



T-MATRIX™



*Shaping Tomorrow's TETRA today*

## A Vision for the Future

At Artevea, our vision is simple: to continue to make life easier for communicators within public and commercial organisations.

We are committed to ensuring our products and services are designed to meet your needs, maintaining attention to detail, rigorous testing and careful consideration of your future requirements.

As established industry experts, our experienced team are constantly finding ways to improve the capability and flexibility of our products, ensuring you receive the best value for money, delivering the most advanced TETRA products and setting new benchmarks for innovation, quality and vision.

We look forward to hearing your communications challenges and providing you with the T-MATRIX™ solution.

.....POLICE.....AMBULANCE.....RAIL.....AIRPORTS.....WATER.....ROADS.....MINING.....PORTS.....

## The Expanding Global Market

Form the earliest days of TETRA, Artevea has played an active and key role in assisting the development of the TETRA standard. We are proud of our achievements and the T-MATRIX™ product range.

Indeed in 2008 Artevea had the honour of supplying a TETRA network to the 100th Country to adopt TETRA since its definition. Designed initially for public safety and military organisations, TETRA is now used in a wide range of industry sectors in some of the most arduous environments in the world.

*design.supply.installation.services*

# Reliable Communications

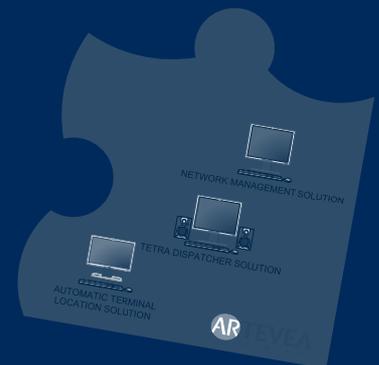
We believe the answer to reliable communications is the T-MATRIX™ range of TETRA-over-IP radio products and solutions.

The TETRA-over-IP infrastructure at the core of T-MATRIX™ ensures networks can be as modular and flexible as required. Whether fixed (T-MATRIX™ F) or transportable (T-MATRIX™ P), each radio site can be part of a larger multisite network. As a distributed architecture, the weakness of a central switch as a single point of system failure is removed. A T-MATRIX™ radio site which loses network contact simply operates locally with no loss of functionality. All other sites remain connected and operational until the link is restored. Network Management, Dispatcher, Gateways and other system components can be located anywhere on the network.

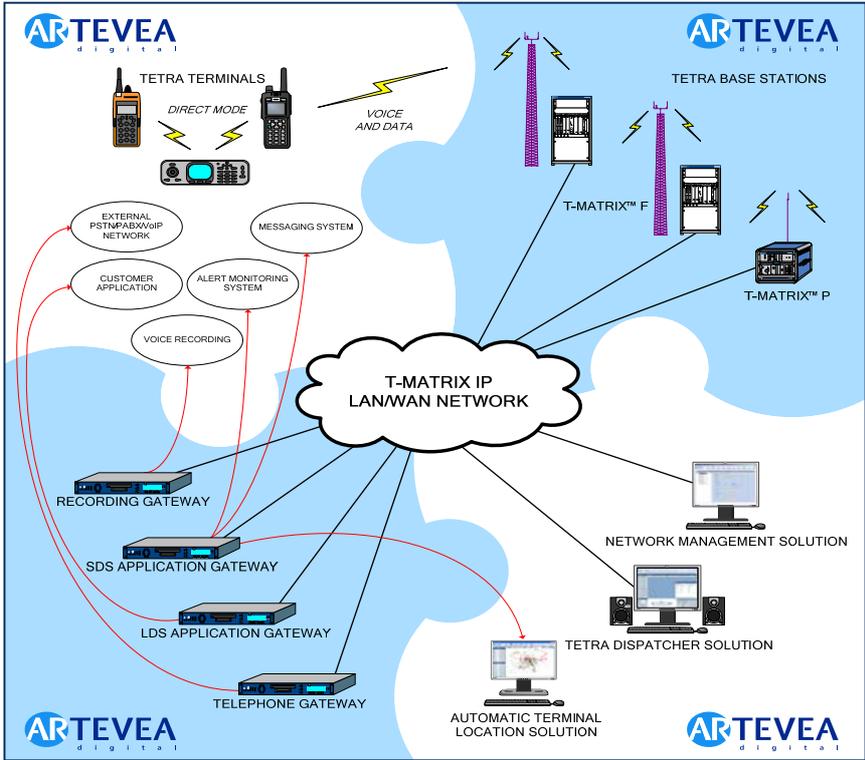
.....SEARCH & RESCUE.....EVENTS.....OIL & GAS.....MAJOR EVENTS.....DISASTER RESPONSE.....

