

# ISITEP

## D4.5.5 – DEPLOYABLE GATEWAY PROTOTYPE FINAL RELEASE

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## REVISION TABLE

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## **Publishable extended abstract**

This document provides a description of a voice and data gateway between a TETRA tactical cell and a TETRAPOL tactical cell. The solution is based on IDR for TETRAPOL part and TB3p for TETRA part.

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## 1. INTRODUCTION

### 1.1 Introduction

The aim is to provide a system to link a TETRA network and a TETRAPOL network in order to manage on the field two fleets of users coming from the two networks may they be tactical or complete infrastructures. The gateway is used to interconnect voice, geolocation data and emergency information. Each cell in the case of deployable solution (which is the focus on the scenario envisaged within ISITEP) can be extended by a connection to its own larger network using a satellite link.

### 1.2 Normative reference

PAS 0001-19-2: "TETRAPOL Specifications: System Terminal Control Protocol".

TETRA Association; TETRA Interoperability Profile (TIP); Part 1: Core AT Commands

### 1.3 Document scope

This deliverable (D45.5) is the final deliverable issued by WP45. In fact D45.5, is the final prototype gateway itself: D45.5 is supposed to be a P deliverable where P stands for Prototype. The present document is supposed to come with the prototype itself to keep some archive on the work completed and the gateway demonstrated within European ISITEP initiative. This document takes over elements from D45.3 which constituted the first release of the gateway that where developed in ISITEP to ensure TETRA-TETRAPOL interoperability. After this first release integration work has started which could have had impact on the gateway. So this document completes D45.3 with some modifications that were operated on the gateway between the first release and the final release in ISITEP project. Nonetheless, it is important to notice that the gateway has been carefully designed in compliance with requirements expressed by our TETRA and TETRAPOL end users involved in ISITEP and with the objective to fill the WP73 demonstration objectives. So the gateway only suffered from minor corrections between its first release and its final release. The main modification concerns the gateway usage. The gateway where previously planned to work in pure disaster relief conditions where coverage was lacking: unplanned event where you have no coverage because it happens in places where there are few people or because the infrastructure has collapsed after a disaster. Now, end users expressed as a requirement that the gateway can connect to fixed infrastructure if they are present on field.

### 1.5 Purpose

This document provides the technical description of TETRA-TETRAPOL deployable gateway developed in ISITEP. It is supposed to come with the gateway prototype itself and for knowledge sharing and dissemination for communication over the project. The actual D45.5 is the gateway itself.

### 1.5 Acronyms

Acronym	Definition
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AG	Access Gate
AI	Air Interface
CN	Control Node (IP TPOL network)
CNA	Code Nature of Address
EMOCH	Emergency Multi site Open Channel
ETH	ETHERnet
GW	GateWay
HW	HardWare
IP	Internet Protocol
LAG	Line Access Gate
LABS	Line Access Base Station
LATC	Line Access Terminal Controller
LCT	Line Connected Terminal
Li	L1st bit (=0 if last element in address list)
MD	Mediation Device in charge of Network Management
MMI	Man Machine Interface
MOCH	Multi site Open Channel
MSW	Main Switch (TDM TPOL network)
NA	Non Applicable
NPI	Numbering Plan Identifier
OA&M	Operation Administration and Maintenance
OMC	Operation & Maintenance Computer
PBM	Product Business Manager
PCM	Pulse Coded Modulation
RN	Regional Network
RSW	Radio Switch (TDM TPOL network)
SSW	Secondary Switch (TDM TPOL network)
SW	SoftWare
ST	System Terminal
TKG	Talk Group
TDM	Time Division Multiplexing
TMP	Technical Management Position
TPA	Talking Party Address
TPOL	TETRAPOL
TPS	Terminal Programming Station
TRS	Technical Requirements Specification

