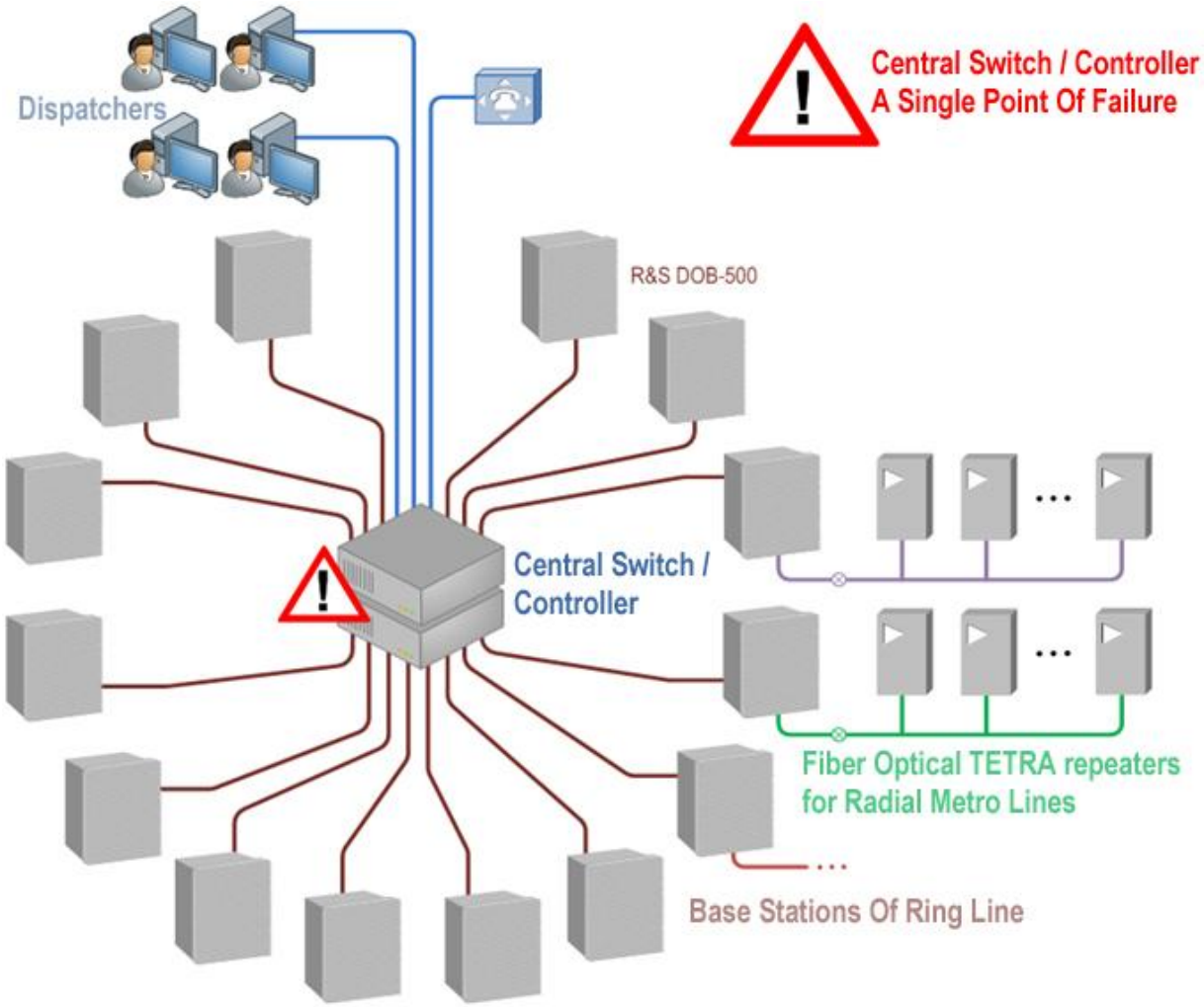
Unified Radio Communication System of Metro (ERIS-M)

Installed in 2005. Based on centralized TETRA infrastructure

- 5 Lines covered in 2005
- 5 Lines in 2006
- 2 Lines in 2007-2008

- More then 800 km of radiating cable
- Cost effective Fiber Optical repeaters are used to provide coverage on Radial Lines