## Choosing Artevea

The Artevea global distribution and partner program ensures that customers can enjoy complete peace of mind when choosing systems from Artevea. All our distributors are constantly trained and updated on the latest designs and configurations. Every one of our partners installs and maintains our systems, backed up by Artevea technical staff who are available around the clock.



# T-MATRIX™ NETWORK SOLUTION



The key benefits of the T-MATRIX™ network are Resilience, Flexibility, Efficiency and the Use of Future Proof technology.

- Resilience**

  - Network Elements and links can be duplicated for extra resilience.
  - Radio Sites work in fallback if their network links fail.
  - Multisite operation still works, even if one part of the network is unreachable.
  - Network continues to operate if central servers fail or shut down.
  
- Flexibility**

  - Any combination of Star or Mesh network topology is allowed to balance traffic handling, resilience and cost-effectiveness.
  - Resources can be placed anywhere in the network
  - Additional sites, gateways can be added with ease
  
- Efficiency**

  - Every site is informed and call processing is very efficient because of IP techniques such as multicast for Group Calls.
  - Group Calls only involve those sites where Group members are currently registered.
  
- Future Proof**

  - Industry Standard IP Hardware and Software
  - Multimedia technology
  - Continuous performance improvements driven by IP market

# T-MATRIX™ SYSTEM FUNCTIONALITY

## TETRA SERVICES

### BASIC SERVICES

Individual Call Full & Half Duplex  
Unacknowledged Group Call  
Broadcast Call

### CIRCUIT/PACKET

Data supported

### CALL CLEARANCE

User Initiated disconnection  
Call limit and Tx Inactivity Timer

### SHORT DATA SERVICE

(Individual and Group)  
Pre defined Status message  
User defined Type 4 SDS  
Concurrent SDS + Voice

### QUEUING

Queue call when system resources busy

### FACILITIES

Basic Link services

### TRUNKING

Late AI Traffic Assignment  
Early Network User Channel Assignment  
Message Trunking

### DIALLING

ISSI/ITSI Dialling  
PSTN Dialling  
DTMF Over-dialling from PABX  
DID Dialling from PABX Gateway  
MS ITSI Dialling from PABX

## SUPPLEMENTARY SERVICES

### GENERAL

Late Entry  
Emergency Call  
Priority Call  
Pre-emptive Priority Call  
Talking Party Identification  
Access Priority  
Ambience Listening  
Dynamic Group Assignment

### TELEPHONY TYPE

Calling Line Identification Presentation  
QSIG Calling Party ID Presentation

### MOBILITY

#### REGISTRATION PROCEDURES

Mobile Initiated registration and de-registration  
Undeclared and unannounced Cell Reselection  
Announced Type 3 Cell Reselection (Handover)  
Call Restoration

### ATTACH/DETACH GROUP IDENTITIES

Attach\Detach of Groups (MS Initiated)  
Group Management

### ENERGY ECONOMY MODE

Energy Group 0

### FACILITIES

Network Broadcast Information  
Neighbour Call Information

## SECURITY

### ENCRYPTION

AI Encryption Static Cipher Key  
Algorithm TEA1, TEA2

### AUTHENTICATION

Algorithm TAA  
Authentication Key Management via NMS

### TERMINAL SECURITY

Permanent Disable  
Temporary Disable/Enable

## SYSTEM INTERFACES

### GATEWAYS

Telephone (ISDN BRI, PRI, Analogue and VoIP)  
SDS Application  
LDS Application  
Recording

### RADIO SITE TO NETWORK

E1/G703  
X.21  
ATM

## NETWORK

## MANAGEMENT

### FAULT

Alarm Logging and Management  
Equipment Monitoring  
External Alarms

### CONFIGURATION

Site Configuration  
Database Management  
Radio Site Software Download

### ACCOUNT

Call Data Records

### SECURITY

SCA Operator Access Rights  
Subscriber Management Access Rights  
Encryption Key Management

### SUBSCRIBER

Addition\ Deletion\ Modification  
Enable\Disable  
Provide\modify\withdraw Supplementary Services  
Barring of incoming and\or outgoing calls  
Call Forwarding

## NETWORK

## CONFIGURATION

### CAPACITY

In excess of 128 Sites

### ACCESSORIES

Call logging  
Dispatchers

### FLEXIBILITY

Various Redundant Configuration Options  
Fault Tolerant Architecture  
Control Channel Agility

# T-MATRIX™ F NETWORK SOLUTION

The T-MATRIX™ F outdoor base station can be installed directly on antenna masts, buildings and towers, due to its small size and weight, keeping installation costs to a minimum.

