

ISITEP

D2.3.1 - END-USER REQUIREMENTS DOCUMENT DRAFT

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Publishable extended abstract

D2.3.1 “End-user requirements draft” is the first version of the base document expressing the end-user requirements concerning both technical and operational aspects related to the introduction of the “roaming” functionality for PPDR radio networks.

The document takes over the operational conclusions of the Three-Country Pilot testing of 2003 and assumes that the functionalities “ISI-phase 3” will be available by the end of the ISITEP project, as well for the TETRA as for the TETRAPOL technology.

This background, combined with more recent experiences and practices related to interim solutions enabling minimal radio interconnection over the borders, leads to a first international “fleet map” proposal.

This document has to be considered as a rough outline: neither the first results coming from the on going ISI implementation between Norway and Sweden, nor the TETRAPOL specificity have been taken into account so far.

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1 INTRODUCTION

1.1 ISITEP at a glance

ISITEP (Inter System Interoperability for TETRA-TETRAPOL Networks) project will achieve operational interoperability among European first responders addressing the regulative, organizational, operational and technical level.

The project will define public specifications of technical and procedural innovations, as well as novel processes for safety applications.

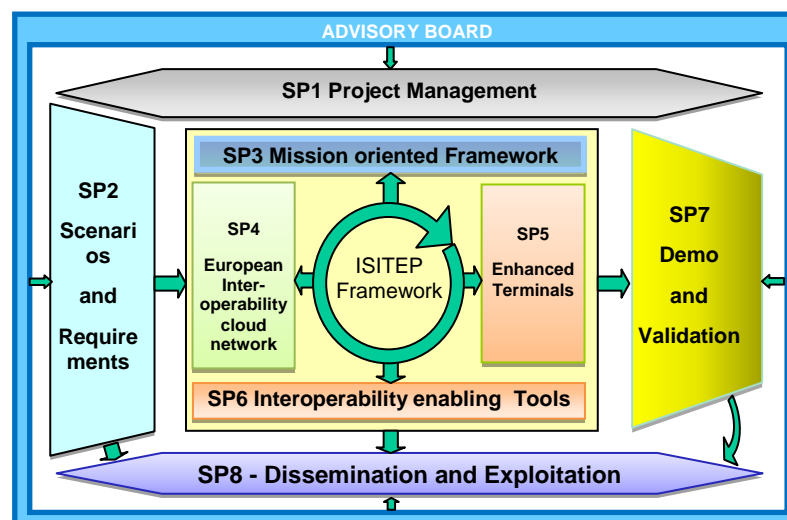


Figure 1 ISITEP framework

The general objective is obtained jointly addressing four components that are coherently defined, developed and integrated through a novel Framework which is constituted by:

1. A Mission-oriented Framework containing a standardized model of operational procedures and associated functional radio model (SP3).
2. A European Inter System Interface (ISI) cloud network integrating the PPDR national infrastructures to allow roaming capability services within a secure framework (SP4).
3. Enhanced User Terminals: integrating TETRA/TETRAPOL technology into a novel terminal architecture based on programmable devices (Tablet, Smartphones) (SP5).
4. Interoperability enabling tools including tools for infrastructures dimensioning, training, business model assessment and services for safety operations (SP6).

1.2 Work Package 2.3 in the sequential ISITEP work structure

In terms of the overall working structure of ISITEP, SP2 is responsible for the “topdown” approach and develops the scenarios (WP 2.1), the requirements (WP 2.2 Security and WP 2.3 End-user specifications) and the overall architecture (WP 2.4). SP2 is the central conceptual integration activity in the project. The subprojects SP3-6 are responsible for the detailed design and implementation of the ISITEP components that will be integrated and demonstrated in SP7.

