

ISITEP

D7.4.1 - DEMONSTRATOR PLAN AND REQUIREMENTS

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Publishable extended abstract

This deliverable presents ISITEP WP74.1 "Joint police surveillance patrol" demonstrator plan and requirements. It is established after discussions with end users from advisory board involved in this demonstrator and will be basis for D74.2 Demonstrator activities design.

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1. INTRODUCTION

Originally, ISITEP WP74 “Joint police surveillance patrol” was a demonstration work-package, focused on an operational trial where interoperability between TETRA and TETRAPOL shall have been demonstrated.

The partners originally involved in this work-package (AMP, MOT, BFP, NETFI and LDO) expressed their willingness to use the TETRA ISI over IP to TETRAPOL gateway developed in WP43. However, for such operational context a gateway would have required a level of stability, flexibility, configuration and management that a proof of concept prototype, like the one developed by AIRBUS FR in WP43, cannot deliver.

AMP, former WP7.4 leader, given the impossibility to perform the demo as originally intended, decided to resign leaving the Project Consortium the responsibility to identify a new WP leader and suggesting AIRBUS FR as being the solely manufacturer of TETRAPOL and in the best technical position to propose a solution for TETRA-TETRAPOL interconnection. Despite the request made to AIRBUS FR to take the lead, it didn't accepted as not formally involved in the WP (According to the DOW).

Acknowledging the importance of completing all the contractual activities and given the interest expressed by the AB members via its representative in the consortium, Etienne Lezaack, in the PMT of August 2016, LDO decided to take the lead in the activity, supported by EXP, NETTECHN, RM3 and AIRBUS FR, and proposed a WP7.4 rehearsal with a the following objectives:

- 1) to comply with the technical objectives of WP7.4 to show different technical options for interoperability of TETRA and TETRAPOL based on technology developed as part of ISITEP framework
- 2) to give a perspective to the interested end-users on how the proposed technology, demonstrated in laboratory, could improve operational efficiency when used in the field

As discussed with the EU officer and project reviewers, a prerequisite for the demo was the interest by the end users, mainly Spanish GC (Civil Guard), Portuguese GNR (Republican National Guard), and their availability for attending the demo and support its assessment. To this aim the WP technical demo has been carefully prepared in close cooperation with them through a number of preparatory audioconferences.

1.1. Document scope and purpose

D74.1 established WP74 “Joint police surveillance patrol” demonstrator plan and requirements. It is the basis for D74.2 Demonstrator design.

1.2. 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. DEMONSTRATOR PLAN

2.1. Demonstrator general objectives

The interoperability among different police entities is vital in crisis situations. The cooperation between National Police and Civil Guard with Madrid police, Vasque Country regional police, Catalanian regional police, almost all mayor councils (like Barcelona, Valencia, Bilbao, etc.) or other countries like France and Portugal is of extreme interest in public safety cooperation.

The WP 7.4 aims to demonstrate potential technological and technical improvements to Portugal-Spain police cross border cooperation scenario using the ISITEP framework and assessing the associated benefits on joint operations efficiency.



Figure 1 - Portugal-Spain reference scenario

2.1.1. Spain and Portugal cross-border cooperation - Current State of Play

Following the signature of the agreement between the Kingdom of Spain and the Portuguese Republic on border cooperation on police and customs matters, made in Évora in 2005, direct cooperation between the law enforcement units of the two countries has been established through the implementation of 8 Police and Customs Cooperation Centers (PCCC) located along the border sides. Each PCCC develops the following activities:

- Collection and exchange of relevant information
- Prevention and suppression of the criminal activities in border areas, in particular, those related to illegal immigration, human trafficking, drugs and weapons;

- Support for surveillance and persecution
- Coordination of joint measures patrolling the border area.

The officers attached to the PCCC work together, subjected to the own applicable law. Each operating unit located in one side of the border area corresponds to one or more operating units of the other side, maintaining regular contact in the following forms:

- Exchange of agents and officers
- Development of land, sea or air mixed patrols
- Establishment of operations of mobile controls;
- Joint research

The competent authorities may agree to conduct joint patrols and mobile controls consisting of agents and officials of both parties. The joint patrols and mobile controls are made in areas of fifty kilometers from the border, by land, sea or air, according to the operational needs of the moment.

The Portuguese and Spanish law enforcement agencies also grant each other communications means.



Figure 2 - Police and Customs Cooperation Centers

Current integration among the two networks SP SIRDEE (TETRAPOL) and PT SISREP (TETRA) is based on use of B2B TETRA-TETRAPOL radio gateways deployed in areas of overlapping coverage that allows patching of GNR and Guardia Civil radio groups.

2.2. Specific WP objectives

7.4 work-package focuses on demonstrating innovative technical solutions to connect TETRAPOL and TETRA networks 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

2.3. Agencies involved

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. It means that the demonstrator is defined closely with these two end users and that they are involved in each step in order to orient the development of the demonstrator to solutions they can benefit from as a priority.

2.4. Approach

The 7.4 Demo is a Lab demo 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 2.1.1, 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.