Alternatively T-MATRIX F is available in high capacity indoor base stations, scalable from 1 to 8 carriers providing the equivalent of 4 to 32 logical channels.

## Indoor Option

- 1-8 Carriers in one single 19" Rack
- Redundant Base Station Controller
- Rx Antenna Diversity
- Tower Mounted duplexer and Rx Amplifier
- Cavity or hybrid combiner system
- GPS Time & Frequency synchronised

## Outdoor Option

- Complete single carrier TETRA Base Station
- Tower or Ground Mounted outdoor or indoor unit
- Built-in duplex filter
- Dual Rx diversity on two antennas
- Can operate on a single antenna (without diversity)
- Expandable to 4 carriers (with jumpers)
- -48 V Operation
- 10/100 Mbit/s Ethernet Interface (+VoIP)
- Simple, easy low cost installation

# T-MATRIX™ P PORTABLE SOLUTION

The T-MATRIX™ P is a compact, cost effective, transportable TETRA over IP solution. It provides exceptional value for the small user looking for a simple but feature-rich system.

The equipment is mounted in a transportable ruggedised rack made from aluminium honeycomb toughened with an outer skin (ABS) with removable covers front and rear.

The T-MATRIX™ P is particularly suitable for use in rapid deployment scenarios when connected to a transportable power generator, manual telescopic mast and rugged laptop for configuration, it can be quickly set up and ready for use within minutes.

# T-MATRIX™ TECHNICAL DATA

## General (Indoor Base Station Option)

### Specification

ETS 300 394-1

### Frequency bands

300-310/336-346MHz, 350-360/360-370MHz,  
380-390/390-400MHz, 410-420/420-430MHz,  
450-460/460-470MHz, 805-825/850-870MHz

Other frequencies on request

### Filter bandwidth

5MHz, typ., 300-346MHz ~ 10MHz  
805-870MHz ~ 14MHz

### Carrier separation

25kHz

### TX power before combiner

Max 25W TETRA

### TX power ant. connector

10W TETRA, typ.

### Receiver diversity

Dual as standard

### RX sensitivity static

-117 dBm

### RX sensitivity dynamic

-112 dBm

### Cavity combiner system

Motor tuned with support for up to 16 carriers per antenna/cell

### Hybrid combiner system

Available as option for max. 4 carriers

### Power source

-48 VDC, positive pole grounded, or 100-240 VAC

### Dimensions model 36U

(HxWxD) 1721 x 542 x 520 mm

### Number of channels

2-32channels

### Weight fully equipped

143 kgs

### Operational temperature range

-20 - +55 Celsius

### Power consumption fully equipped

975W (typ.) for DC-input

### IP classification code

IP20

## Antenna interface unit

- Built-in DC-feed and alarm for TMA/TMD
- RF test loop converter
- DC control to TMA/TMD for antenna/amplifier measurements
- Power detectors for forward and reflected TX antenna power

## Tower mounted duplexer and RX amplifier

- Dual RX amplifiers for diversity
- Duplex filter to combine TX and one RX antenna
- Tower or ground installed
- Built-in RX antenna return loss measurement feature
- Built-in amplifier measurement feature
- Accepts low-cost thin cables (up to 8dB)
- IP classification code: IP65

## Base station controller

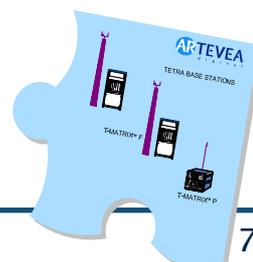
- High performance low-power Pentium PC
- Windows XP-embedded operating system
- Compact flash disk
- Ethernet 10/100 Mbit, RJ45 connector
- Four E1 interfaces 75/120 ohm
- PCM cross connect/switch with 8kBit switching capability
- Automatic switch-over to redundant BSC at failure
- GPS built-in for time and frequency synchronization
- O&M interface via RS232 and TCP/IP

## Power supply

- -48 VDC or 100-240 VAC input voltage
- +14V/+26V output voltages
- Support for external battery back-up

## Transceiver

- Synthesizer channel step of 12,5kHz
- TETRA and as option TETRA / analogue dual mode
- 1-25W in TETRA mode
- 2 to 50W in analogue mode
- Dual RX antenna diversity as standard
- Software update from BSC
- High performance DSP implementation
- Highly flexible software controlled functionality
- Fully GPS controlled synchronous operation





TSP -200 Jan 2010 Due to our policy of continuous improvement of our products and services, technical specifications and claims, whilst being correct at the time of going to print, may be subject to variation without notice.



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