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Critical Communications World 2016

Who is actually using TETRA for SST?

31 May 2016 | Nick Smye

Introduction

- A question that often arises is:

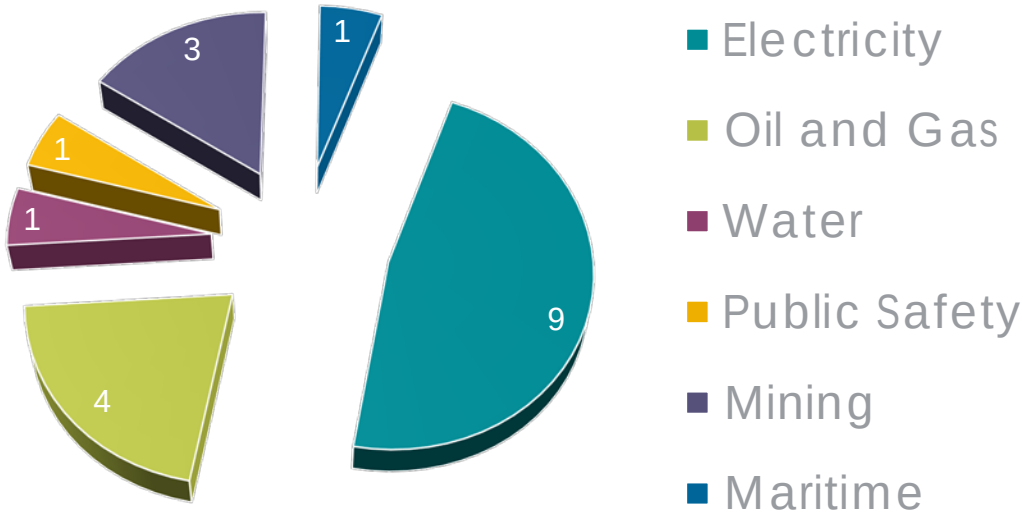
> "TETRA sounds good in theory, but is anyone actually using if for SCADA?"

- For several years now, the TCCA SCADA, Smart Grid and Telemetry (SST) Group has been compiling a list of SCADA schemes that use TETRA as the bearer

TETRA's proven SCADA track record

- The TCCA SST Working Group maintains a list of operational SCADA schemes using TETRA as a bearer
- Currently 20 schemes listed
- **Largest scheme** has 4800 RTUs and 130 sites
- **Largest TETRA network** – 215 base stations
- **Oldest scheme** – has been in operation >10 years
- Using SDS and packet data bearers

Split by sector



List of operational schemes [1/2]

Customer	Sector	Application
Bilbao Bizcaia	Water	Remote control and monitoring of up to 600 outstations
City Power (Johannesberg)	Electricity	Substation monitoring, street lighting, access control*
CLP Power HK	Electricity	MV Telecontrol, FPI and AMR (Smart Grid)
Creos	Electricity/ Gas	Remote meter concentrator, electricity/gas, distribution etc.
Ebro River	Water	Hydrological control and flood warning siren*
Energa	Electricity	Telemetry and remote control of breakers*
Energias de Portugal	Electricity Distributor	Telecontrol – MV network*
KEPCO	Electricity	Distribution automation
Port Authority of Valencia	Maritime	Automated Early Warning System – hazardous cargo*

