ISITEP
D7.4.3 - DEMONSTRATOR TEST RESULTS FIRST RUN

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Publishable extended abstract

This deliverable presents ISITEP WP74 “Joint police surveillance patrol” Demonstrator test results first run. It describes the implementation for ISITEP “Joint police surveillance patrol” scenario to achieve the first run test in conformance with test procedures defined in D74.2. The first run test took place at Leonardo premises in Genoa on the 20th of December

CONTENTS

TABLE OF FIGURES

1. INTRODUCTION

1.1. Introduction

ISITEP aims at achieving the interoperability between legacy PMR networks based on TETRA and TETRAPOL technologies..

WP74 focuses on routine cross border cooperation between PPDR agencies using different technologies: TETRAPOL and TETRA. This is specifically referred to the Spain and Portugal crossborder cooperation scenario (see. D74.1) where the competent authorities Spanish GC (Civil Guard) and Portuguese GNR (Republican National Guard), agreed to conduct joint patrols and mobile controls consisting of agents and officials of both parties in areas of fifty kilometers from the border, by land, sea or air, according to the operational needs of the moment.

In specific this work-package focuses on demonstrating innovative technical solutions to connect TETRAPOL and TETRA systems using the framework developed by ISITEP. Procedures between involved agencies are already in use and periodic training sessions are organized between end users. So, the trial aims to demonstrate the use of technology to support the procedures and assess the benefits that can be taken from the innovation developed within ISITEP framework, such as:

- Interconnection of TETRAPOL and TETRA networks through TETRA-TETRAPOL ISI over IP gateways
- TETRA-TETRAPOL voice migration through the Enhanced Terminal
- ISITEP Value added apps (Workflow, Enhanced Message Exchange, Semantic Syntactic Translator)
- ISITEP tools: Dimensioning Tool, Operation Cost Estimation Tool or Operations Training Tool

1.2. Document scope and purpose

D74.3 reports WP74 demonstrator implementation and first run test. It describes the implementation for ISITEP “Joint police surveillance patrol” scenario that took place at Leonardo premises in Genoa on the 20th of December.

1.3. Abbreviations

Acronym	Definition
AG	Access Gate
AI	Air Interface
CN	Control Node (TETRAPOL network)
CAN	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	LIst 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 (TETRAPOL 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 (TETRAPOL network)
SSW	Secondary Switch (TETRAPOL 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. 1ST RUN DEMONSTRATOR GENERAL CONTEXT

2.1. 7.4 Demonstrator general objectives

The 7.4 demonstrator is a laboratory demo performed at Leonardo premises with the main objective of validating technological capabilities of the ISITEP framework for improving TETRA-TETRAPOL interoperability.

With reference to the current cross-border cooperation scenario described in D7.4.1, the 7.4 demo proposes technological solutions part of the ISITEP framework that can improve Spanish Civil Guard & National Police, and the Portuguese Republican National Guard operational efficiency mainly in terms of ease of deployment and flexibility, improved quality of communications.

WP7.4 aims at demonstrating 4 technological ISITEP pillars:

- TETRA-TETRAPOL and TETRA ISI gateways from ISITEP WP4 (WP4.1 and WP4.3): This gateways suits perfectly in the envisaged scenario of cross border cooperation/ joint patrolling as they provide network side interconnection between TETRA and TETRAPOL network (currently limited to the group call service), fully digital, IP based and without geographical constraint.
- ISITEP Enhanced Terminal from WP5: This enhance terminal includes two modems: one TETRAPOL modem and one TETRA modem. These modems are controlled by a common control unit running on an android OS. The assembled device allows benefiting from the connection to the two networks on and value added apps (WF, EME, SST) that run on it to and make as “smooth” as possible the changeover from one radio modem to the other in border areas according to the available coverage and end-user preferences.
- The Interoperability enabling Tools (see SP6 Interoperability enabling Tools): Infrastructure Dimensioning Tool (IDT), Terminal Training Tool (TeTR), Operation Training Tool (OTT), Operation Cost Estimation Tool (OCET).