2.5. Technologies involved

The demonstrator plans to demonstrate as prior focus interoperability between agencies working on different TETRA and TETRAPOL networks

2.6. Number of networks interconnected

The demo will show the interconnection of 2 networks in order to support interoperability between agencies: 1 TETRAPOL networks and 1 TETRA network.

2.7. ISITEP Framework validation

WP7.4 demonstrator is focused on TETRA-TETRAPOL IOP use case. So, WP7.4 demonstrator plans to demonstrate the following components of the ISITEP framework

- the TETRA-TETRAPOL gateway (see WP43: TETRAPOL - TETRAPOL gateway development and integration),
- the TETRA ISI gateway (see WP 4.1 ISI over IP: specifications and gateway design and implementation).
- The ISITEP Enhanced Terminal (see SP5 Enhanced Terminal) This enhanced 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 and value added apps (WF, EME, SST) that run on it
- 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).

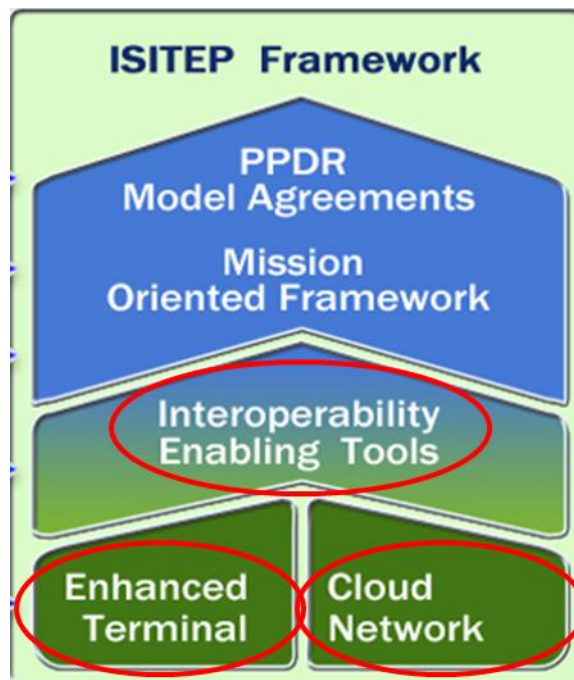


Figure 3 - ISITEP Framework WP7.4 validated components

2.8 Test strategy

The test strategy for WP 7.4 has four stages:

1. Supplier testing of all Test Network components (ISI gateways from WP4.1 and WP4.3) and Enhanced Terminal (SP5). Supplier testing of ISI gateways is described in D 4.7.1 Gateways integration and testing plan. The implementation and testing of the Enhanced Terminal and Apps is described in D5.7.1. The implementation and testing of the ISITEP tools is described in WP6.1, WP6.2, WP6.3.
2. Design and set-up of the test bench.

3. Test first run and Go/no Go decision on readiness for Final Exercise/Demo.
4. Test final run and End Users assessment

2.9. Relationship with other work packages and inputs

The main baseline for WP74 demonstrator is the end-user requirement specifications from WP2 and more specifically D23.1 “End-user requirements document draft” and D23.2 “End-user requirements document candidate release” that are already published and then draft versions of D23.3 “End-user requirements document final release” that will be published by the end of the project on M30.

Moreover, the industrial partner, LDO, as leader of this demonstration case had close interaction and collaborative work with the end users from ISITEP advisory board especially interested in the results and achievements within this work package: Spanish Civil Guard & National Police, Portuguese Republican National Guard. A number of audioconferences have been arranged in order to ensure to take into account all their requirements, answer concretely and at short term view to the needs they have expressed and define strategic directions for TETRA-TETRAPOL interoperability at mid-term on currently deployed networks.

2.9. Comparison to other ISITEP scenarios

WP7.4 describes a typical cross border routine operations use case. Thus this demonstration intends to show all the technical means developed within the ISITEP framework to make TETRA-TETRAPOL interoperability more effective and efficient on daily cross border operations. Specifically, compared to the other WPs, it is the only demonstration where the TETRA-TETRAPOL ISI over IP gateway (WP4.3) is showcased providing interoperability at network/infrastructure level and thus the possibility to dynamically patch TETRA and TETRAPOL groups without geographical restrictions.

The Enhanced terminal and Apps already presented in demo 7.2 and 7.5, providing interoperability at terminal level as the possibility to “seamlessly” migrate, is showcased here with the intention to give a complete picture of TETRA-TETRAPOL interoperability means relevant for the joint patrolling scenario.

The Interoperability enabling Tools (Infrastructure Dimensioning Tool (IDT), Terminal Training Tool (TeTR), Operation Training Tool (OTT), Operation Cost Estimation Tool (OCET)) already presented in demo 7.2 and 7.3 are showcased here with the intention to show their application to the joint Spain-Portugal corss-border cooperation context.

2.10. Key performance indicators and target performance

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

Interconnection of TETRAPOL and TETRA networks through TETRA-TETRAPOL and TETRA ISI over IP gateways is a totally new subject dealt with within ISITEP. It is a strong requirement from

the end users of the two networks SP SIRDEE (TETRAPOL) and PT SISREP (TETRA) faced with the necessity to conduct joint patrols and mobile controls consisting of agents and officials of both parties. The joint patrols and mobile controls are made in areas of fifty kilometers from the border, by land, sea or air, according to the operational needs of the moment. Current integration among the two networks is based on use of B2B TETRA-TETRAPOL radio gateways deployed in areas of overlapping coverage that allows patching of GNR and Guardia Civil radio groups.