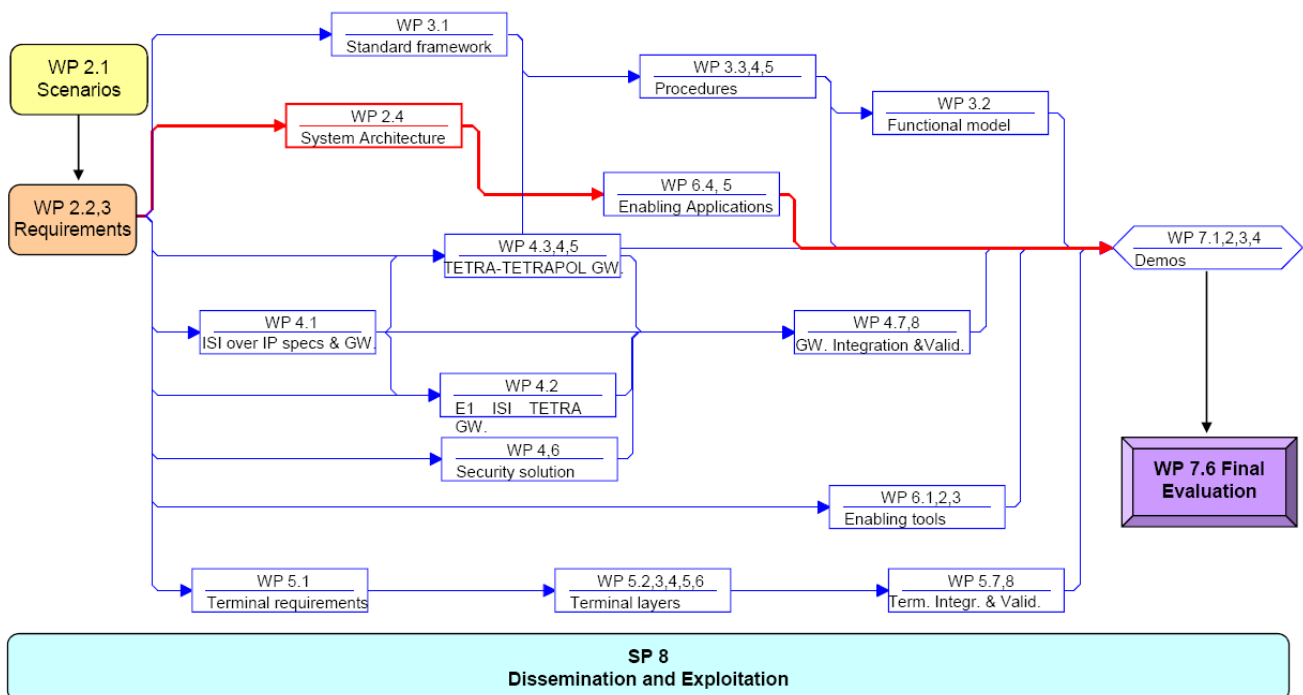


Figure 2 ISITEP Main components interdependencies

The end-user requirements specification (WP 2.3), in reality a trade-off between the end-user wishes and a feasible technical implementation, are the necessary conditions to establish a solid base on which the organizational interoperability stack (SP3) and the enhanced terminal (SP5) will be further developed.

End user Requirements will also influence the technical architecture (SP4) and the interoperability enabling tools (SP6).

1.3 Work Package 2.3 objectives

The legal framework, the related missions involving information fluxes and their execution efficiency come under the scope of the end-user functional needs and requirements:

1. Some modifications or simplification improvements of current regulatory and legal framework will be proposed.

This point will be addressed in the D23.3 document as a result of a survey among the EU member states.

2. The needed information fluxes in case of international move or (joined) operation will be established, based on the end-user missions and the related professional processes.

Therefore:

- the several PPDR entities on the field and their supporting entities (control rooms...) will be defined (point 2),
- the past European PPDR cooperation and pilot trials events will be analysed from the information fluxes point of view: Three country pilot (2003, Be-De-NI), Cross Border Communication trial (2010, De-Se)... (point 3).

3. In order to sustain, with international radio communications, these information fluxes in a real operative way for the first responders, key- technical-operational requirements will be specified.

Therefore, will be defined:

- the needed set of radio groups ("fleet map") and fleet integration mechanisms to ensure the needed information fluxes during international missions will be defined (points 4 and 7),
- the needed supplementary services for the international individual, group and broadcast radio calls (voice and short data) (points 5 and 6),
- the services increasing the terminals efficiency in an international context: TETRA-TETRAPOL roaming manager and the data tools tending to overcome the language barrier (point 8),
- the Man Machine Interface (MMI) principles for the international groups and users management by the control room operators (point 9),
- the manipulations requested to the user in order to operate his terminal during international missions (point 10).

The above requests will be determined for the TETRA-TETRA, TETRAPOL-TETRAPOL and TETRA-TETRAPOL interfaces as well as for a combining of these interfaces in order to obtain an effective Inter System Interface global solution.