Main agencies involved in WP7.4 demonstrator are the Spanish Civil Guard & National Police, and the Portuguese Republican National Guard, who are members of ISITEP advisory board. The demonstrator has been defined closely with them.

2.2. Demonstrator1st run objectives

The demonstration 1st run has taken place at Leonardo laboratory in Genoa on the 20th of December. The main purpose of the 1st run was to test all the technical components of the 7.4 demo at the presence of a restricted audience composed only by the partners directly involved in the demo (LDO, EXP, RM3, NETFI, ADS FR) and ISCOM, review the results and define the agenda for the technical demonstrations for the 2nd run the following day at the presence of the end-users

3. 1ST RUN DEMONSTRATOR TECHNICAL SET-UP

This chapter presents technical design for WP74 demonstrator for the 1st run.

3.1. Interconnection of TETRAPOL and TETRA networks through TETRA-TETRAPOL ISI over IP gateways

The goal of this demo is to showcase interconnection of TETRAPOL and TETRA networks through TETRA-TETRAPOL and TETRA ISI over IP gateways developed as part of WP4.3 and WP4.1. To perform the test the remote connection between the TETRA network deployed at LDO premises in Genoa (Italy) and a TETRAPOL network deployed at ARIBUS FR premises in Elancourt – Paris (France) used as part of WP4.7 integration activities was reused

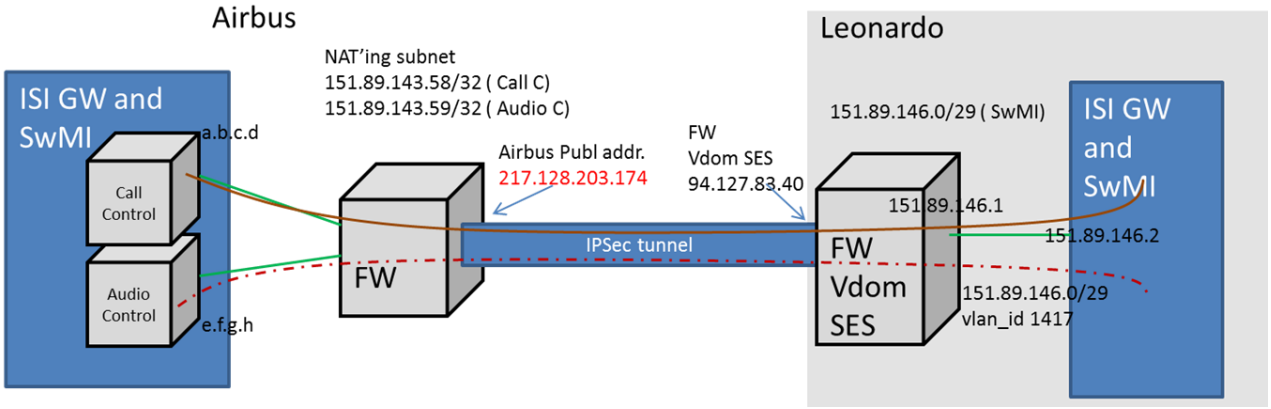

Figure 1 - TETRAPOL and TETRA network remote interconnection- details

The demo involved on the TETRA side

- a Control Room despatcher
- three TETRA mobile terminals
- a TETRA over IP ISI Gateway
- a TETRA SwiMi
- a TETRA BS

and on the TETRAPOL side

- a Control Room despatcher
- a number of mobile terminals
- a TETRA TETRAPOL Gateway
- a TETRAPOL SwiMi
- a TETRAPOL BS

3.2. TETRA-TETRAPOL voice migration through the enhanced terminal

The goal of this demo is to showcase migration across TETRAPOL and TETRA networks through the use of the enhanced terminal.

The demo had to involve:

- an Enhanced Terminal (vehicular deployment)
- a TETRA network composed of:
  - a TETRA SwiMi
  - a TETRA BS
  - a Control Room despatcher
  - a number (three) of TETRA mobile terminals
- a TETRAPOL terminal configured to operate in DMO (acting as TETRAPOL network)
- a TETRAPOL terminal acting as TETRAPOL Despatcher

Due to the impossibility of AIRBUS FR to deliver the TETRAPOL terminals in time for the 1st and 2nd run only the TETRA and Android part of the IET was set-up.

