Summary

- PT Inovação Intro
- ITS developments in PT Inovação
- E-Road architecture
Portugal Telecom Inovação, S.A.

... Innovate to create value...
50 years OF HISTORY

ANALOGUE SWITCHING
- strowger (ATU)
- cross-bar exchanges (ATC, SASC)

DIGITAL TRANSMISSION
- pcm: MIC30

DIGITAL SWITCHING
- ETD, ELD exchanges
- O&M systems, Network Management

50’s
60’s
70’s
80’s
90’s

International Collaborative R&D
Institute of Telecommunications
Inesc, MARCONI Labs

Inovação
Competence Domains

- Intelligent Networks (IN)
- Access Network (x DSL, FITL)
- Multimedia Technologies
- IP Technologies
- Wireless Networks and Services (GSM, WAP, UMTS)
- Network Management
- Business Support Systems
- Technology and Service Training
- Engineering Consulting
- Development
- Production
- Test and Integration
- Quality Control
- **Installation**
- **Support**
- **Maintenance**
- **Training**
ITS developments in PT Inovação

• 1992 - First implementation of an emergency voice system (SOS) transported over Optical Fibre.
ITS developments in PT Inovação

- 1998 – Support of the CIRPOR telematic network around Lisbon (Expo98) (Video, VMP, etc…).
ITS developments in PT Inovação

• Several partnerships with other Portuguese companies to implement complete solutions based on national know-how.
• **Main Goal**
  – Solutions to support the operation of the road infrastructure operators;

• **Clients**
  – Road infrastructure operators;
- **Services**
  - Telematic services for road traffic
  - Image data transmission, telemetry, control of information panels and emergency voice (SOS).

- **High availability transport network**

- **Transport Media – Optical Fibre**
Primary Transport Network

- Optical Ring Network
- SDH Technology (from 155Mbps up to 2,5Gbps)
- Automatic protection in case of node failure or fibre cut in 50ms

The Primary Network Nodes are typically located near the road access nodes.
Primary Transport Network

The SDH Nodes

Compact systems (1U)

The full node hardware is typically installed in an Outdoor curb.
Primary Transport Network

EMILO-NG
A Product developed and tuned for ITS applications

Key interfaces used for ITS systems:
- E1 (2Mbps)
- Fast Ethernet and GbE – QoS guarantee using GFP mapping for Ethernet transport
- V.24 ports to interface other peripherals
Video Surveillance Sub-Network

Used to aggregate other telematic elements on the far SDH Nodes

50ms for protection using Rapid Spanning Tree Protocol (RSTP)
MC7

Gigabit Ethernet Switch
IEEE 802.1Q (VLAN)
IEEE 802.1w Rapid Spanning Tree (RSTP)
2 SFP ports
1 UTP port
MC7 Telematic

Gigabit Ethernet Switch
IEEE 802.1Q (VLAN)
IEEE 802.1w Rapid Spanning Tree (RSTP)
2 x SFP ports
2 x UTP port
2 x V.24 Interfaces (RS232/RS485/RS422)
Digital I/O (4 Inputs and 2 Outputs)
SERTO 2001 system chain

Emergency Voice Transport

V.24 - Meteo, Weight Counting, etc…

2 alternative routes
SERTO 2001 system chain

Sensor Data Transport

V.24 - Meteo, Weight Counting, etc…

Control Centre
SERTO 2001 system chain

Interfacing with the Primary Transport Network

SDH Node

Far Node

SDH Node

Far Node

SDH Node

Control Centre
The SERTO2001 nodes can be installed inside the SOS pole, or inside an information panel.

The SERTO2001 Nodes are typically located every 2km or less if needed.
SERTO 2001 system chain
General Architecture
Solutions in Portugal

- Grande Porto (IC23-IC24-IP1-IC29)
- A29
- A17
- A14
- A8
- CIRPOR A5, IC19, A19, A1, A2, A12, CRIL, 2ª CIRCULAR, IC16, IC22

Map showing major roads and cities in Portugal, including A7-A11, IP4, IP5, IP3, A23, A15, and A22.
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