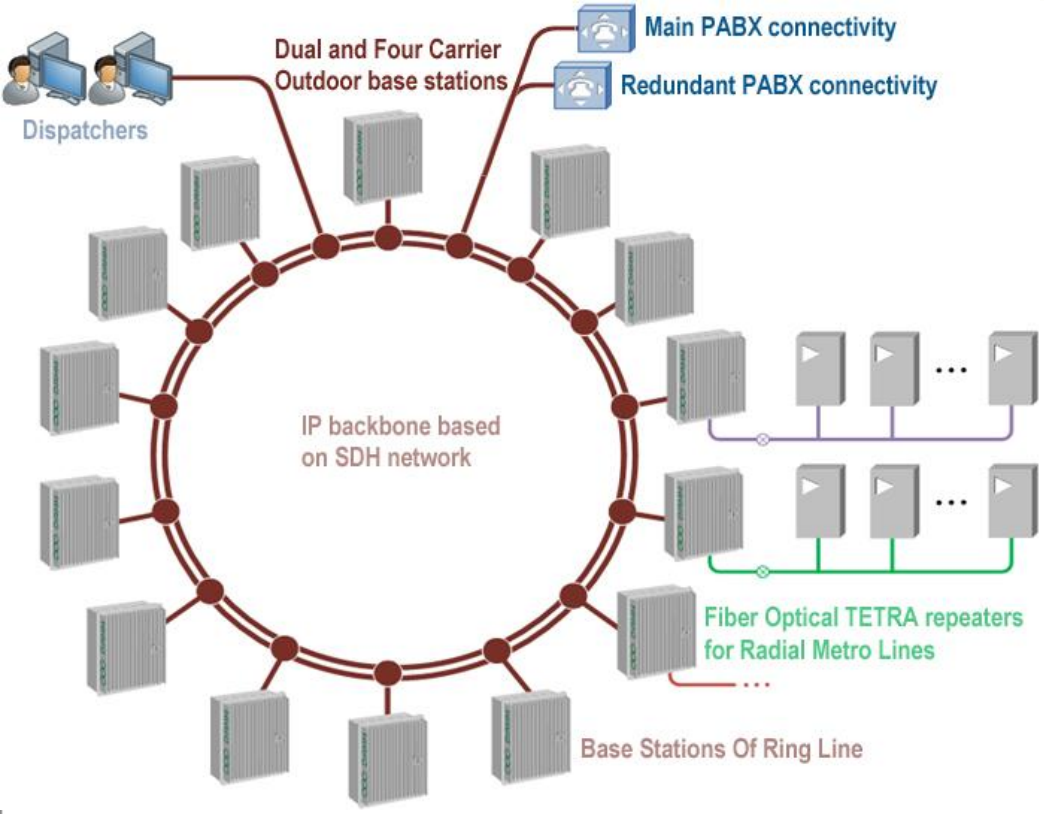
ERIS-M Before Upgrade



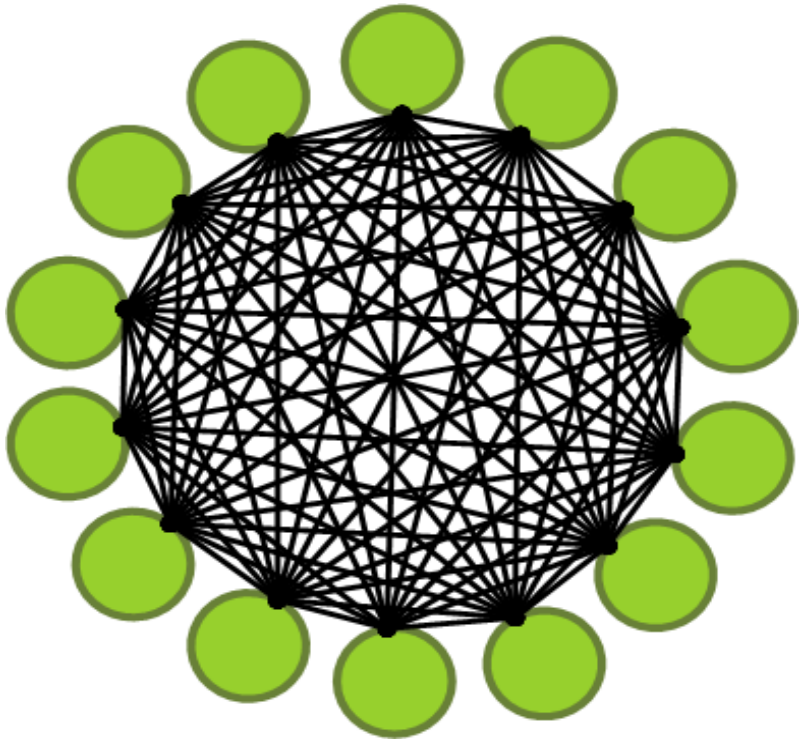
Main reasons to upgrade :