Target performance TETRA-TETRAPOL interconnection using ISI over IP: to propose within the ISITEP framework concrete, affordable and medium term solution allowing cross the border integration of TETRA-TETRAPOL networks, fully digital, based on IP transport, at infrastructure level and without geographical constraint.

Associated key performance indicators: price of the solution, configuration flexibility, operational performances (audio quality, end to end delay) number of key benefits for end users on the developed gateway compared to currently deployed gateways, number of audio frames lost during a PTT activation between the two networks, reliability of the ISI/gateway.

2.10.2 TETRA-TETRAPOL voice migration through the Enhanced Terminal

Regarding the TETRA-TETRAPOL interoperability, there is de-facto no migration possibility among the two standards having two different radio interfaces. Migration is thus “simulated” through the use of terminals composed of two modems properly configured. In order to allow migration a group patch among the two networks (TETRA and TETRAPOL) at Control Room level must be present and group configuration on the modems properly aligned to that of the network. The innovative objective of ISITEP centers on the development of the Enhanced Terminal, consisting of two modems (one TETRA and one TETRAPOL) driven by a common control unit running on an android device able to activate and de activate the radio modems thus simulating the migration across TETRA and TETRAPOL networks

Target performance for enhanced terminal is to facilitate and make as “smooth” as possible the changeover from one radio modem to the other according to the available coverage and end-user preferences.

Associated key performance indicators: prize of the terminal.

- The possibility for the terminal user to choose between a manual migration and an automatic migration, via an easy to change terminal setting.
- A straightforward and easy to use unique control panel displaying the active group, the active network and the selected folder; and supplying the following commands: on/off, PTT, volume, manual/automatic migration, group selection, emergency button.
- Menus should notably enable to access to a more “technical” display (signal strength received at both modem levels...) and to the SDS management.

2.10.3 ISITEP Value added apps (Workflow, Enhanced Message Exchange, Semantic Syntactic Translator)

Target performance for Workflow is to provide a system to support the field officers during operations leveraging on “on terminal display” workflow representation.

Associated key performance indicators: perceived benefits from end users in managing field operations, perceived benefits from the Control Room operators in managing field operations and improved situation awareness; capability to plan deploy and control a mission

Target performance for Enhanced Message Exchange and Semantic Syntactic Translator is to provide real time automatic secure (authenticated and encrypted) translation of messages and commands exchanged via SDS among the field officers and the Control Room operators in joint operations

Associated key performance indicators: speed of translation, correctness of translation, ease of use.

2.10.4 ISITEP tools

Target performance for Infrastructure Dimensioning Tool (IDT) is to provide a system to support the deployment of the ISI developed solution by assisting the stakeholders' decision makers through provision of the network elements required for the realization of the anticipated interoperability functionalities. The tool receives input related to the "disaster" area (the area where common transnational operations are taking place), such as the number and the type of first responder forces that are expected to operate in the area, information related to the existing infrastructures (e.g. Base Stations, Switching nodes, etc.), information related to end-user traffic load, available traffic resources. The output of the tool is an estimate of all network elements required to fulfill the communication needs within each operational scenario, providing also valuable information related to number of ISI connections, access points, gateways and VPN connections required.

Associated key performance indicators: perceived benefits from end users in defining the network elements needed to implement cross border TETRA-TETRAPOL interoperability

Target performance for Terminal Training Tool (TeTR) is to provide a system to support the training of field officers in the use of TETRA/TETRAPOL terminals, that are different (different manufacturer, model) from those used in their own organization and with specific reference to WP7.4 scenario to the use of the Enhanced Terminal. This will help the end users participating in cross border operations to get familiar with the Enhanced Terminal and provide a solid preparation in an easy and cost effective way.

Associated key performance indicators: ease of use of the tool, number of terminal features simulated, correct simulation of the interaction with the terminal, in line help support availability for each feature

Target performance for Operation Training Tool (OTT) is to provide a system to collect and provide the necessary information related to the organizational and operational methods that different PPDR first responder agencies, from different European countries, employ. This will help the harmonization of actions of the different PPDR first responder agencies (i.e. from Spain and Portugal) and facilitate cross border joint operations.

Associated key performance indicators: ease of use of the tool, perceived benefits from end users in managing joint operations, number of procedures collected, ease of distribution of policies among involved actors.

Target performance for Operation Cost Estimation Tool (OCET) is to provide system to support the stakeholders' decision makers in estimating the cost for the realization of the interoperability functionalities. The tool receives input from the Infrastructure Dimensioning Tool (IDT) and taking into account the number and the type of first responder forces that are expected to operate in the area provides an estimate of costs associated to implementing the joint operations.

Associated key performance indicators: perceived benefits from end users in estimating the costs to implement cross border TETRA-TETRAPOL interoperability