## 2. GATEWAY HARDWARE DESCRIPTION

### 2.1 General synoptic

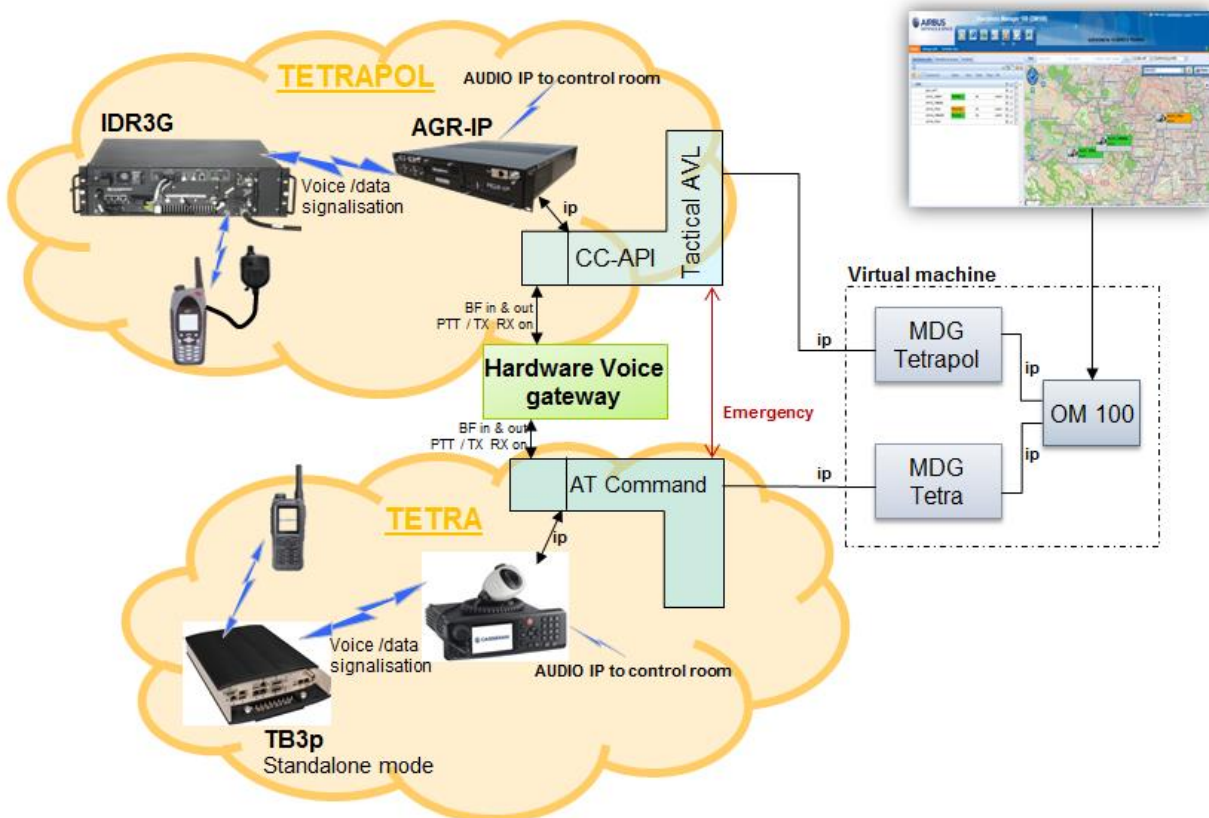


Figure 1 : General synoptic

### 2.2 Gateway principle:

The gateway comprises a mobile of each fleet and is used to cross the audio and the I/O (PTT, receive activity). The mobile management (communication, data interface) is done by a PC which is connected to an AVL server. The PC provides the geolocation data from both the TETRA fleet and the TETRAPOL fleet and the positions are displayed on the same map.

Alongside, the audio and geolocation data can be transmitted to the regional network by the means of an IP link (satellite, microwave).

### 3. OPERATING MODE

When a user takes the PTT on a terminal of his fleet (e.g. TETRA), the mobile gateway receives an activity information and transmits it to the mobile gateway of the second fleet (e.g. TETRAPOL). The received activity information is transformed to a PTT signal and the audio is transmitted to the rest of the terminals belonging to the second fleet.

At the same time, all the terminals of each fleet transmit their geolocation. The PC managing the 2 terminals in the gateway receives and routes the data to the AVL server. The latter embeds a module to compute geolocation data from both fleet and display all the information the same map.



#### 4. KEY BENEFITS FOR END USERS

The gateway comes with innovative features that TETRA and TETRAPOL end users expected for their interoperability missions:

- The gateway is easily deployable: this is an important point. The gateway is designed to face large scale disaster. This requires to set-up communications means as quick as possible with no time to read manuals.
- The gateway can be remotely IP piloted (potentially through satellite connection)
- The gateway allows sharing COP (Common Operational Picture) encompassing TETRAPOL and TETRA end users on the same map/dashboard.
- The gateway allows sharing audio and geolocations with control rooms.
- The gateway enables interoperability of emergency communications.

## 5. GATEWAY USAGES

This gateway solution is easily deployable and scalable. It supports to connections. Each connection can interface with a TETRA or a TETRAPOL network. The gateway even enables direct connection between TETRA and TETRAPOL terminals with no additional equipment: this was demonstrated during ISITEP second year review where an Airbus TETRAPOL terminal and an Airbus TETRA terminal has shared a communication with no other deployed equipment except the gateway. The selected gateway configuration will depend in fact on the scale of the event you need to support and the coverage you need. So each of the 2 gateway interface can connect to:

- TETRA terminals fleet in direct mode
- TETRAPOL terminals fleet in direct mode
- TETRA tactical solutions
- TETRAPOL tactical solutions
- TETRA fixed infrastructure
- TETRAPOL fixed infrastructure

In ISITEP, the gateway has been demonstrated 3 ways:

- During 2<sup>nd</sup> year review connecting 1 Airbus TETRA terminal and 1 Airbus TETRAPOL terminal
- In WP7.3 demonstration, connecting the live network TETRA CERN networks (provider SYSOCO industry) and an Airbus TETRAPOL tactical network configured for Federal police of Switzerland
- In WP7.5 demonstration, connecting the Airbus live network TETRA from Federal Belgium police and the Airbus TETRAPOL live network from French police.