

ISITEP

D7.4.4 - DEMONSTRATOR TEST RESULTS FINAL

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Publishable extended abstract

This deliverable presents ISITEP WP7.4 “Joint police surveillance patrol” Demonstrator test final results. It describes the implementation for ISITEP “Joint police surveillance patrol” scenario that took place at Leonardo premises in Genoa on the 21th of December at the presence of the ends-users from Spain and Portugal.

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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

D74.4 reports WP74 demonstrator test results final. It describes the implementation for ISITEP “Joint police surveillance patrol” scenario that took place at Leonardo premises in Genoa on the 21th of December at the presence of the ends-users from Spain and Portugal.

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	TaK Group
TDM	Time Division Multiplexing
TMP	Technical Management Position
TPA	Talking Party Address
TPOL	TETRAPOL
TPS	Terminal Programming Station
TRS	Technical Requirements Specification

2. FINAL RUN DEMONSTRATOR GENERAL CONTEXT

2.1. 7.4 Demonstrator general objectives

The demonstration final run has taken place at Leonardo laboratory in Genoa on the 21th of December at the presence of end users from Spain and Portugal 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 proposed 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 final demo consisted of 4 technological components:

- 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).

3. FINAL RUN DEMONSTRATOR TECHNICAL SET-UP

This chapter presents technical design for WP74 demonstrator for the final 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

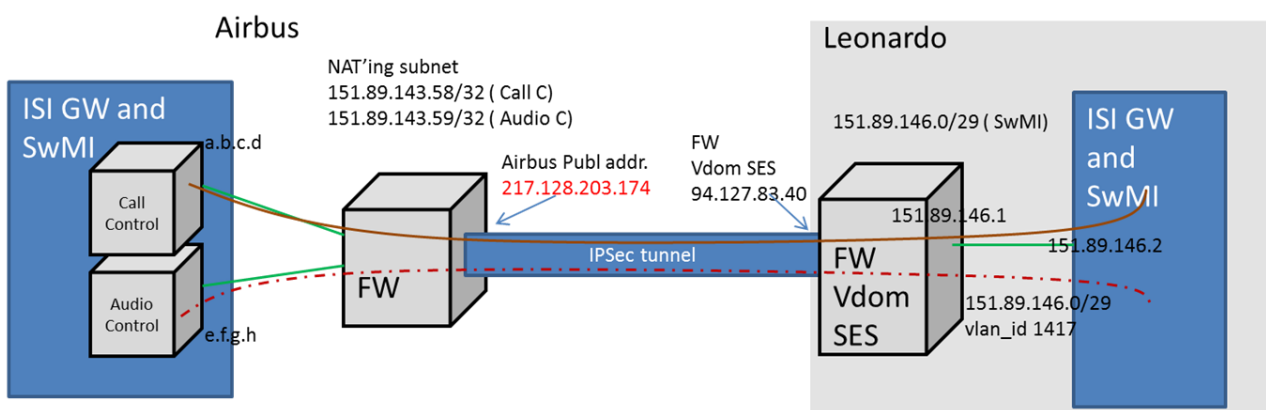


Figure 1 - TETRAPOL and TETRA network remote interconnection- details

The demo involved on the TETRA side

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

and on the TETRAPOL side

- a Control Room dispatcher
- 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.

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 assembled to support the demonstration of the ISITEP value added apps. The voice migration demo was replaced by the presentation of the videos taken from the 7.5 demo where the feature had been successfully tested in the field

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 (where the SST server was deployed). In order to avoid problems on the SST Android client a PC with a browser was used instead.

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. FINAL 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

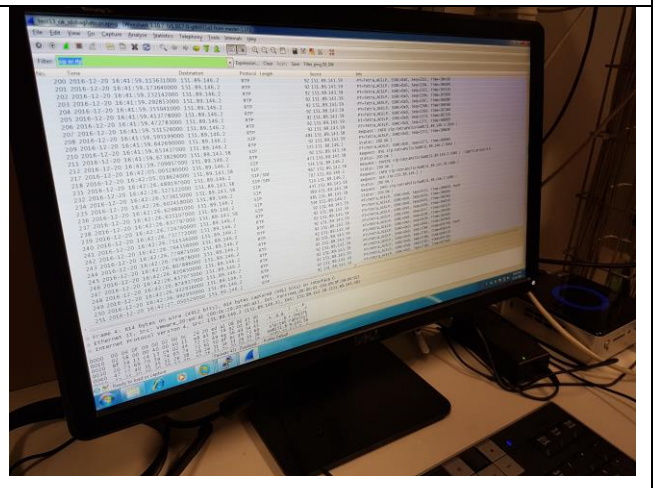
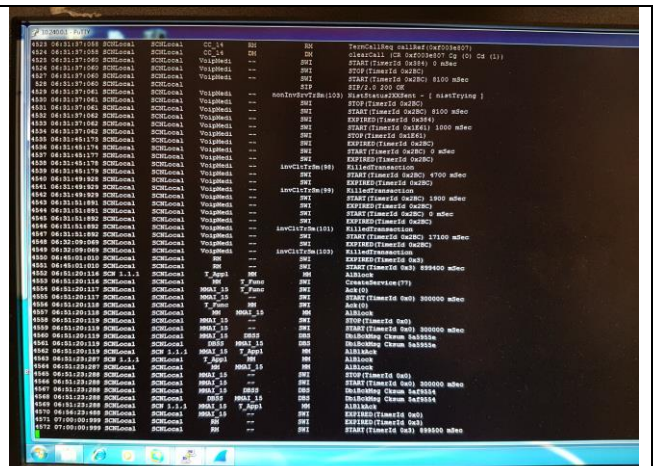
3	TETRAPOL speaks to TETRA
3.A	TETRAPOL push to talk, audio is transmitted to a TETRA UE
3.B	TETRAPOL release, transmission stops

4	TETRA leaves the group communication
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4.A	TETRAPOL accepts, the ISI session is ended
5	TETRAPOL TKG is deactivated
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).