1.4 Work Package 2.3 timing

The requirement phase is started in parallel for SP2-6. This document D23.1 is a first input from WP 2.3 to SP3-6, encompassing a preliminary list of general system requirements. WP 2.3 will afterwards collect the detailed requirements from SP3-6 to verify consistency between systems and subsystem requirements.

WP2.3 will then generate candidate requirement documents D23.2, from M6, and each SP will be in charge of verifying its own requirements (or selecting the ones to be verified) and tracing the verification at the end of the project.

The end-user requirements will then be included in the final release document D23.3 at M30.

2 DEFINITION OF THE SEVERAL PPDR ENTITIES

2.1 The first responders.

1. Intervention teams on the field.

Officers on the field have first to care about their professional core missions and tasks (security, rescue, fight against crime...). They have to spend a minimum of time and capacity with radio transmission.

Therefore, the radio procedures they apply must be kept as simple as possible. In particular:

- a. Terminal manipulations (like talk group selection) shall be strictly limited.
- b. The intelligence of the radio communication functional model will be limited to, basically, the ability of selecting the talk group that is requested by the dispatcher and/or the operations leaders.

2. Their leader(s) on the field (integrated in intervention teams or in mobile command rooms) or in control rooms.

The leader must firstly have the intelligence of the mission and the way to perform it. In particular, besides the basic officer radio communication knowledge, they need to master the radio scheme of their mission, i.e. who has to speak with whom, and, in application of the Functional Radio Model (FRM), on which talk groups.

A deeper knowledge of the FRM (e.g. which talk groups are to be used in all the possible situations) is an affair of radio communication specialists.

3. Their dispatcher(s) or operator(s) in the control rooms.

The dispatchers are supporting the intervention teams on the field and their leaders:

- a. In the execution of their professional core missions and tasks.
Depending on the governance model, dispatchers will only assist and coordinate the teams on behalf of an end chief, or will also have the lead on them.

Therefore:

An information flux is needed between the teams on the field and their dispatcher(s).

Mostly, both voice and positioning are required.

In case of autonomous teams, positioning remains necessary, so that dispatchers keep control (emergency calls management included) on all teams operating on the territory they are in charge.

- b. By managing their radio communications.

Therefore:

- i. They must have a solid understanding of the Functional Radio Model (FRM) and the related operational radio procedures to face an evolving or an unexpected situation.
- ii. They have some extra features at their disposal to regulate, in real time, the radio communications: combining (patching) of groups, remotely programming extra groups on terminals (DGNA) and remotely selecting groups on terminals.

2.2 The back-office support teams

The back-office support teams are the manufacturers, the network operators, the end-user radio communication services...

They are responsible for:

1. The technical-operational conception, design and implementation of the radio communication system.
2. The data bases pre-provisioning, the technical–operational parameters adjustments and the technical maintenance.

Note:

Some PPDR organisations could delegate data base provisioning or technical-operational parameters programming to dispatchers in order that they e.g. can regulate the traffic, in real time, in case of network congestion. This approach is however a risk, if not perfectly controlled.

3. The FRM development and the related operational radio procedures.

3 DEFINITION OF THE GENERAL NEEDED OPERATIONAL INFORMATION FLUXES

3.1 Operational voice fluxes

3.1.1 Group calls

A standardised way of thinking in communication procedures in case of cross-border activities has been developed during the Three-Country Pilot testing (see Final report Three-Country Pilot ‘first phase’ November 2003).

The operational standard was made to manage cross-border communication and does not influence the national procedures.

This point is important because it allows the coexistence of one international European standard next to a large diversity of national standards, each of them having the possibility to evolve independently.

The scheme below illustrates this way of thinking in the communication procedures.