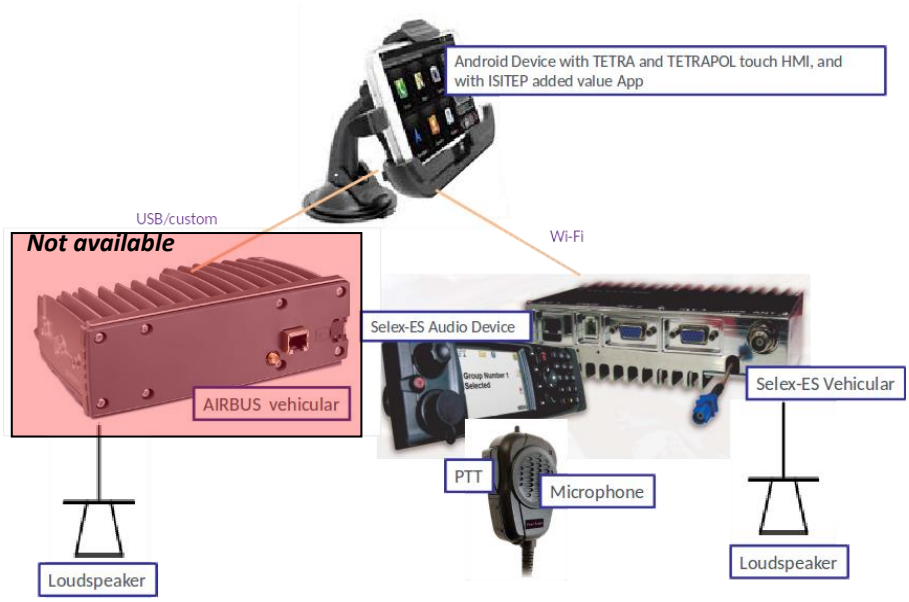

Figure 2 - Enhanced Terminal – vehicular deployment

3.3. ISITEP Value Added apps (workflow, enhanced message exchange, semantic syntactic translator

The goal of this demo is to showcase the value added apps (WF, EME, SST) that run on the Enhanced Terminal. The demo involved:

- an Enhanced Terminal (without TETRAPOL modem, see 3.2)
- a TETRA network composed of:
  - a TETRA SwiMi
  - a TETRA BS
  - a Control Room despatcher
  - one TETRA mobile terminals

- a PC deployed in the TETRA Control Room Hosting the WorkFlow Server and Control Room Operator HMI
- a PC deployed at NETFI premises hosting the EME and SST servers
- a tablet running the SST and EME clients

The WF demo was performed over the LDO lab network, while the EME and SST demos were performed over a Wi-FI network remotely connected to the NETFI site (were the SST server was deployed).

3.4. ISITEP Tools

The goal of this demo is to showcase the Interoperability enabling Tools: Infrastructure Dimensioning Tool (IDT), Terminal Training Tool (TeTR), Operation Training Tool (OTT), Operation Cost Estimation Tool (OCET).

The demo involved:

- a tablet with a web browser
- a PC deployed at NETFI premises hosting the ISITEP tools server

4. 1ST RUN DEMONSTRATOR TEST PROCEDURES

4.1 Test procedures for Interconnection of TETRAPOL and TETRA networks through TETRA-TETRAPOL ISI over IP gateways

The interface between the TETRA and TETRAPOL network is based on ISI over IP (D4.1.1) . The TETRAPOL network is the Push To Talk master:

- TETRA shall request for PTT in order to participate to the TETRAPOL group communication. PTT can be granted or not.
- When the TETRAPOL-TETRA GW receives audio, this is notified to TETRA which can accept or refuse to listen to it.