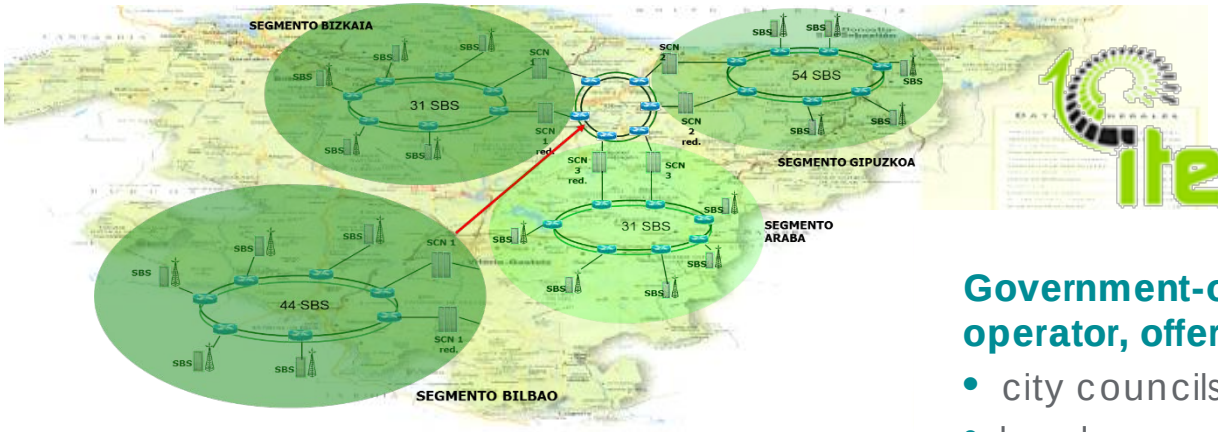
List of operational schemes [2/2]

Customer	Sector	Application
Sasol	Oil & Gas	Flow meter management, emergency announcement system (voice, monitoring and control), TETRA high site monitoring etc.
Saudi Aramco	Oil and Gas	Oil reservoir management*
Sibur	Oil and Gas	Gas condensate pipeline
South African Police Service	Public Safety	TETRA high site monitoring and control
Stromnetz Berlin	Electricity	Telecontrol – MV network
Tauron	Electricity	Telemetry and remote control of breakers*

List of pilot/planned schemes

Customer	Sector	Application
BHP Mt Whaleback mine – Crusher plant	Mining	DAMM node system monitoring
DNK Norway	Electricty	Trial carried out for one electricity company and possibility of two more
EWR Netz Gmbh West Germany	Electricity, gas and water	A trial operation is currently being run with the meter manufacturer Elster
Mobilight USA	Mining	Full solar mobile light tower management systems, light delivery, light alignment and mast deployment with voltage feedback
Pilbara-based iron ore mine	Mining	Water telemetry for borefields, extraction and distribution, generator and dam management

Bilbao Bizcaiao [1/2]



Itelazpi, Basque Government

- **160** SBS installed and operational
- Between **6000** and **10 000** users
- **Operator Business Model** – Itelazpi manages the network and supplies the terminals: HTT-500, MDT-400 and DT-410.
- **AVL** application – SDM & N2A protocol
- **Control centre** for the Itelazpi operator
- **Billing system** – fee per month for each user of the network
- **Different priorities** for users to avoid network collapse

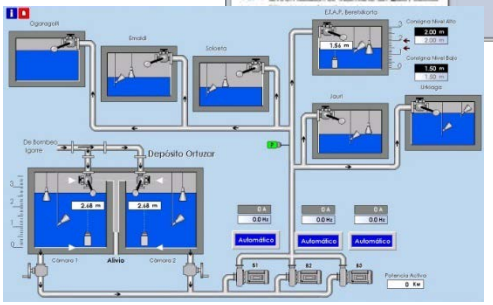
Government-owned regional network operator, offering service to

- city councils
- local government
- public transport
- service users
- etc.

Source: Teltronic Presentation CCW 2015

Bilbao Bizcaiao [2/2]

- The project aims to provide secure communications over TETRA in the remote stations of water supply and sanitation in the Bilbao Bizkaia Water Consortium interconnecting with the central front-ends by the SCADA through the ITELAZPI TETRA network
- Up to 600 remote stations
- TETRA DCM-300 composed of TETRA TRM-300 Teltronic radio modem in every station
  - the DCM-300 is connected to the communications processors of Siemens and Schneider PLCs, using the SINAUT and IEC104 protocol over TCP/IP



Traffic figures

- Average of 70 SDSs (TX and RX) per minute
- Peaks of up 8 SDSs per second

Source: Teltronic Presentation CCW 2015

Kepco

Sector: Electricity Generation, Transmission and Distribution

Application: Distribution Automation, Transformer Monitoring, AMR, wind etc.

