

TErrestrial Trunked Radio (TETRA)



Best In Class Radio Systems

TETRA TODAY

6 CONTINENTS

OVER 100 COUNTRIES

**OVER 80 NEW SYSTEMS
IN 2015 - 2018**



TETRA, a “real” standard in evolution...

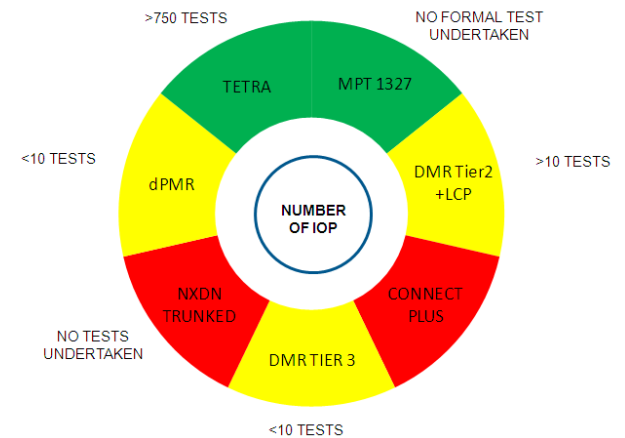


- **TETRA is a real Standard...**

- IOP Certification process in place since 15 years
- 21 Manufacturers made IOP process
- About 15 IOP Session per Year