An ISI session matches the activation of the TETRAPOL group communication. When the group communication gets activated on TETRAPOL side, the gateway initiates an ISI session

The tests performed were the following:

1	**TETRA requests to initiate an ISI session in order to participate to a TETRAPOL TKG**
1.A	TETRAPOL accepts, an ISI session is established
1.B	TETRAPOL doesn't accept

2	**TETRAPOL activates the TKG, this initiates an ISI session**
2.A	TETRA accepts, an ISI session is established

Once the session is established:

2	**TETRA speaks to TETRAPOL**
2.A	TETRA push to talk, audio is transmitted to a TETRAPOL UE
2.B	TETRA release, transmission stops

3	**TETRAPOL speaks to TETRA**
3.A	TETRAPOL push to talk, audio is transmitted to a TETRA UE
3.B	TETRAPOL release, transmission stops

4	**TETRA leaves the group communication**

4.A	TETRAPOL accepts, the ISI session is ended

5	**TETRAPOL TKG is disactivated**
5.A	TETRAPOL closes the ISI session

4.1.1 Test results

The test were all passed successfully despite some instability of the sw (especially the TETRAPOL-TETRA gw).

4.2 Test procedures for Enhanced Terminal

Due to the impossibility of AIRBUS FR to deliver the TETRAPOL terminals in time for the 1st and 2nd run no test was performed on the Enhanced Terminal concerning the TETRA-TETRAPOL migration procedure. A decision was taken by Leonardo to showcase on the 2nd run the following day the videos taken from the 7.5 field demo in order to allow the end-users to express their feedback on the technology.

4.2.1 Test results

No test was performed due to the unavailability of ETERTAPOL terminals from Airbus FR.

4.3 Test procedures for ISITEP Value Added Apps

The test procedures for EME and SST are part of D58.1 (CP 4.5).

Test procedure for WF are part of D54.1

4.3.1 Test results

The test were all passed successfully

Some instability of the sw of the SST server (sometimes unresponsive) and client (crashes on the Android client).

4.4 Test procedures for ISITEP tools

The test procedures for the tools selected for this demonstration, Infrastructure Dimensioning Tool (IDT), Terminal Training Tool (TeTR), Operation Training Tool (OTT) and Operation Cost Estimation Tool. (OCET). were based on a subset of the procedures described in D61.4, D62.2, D62.3 and D63.2. Specifically the following tests have been applied in order to validate the tools correctness and functionality.

I. Functionality Testing

   a. Test of links:Outgoing links, internal links, anchor Links, mailto Links

b. Forms Test:Scripting checks on the form for missing values, default values checks, submission result tests

c. Cookies Test: Testing cookies (sessions) are deleted either when cache is cleared or when they reach their expiry, delete cookies (sessions)

II. Test HTML and CSS

III. Test business workflow

IV. Usability testing

a. Test the site Navigation, test the content

V. Interface Testing

a. Application: Test requests are sent correctly to the Database and output at the client side is displayed correctly.

b. Web Server: Test Web server is handling all application requests without errors.

c. Database Server: Test that queries sent to the database give expected results.

VI. Database Testing

a. Test if any errors are shown while executing queries, data Integrity is maintained while creating, updating or deleting data in database, test data retrieved from database

VII. Compatibility testing

a. Mobile Devices, desktop devices, modern Browsers (IE, Chrome, Firefox)

VIII. Security testing

a. Test that unauthorized access to secure pages is not be permitted.

4.4.1 Test results

Tools were successfully operated.

5. 1ST RUN DEMONSTRATOR FINAL RESULT

The demonstration 1st run has taken place at Leonardo laboratory in Genoa on the 20th of December. The main purpose of the 1st run was to test all the technical components of the 7.4 demo at the presence of a restricted audience composed only by the partners directly involved in the demo (LDO, EXP, RM3, NETFI, ADS FR) and ISCOM, review the results and define the agenda for the technical demonstrations for the 2nd run the following day at the presence of the end-users.

Despite the impossibility to demonstrate the TETRA-TETRAPOL voice migration with the Enhanced Terminal, due to the unavailability of TETRAPOL terminals, the decision was taken to keep the original agenda of demonstration unchanged based on the positive test results on the other technical components (Interconnection of TETRAPOL and TETRA networks through TETRA-TETRAPOL ISI over IP gateways, ISITEP Value Added apps and ISITEP tools), and resorting on the videos available from the 7.5 demo were the TETRAPOL-TETRA migration had been successfully tested.