Status: Operational

TETRA network: Airbus, 7 switches and 130 sites

TETRA bearer: SDS (DA) and packet data (AMR)

RTUs: RTUs

SCADA protocol: DNP3

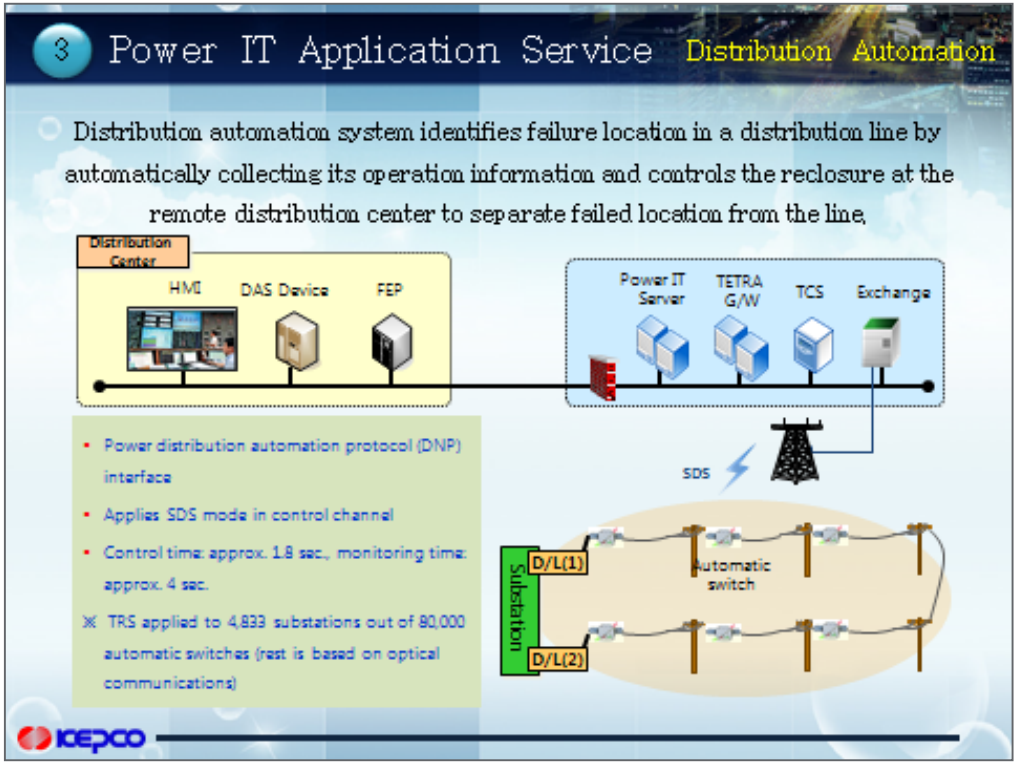
Performance: DA Control time: approx. 1.8 sec., monitoring time: approx. 4 sec