- Found a weak– Single point of failure
- High operational cost
- High power consumption
- Limited data and voice services
- Not upgradable

New TETRA system of Moscow Metro



No single point of failure because of absence of Central Switch!



In 2010 it was decided to upgrade ERIS-M and change infrastructure from centralized system to DAMM TetraFlex

Reasons to choose DAMM TetraFlex

- De-centralized infrastructure
  - Full redundancy
  - No single point of failure.
- Upgradable without interruption of operation
- Well advanced Dispatching and Management
- Voice and system logging
- Authentication and Encryption
- Low operational cost
- Low power consumption
- IP65 encapsulation of all components is the most important due to high level of Metal Dust and Humidity underground.

To meet specific Metro Requirements

BS421 TETRA Base station

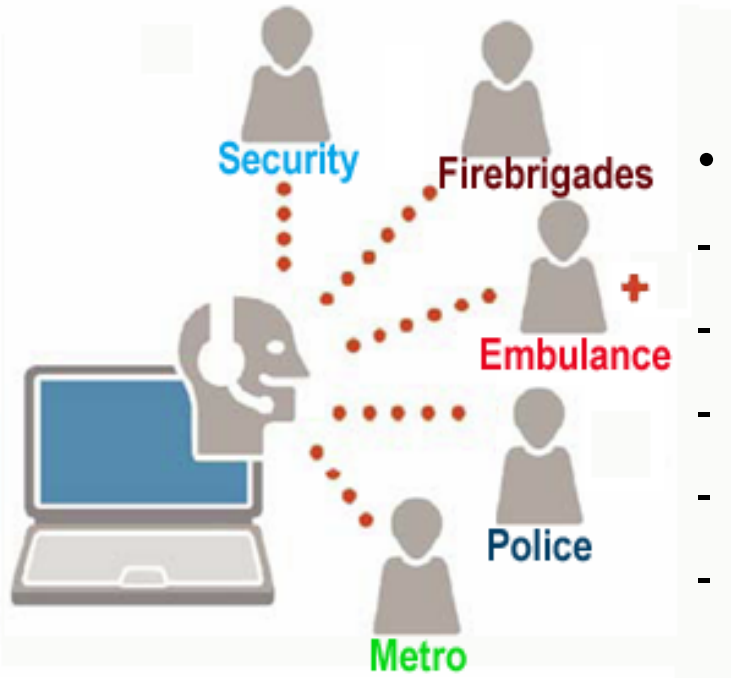
- Outdoor IP65 encapsulation
- Extremely low power consumption: (less than 75 Watt)
- Use only 3,5 Watt – 50Watt
- Low weight: 9 kg

- Designed for harsh environment
- Up to 10 times less power consumption
- Less weight and Size

SB421 Service Box (Control unit)

- Outdoor IP65 encapsulation
- Built-in batteries for long period operation;
- Extremely low power consumption: (up to 20 Wt)
- Low weight: only 9 kg without batteries (20 kg with Batteries)

Dispatching in Moscow Metro



Dispatcher is a key figure in an Emergency situation

- Over 70 operators on regular shifts
- 3-5 Dispatchers operates different tasks

- When emergency happens Dispatchers are to:

- Notify personnel
- Notify passengers on trains and at stations
- Cooperate with special services (needed at the moment)
- Easy to operate – Intuitive user interface
- Russian language implemented

Data Services And Applications

Packet data services.

- Multi-Slot-Packet-Data mode for low speed data transfer and specific applications e.g. train locator

Short Data Services

- Noisy environment
- Short reports
- Access control to Moscow Metro facilities with telemetry modules (SDS)

Summary

- Moscow Metro
  - Requested a reliable unified Radio Communication System
  - Centralized to de-centralized
  - No single point of failure
  - Easy maintenance and upgrade
  - Plug-and-play expandable
  - Low operational costs
  - Intuitive dispatcher