- **...evolving in a reliable way**

- TETRA Release 1
- TETRA Release 2 (TEDS)
- TETRA and LTE



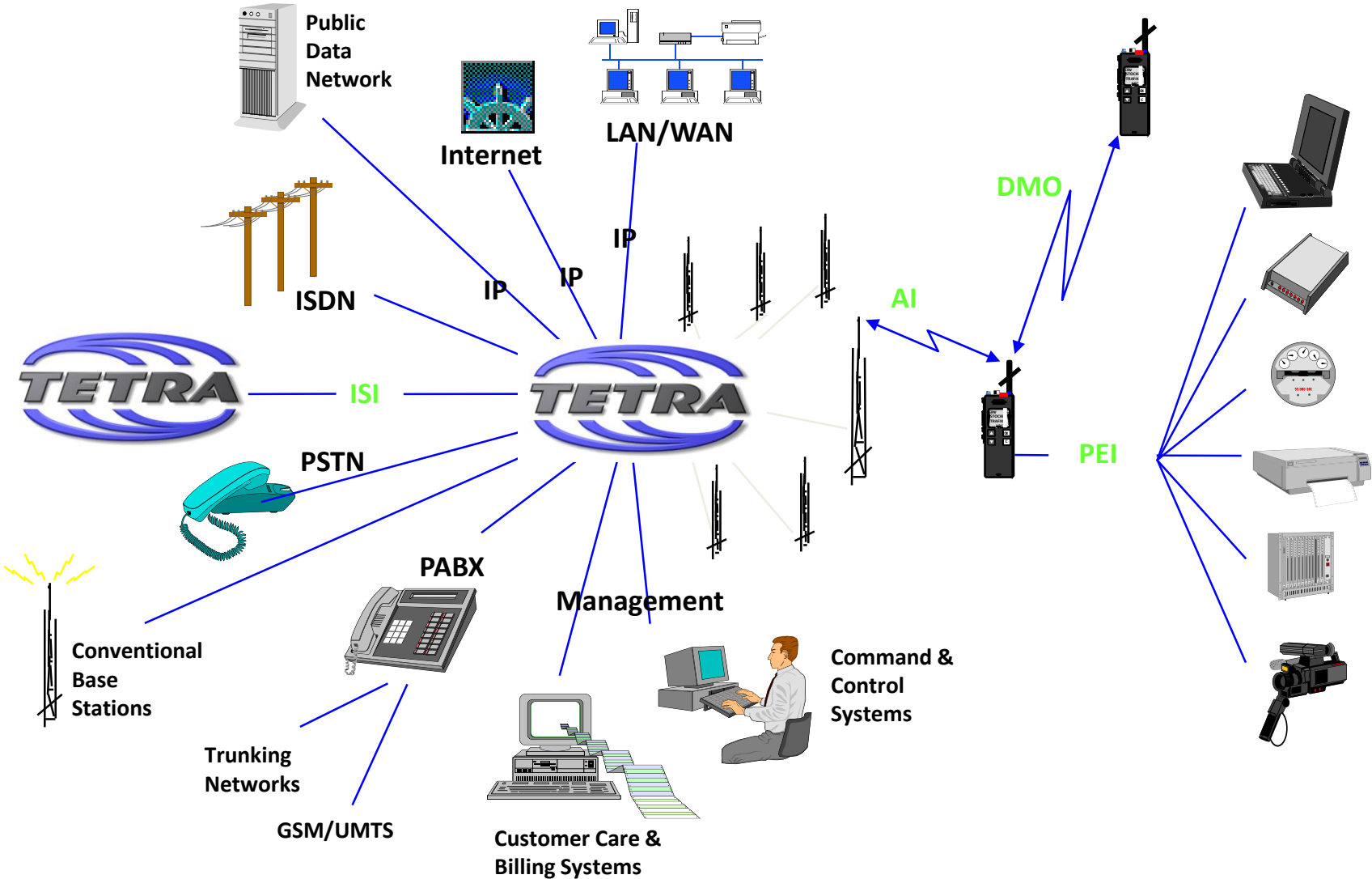
Access Mode and Traffic Management



- TDMA 4:1
- Channel Spacing: 25 khz (TETRA 1) – 25,50,100,150 khz (TETRA 2)
- Trunking System (by standard)
- Cellular-like access mode
- Priorities in access to resources, defined in centralised way
- Detailed Resource Load reports and Centralised Traffic Management

TETRA IS THE BEST-IN-CLASS TECHNOLOGY FOR TRAFFIC MANAGEMENT IN MULTI-ORGANIZATION ENVIRONMENT

TETRA Architecture: complete connectivity



Voice Features

- **General Characteristics**
 - Good Quality (noise reduction with ACELP vocoder)
 - Fast Call Setup (around 300 mS)
 - Full Duplex or Half Duplex
- **Individual Calls (one-to-one), Group Calls (one-to-many) and Telephonic Calls**
- **Group broadcast , patching and scanning**
- **Emergency Calls (priority and preemptive calls)**
- **Direct Mode Operation DMO (term. to term.)**
- **Supplementary Services**
 - Priorities Management
 - CLIP and CLIR
 - Dynamic Group Number Assignment
 - DTMF
 - Late Entry
 - Ambience Listening
 - Roaming and Handover
 - etc



**TETRA PRESENTS A STABLE, RELIABLE AND STANDARDIZED
VOICE APPLICATION LAYER**

Data Features

Status Messages

- 16 bit values for free use
- Fast delivery on Control Channel
- Simultaneous to Voice Calls

Short Data Service

- Type: 1 (16 bit), 2 (32 bit), 3 (64 bit) and 4 (Text)
- SDS4: Max. 140 char, 8 bit
- Fast delivery on Control Channel
- Simultaneous to Voice Calls

IP Packet Data

- TCP/IP standard on Air Interface
- Packet Switched architecture
- Multi-slot and Dinamic Channel Resizing in case of higher priority calls
















Easy to use via:

- PC connected to terminals via PEI
- Terminals User Interface (SDS management, WAP Browser, WAP Push)
- Bluetooth connectivity and VideoCamera



Data Features – Applications' Perspective

A SUITABLE BEARER FOR EACH SERVICE

| Bearer \ Application | TETRA 1 Circuit data | TETRA 1 SDS | TETRA 1 Single slot PD | TETRA 1 Multislot PD | TEDS - High Speed Data |
|--------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Database search |  | ★ | ★ | ★ | ★ |
| AVL, telemetry and telecontrol |  | ★ | ★ | ★ | ★ |
| Email |  |  | ★ | ★ | ★ |
| File transfer |  |  | ★ | ★ | ★ |
| Slow scan video |  |  |  |  | ★ |
| Streaming video |  |  |  |  |  |