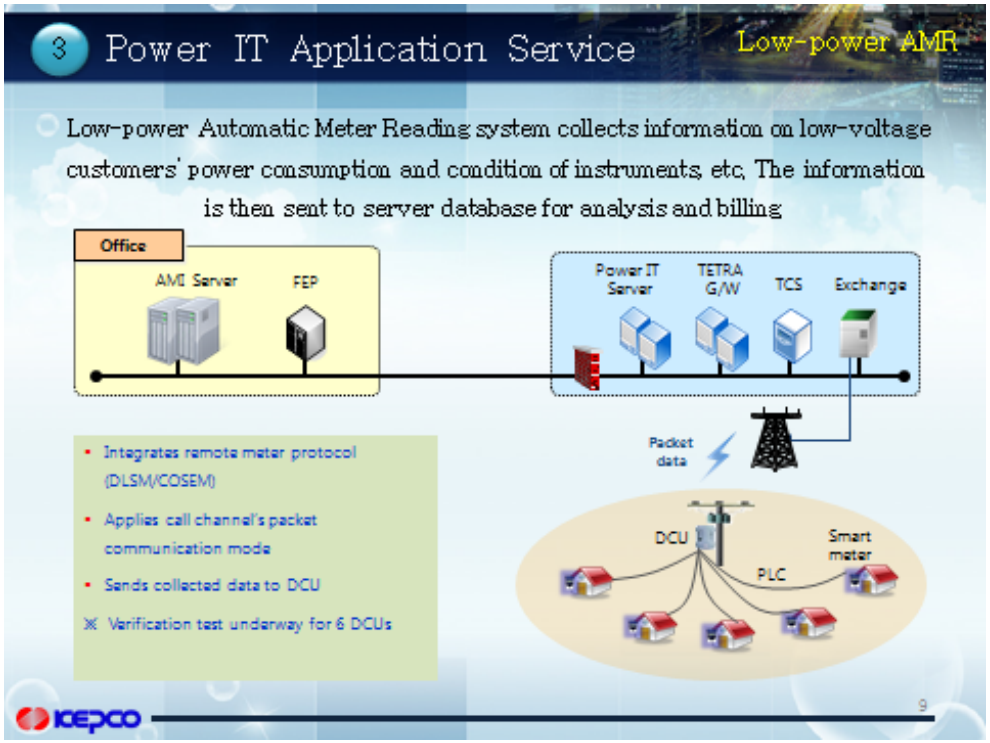
Comment: 4833 substations out of 80 000 automatic switches using TETRA (rest is based on optical communications)

6 data collectors for AMR on trial

Future: Increase the number of control channels 1-> 4 to expand DA
Boost speed to expand Low-Power AMR capacity (TEDS)

Source: Presentation CCW 2014





Source: Presentation CCW2014

Sasol

Sector: Oil and gas

Application: Flow meter management; emergency announcement system (voice, monitoring and control); TETRA high site monitoring and control

Status: Operational

TETRA network: Sasol 17 sites over two locations, still expanding (Hytera)

TETRA bearer: SDS

RTUs: 95 ESS-RTU-SRB

SCADA protocol: Modbus OPC

Performance: Data transmission on change of I/O state, keep alive interval 10 minutes

Comment: Operational since mid-2013

Source: TETRA Today article, 2013

South African Police Service

Sector: Public safety

Application: TETRA high site monitoring and control

Status: Operational

TETRA network: SAPS 215 sites (Cassidian)

TETRA bearer: SDS

RTUs: 210 ESS-RTU-S&A

SCADA protocol: OPC

Performance: Data transmission on change of I/O state

Comment: Operational since 2010

Source: TETRA Today article, 2012

Sibur

Sector: Oil and gas

Application: Gas condensate pipeline (1024 km)

Status: Operational

TETRA network: Sibur TETRA (Motorola) 66 base stations

TETRA bearer: Packet data

RTUs: 36 RTUs

SCADA protocol: Proprietary

Performance: RTUs are not polled, but report at least every 40s for telemetry signals and 90s for telemetry information

Comment:

SCADA functions:

- Valve control
- Cathodic protection
- Reclosers management
- **3 x** leak detection system integration

SCADA functions:

- **3 x** leak detection system integration
- Diesel power system control
- Fire Fighting System
- Power Consumption control
- Gas detection system

Source: SiburTWC 2015 presentation

Stromnetz Berlin

Sector: Electricity

Application: Telecontrol – MV network

Status: Operational

TETRA network: Stromnetz Berlin (Motorola) circa 30 sites

TETRA bearer: Packet data and SDS

RTUs: 350 connected via TETRA, 650 line connected

SCADA protocol: IEC 68070-5-104 IP (PD); IEC 68070-5-101 serial (SDS)