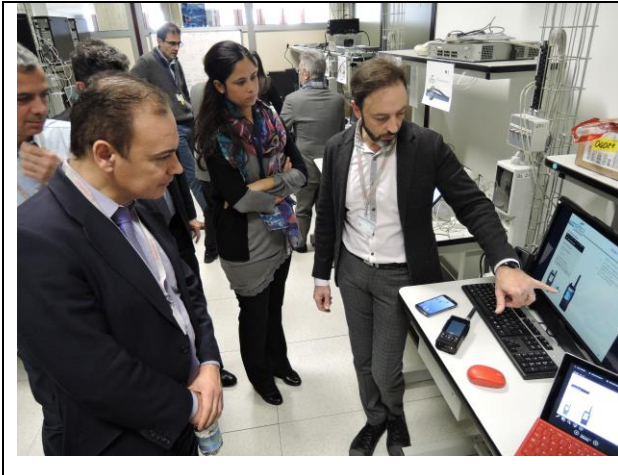


4.2 Test procedures for Enhanced Terminal

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.

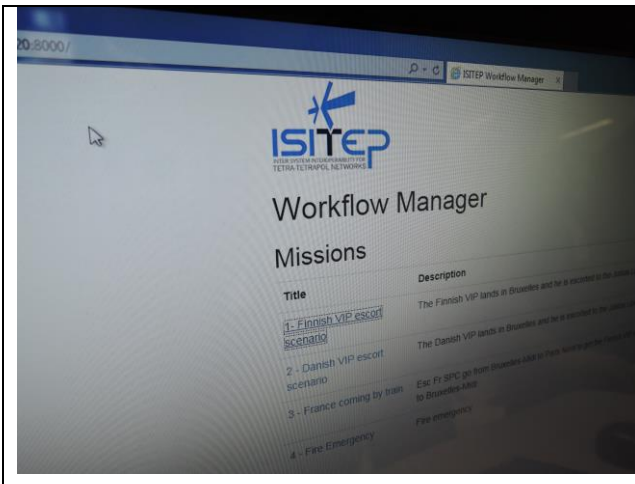


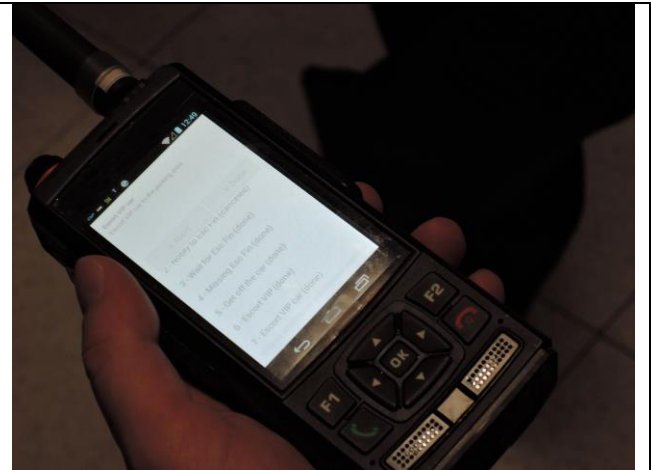
4.3 Test procedures for ISITEP Value Added Apps

The test procedures for EME and SST are part of D58.1 (CP 4.5).
 Test procedure for WF are described in D54.1.

4.3.1 Test results

The test were all passed successfully





4.4 Test procedures for ISITEP tools

The tools selected for this demonstration are the Infrastructure Dimensioning Tool (IDT), the Terminal Training Tool (TeTR), the Operation Training Tool (OTT) and the Operation Cost Estimation Tool. (OCET).

All the tools were demonstrated with reference to a Portugal-Spain cross border use case. The test performed were mainly functional and interface testing.

- 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 business workflow
- III. 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.

IV. 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

4.4.1 Test results

Tools were successfully operated.

5. 7.4 DEMONSTRATOR FINAL RESULTS

The demonstration final run has taken place at Leonardo laboratory in Genoa on the 21th of December at the presence of end users from Spain and Portugal with the main objective of validating technological capabilities of the ISITEP framework for improving TETRA-TETRAPOL interoperability.

Despite the impossibility to practically demonstrate the TETRA-TETRAPOL voice migration with the Enhanced Terminal, due to the unavailability of TETRAPOL terminals from Airbus Fr, the demo successfully presented a complete overview of solutions to enhance TETRA-TETRAPOL interoperability, tools and applications to support field joint cross-border operations, based on the ISITEP framework.

End-users didn't have the chance to take part in an operational demo but had the possibility to touch and test the technology in a laboratory set-up. The discussion was favored in order to better understand the value of the proposed technology for the operative contexts. In order to collect and formalize their feedbacks the end users were requested to fill in an evaluation questionnaire whose results are presented in D7.4.5. In general the feedback was very positive on all the technological components successfully demonstrated.