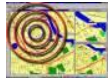
Not Suitable



Possible

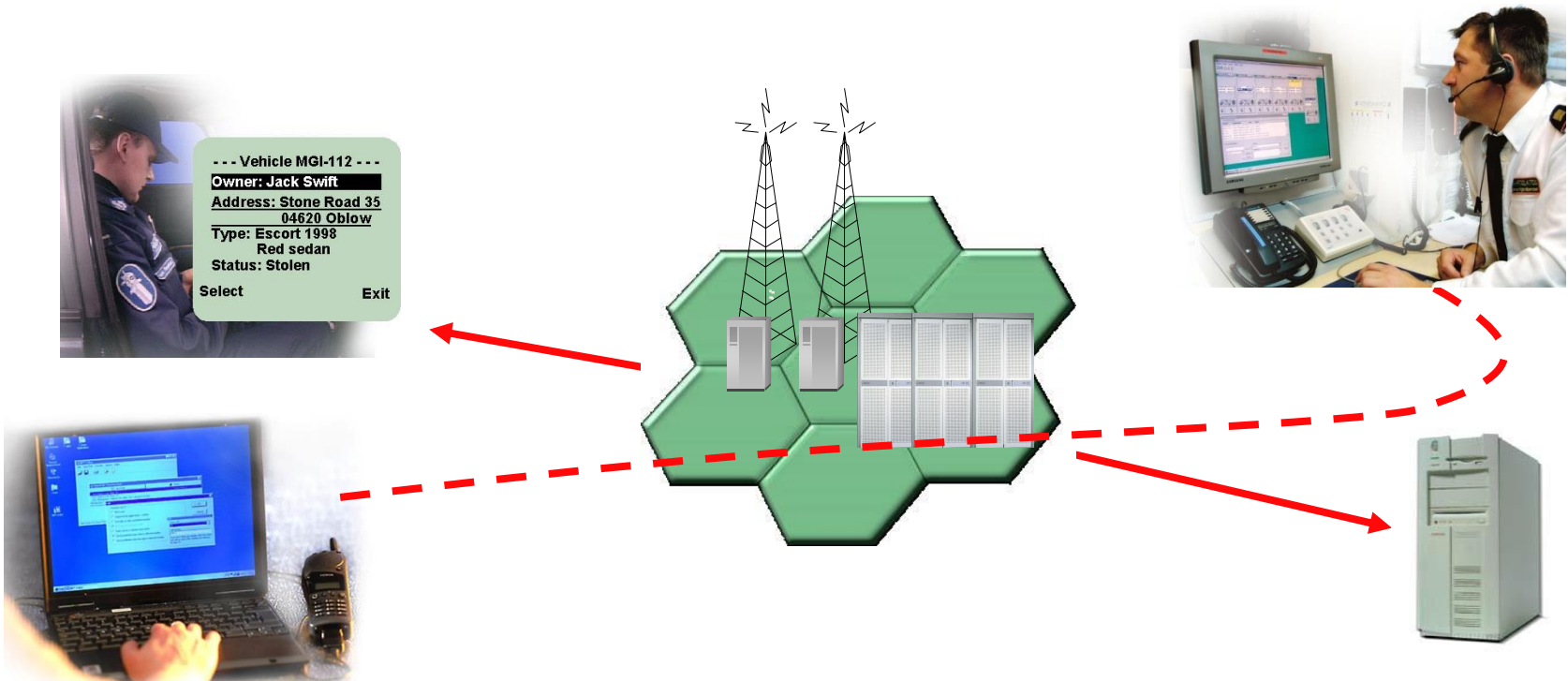


Suitable

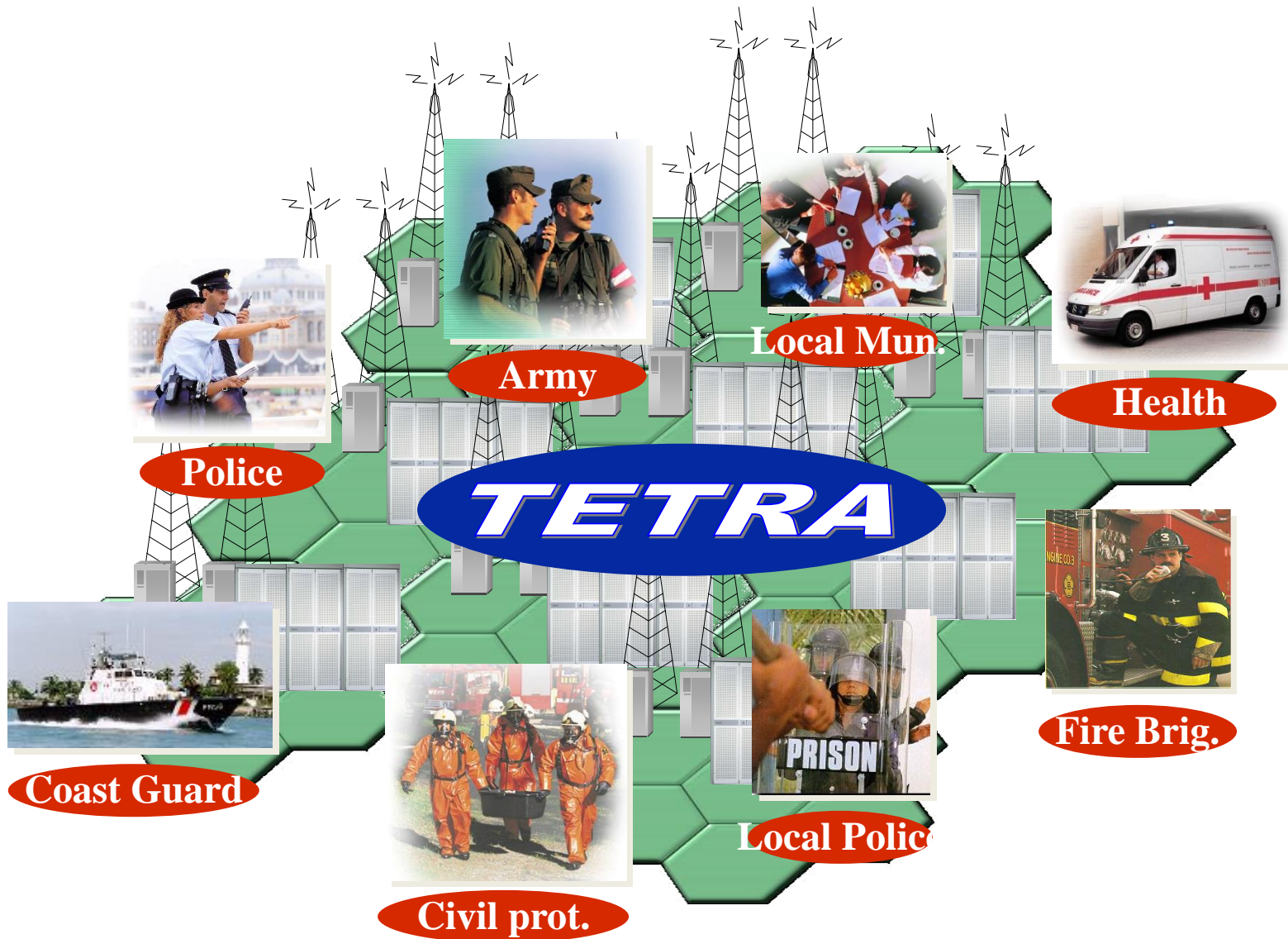


TETRA is a REAL Application Platform

- Advanced Data services (MSPD, TEDS, Text and Status Messaging)
- Voice and Data integration (V+D, priorities, resources optimization)
- Complete and Advanced Connectivity
- Application Libraries and Open Interfaces (SDS, PDS, TNP1, PEI, Billing, ecc)
- Development Tools (SDK, modems, simulators, Partner Programs)
- Advanced Terminals Platforms (GPS, Bluetooth, Imaging, etc)



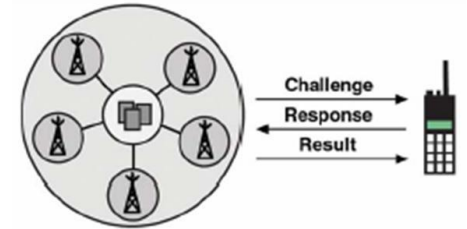
One Network– Many Users: VPNs in TETRA



SECURITY FEATURES

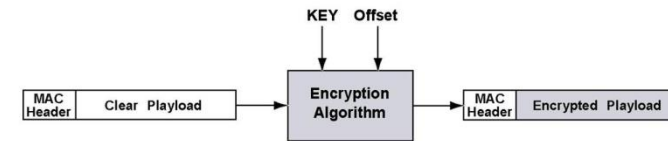
Authentication

- Only authenticated terminals have access to the network
- Authentication keys inserted in terminals and Infra
- Advanced keys management
- Fake terminal detection
- Standard driven



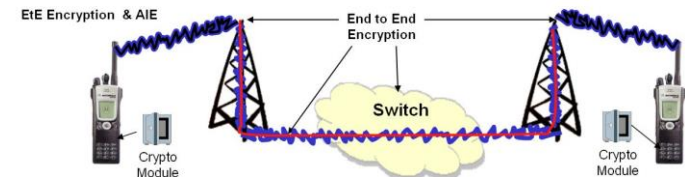
Air Interface Encryption

- Voice communications are encrypted on Air Path
- Different algorithm for different users (TEA1-2-3)
- Same keys management of Authentication
- Standard driven



End-to-end Encryption

- Entire Voice path (air+cable) is encrypted
- Dedicated keys management
- Keys inserted at terminal level with secure procedure
- Standard driven



TETRA: present and future of PS communications (1/2)



- **TETRA presents an highly reliable Voice Application Layer that will never be matched by other standards**
- **TETRA covers 95% of application needs of Public Safety Organizations (Data Features, Connectivity and Application Platform)**
- **TETRA is the unique mission critical radio standard that guarantees Multi-Organization communication with high traffic load**

TETRA: present and future of PS communications (2/2)



- **TETRA Security Features are advanced and standard driven**
- **Evolution of TETRA Technology, standard driven, is steady and reliable (new terminals, new services, new applications every years)**