Performance: Circa 50 RTUs per PD plus circa 20 RTUs via SDS

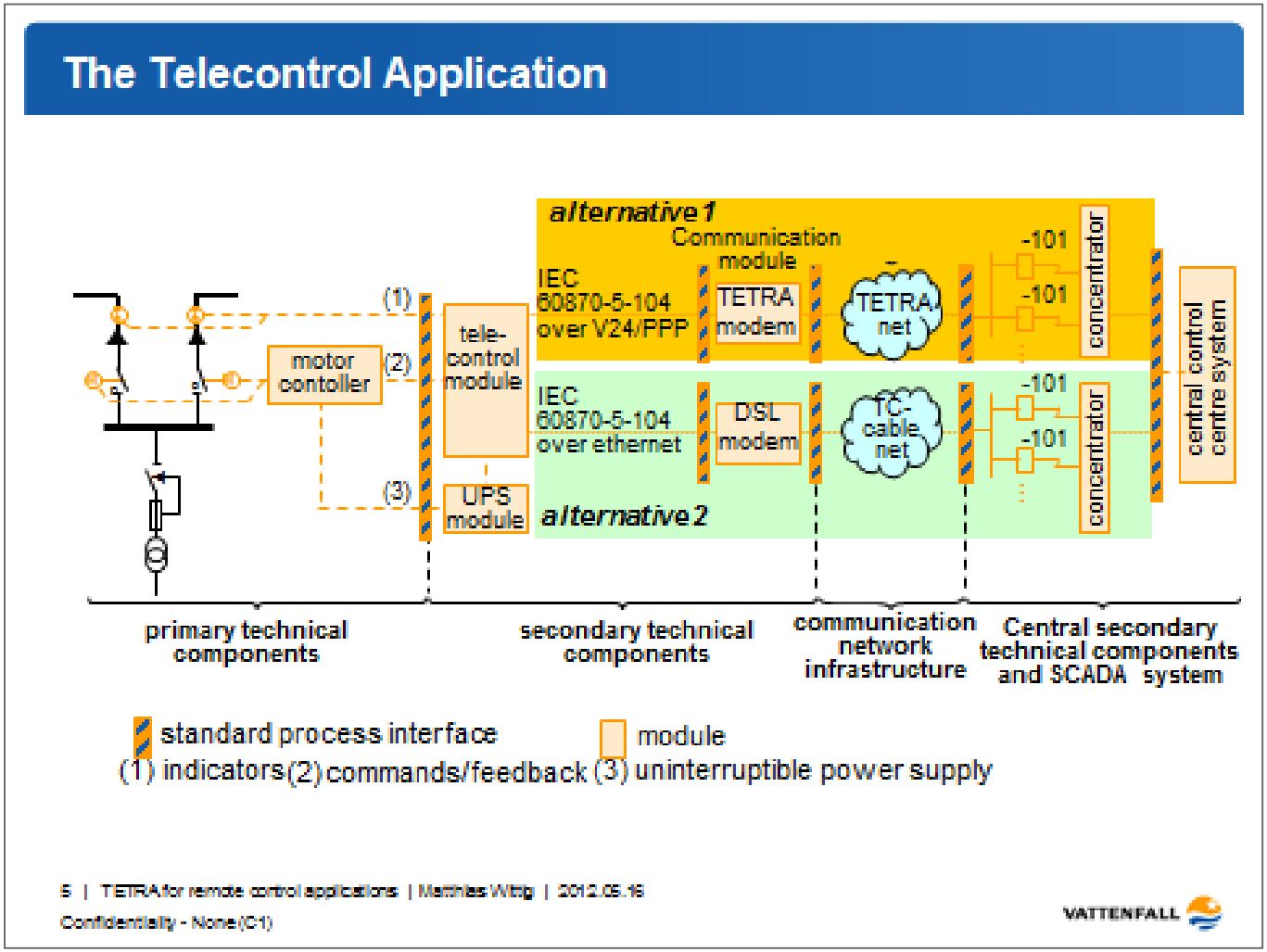
Comment: Custom mapping of IEC protocol to SDS

Operational usage of SDS planned for 2016

Future expansion to 4000 RTUs

TETRA has reduced duration of power outages by 50%

Source: TWC 2012 presentation



Source: TWC 2012 presentation

Planned mining schemes

Sector: Mining

Application: Various - Full solar Mobile light tower management system, Water telemetry for borefields, extraction and distribution, generator and dam management and TETRA node monitoring

Status: Planned

TETRA network: DAMM (Australia x2 and USA)

TETRA bearer: SDS

RTUs: Radlink BVR5000

SCADA protocol: Modbus

Performance:

Comment:

Source: Radlink

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