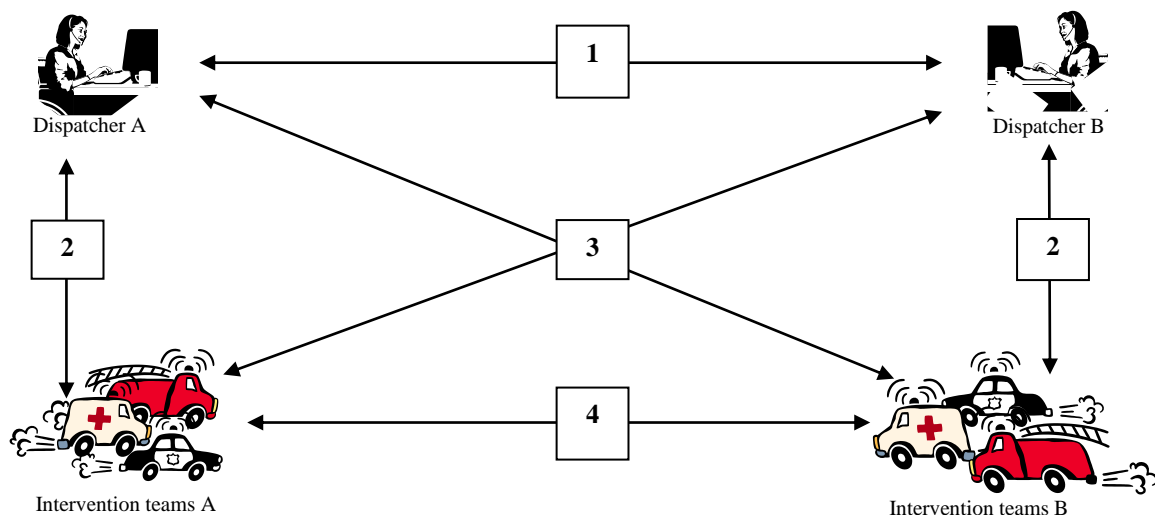


Figure 3 Three-Country Pilot operational communication standard

Explanation:

1. At first there is a contact between dispatch rooms from the different involved countries in case of cross-border activities.
2. In basic the coordination of the intervention teams will occur from out their own dispatch rooms in each country. The dispatch rooms their selves keep frequently contact with each other (1) to keep informed about the incident.
3. If necessary the dispatch room which is in charge of the incident (defined by the legal territory where the incident takes place), can connect foreign intervention teams directly under their command.
4. If necessary cooperating intervention teams from different countries can connect together for communication in field operations.

Note:

To have an effective base for operating in such a communication scheme, a well-considered international fleet map is needed.

3.1.2 Broadcast calls

Operational leaders and/or dispatchers need launching broadcast calls in order to warn operational people, staying in a specific geographic area on the field, about an immediate danger, or to notify it about essential and urgent information.

In a cross-border context, it means that local dispatcher should be able to reach, on territories where he is competent, both local and visiting teams.

3.1.3 Individual calls

Group calls are the common way to communicate between teams on the field and dispatchers. However, point to point communication fluxes are sometimes needed, e.g. between a first responder having sent an emergency call and his dispatcher or between a first responder and an authority that is only reachable via telephony.

3.2 Operational short data fluxes

3.2.1 Context

Exchanging status messages between first responders (intervention teams, their leaders and their dispatchers) and/or radio systems implies that all the concerned terminals and/or systems are compatible or made compatible with the status signification and/or impact.

Note:

Status messages exchange with radio system(s) can be technically used to implement some services and supplementary services like emergency calls.

Exchanging data related to applications between first responders implies that all the concerned user terminals are compatible or made compatible with the concerned application.

In a cross-border context, where there is likely no compatibility between the different national radio systems and mobile applications, the first thing to ensure, if operationally needed, is to guarantee the link between terminals abroad and their home network (e.g. possibility for terminals abroad to keep sending their status to their home dispatcher).

This minimal requirement is however not sufficient as regards the automatic terminal location. In this case indeed, the dispatchers of the visited network need to receive the visitors' positions too.

3.2.2 Group calls (point to multi-point)

Purposes of the short data (SDS) group calls:

1. Exchanging text messages.
2. Exchanging status messages (sending pre-programmed status from a terminal to a talk group or to the dispatcher(s) of the selected talk group).
3. Exchanging short data messages related to mobile applications.
 - a. Radio Positions.

- b. Pictures.
- c. Terminals remote control from dispatching via AT commands over SDS (selecting a group remotely...).
- d. ...

3.2.3 Broadcast calls

Operational leaders and/or dispatchers need launching broadcast text messages or pictures in order to warn operational people staying in a specific geographic area on the field, about an immediate danger, or to notify it about essential and urgent information.

In a cross-border context, it means that local dispatcher should be able to reach, on territories where he is competent, both local and visiting teams.

3.2.4 Individual calls (point to point)

Purposes of the SDS individual calls:

1. Exchanging text messages.
2. Exchanging status messages (sending pre-programmed status from a terminal to another terminal, like a call-back request...).
3. Exchanging short data messages related to mobile applications between first responders:
 - a. Radio positions.
 - b. Pictures.
 - c. Terminal remote control from dispatching via AT commands over SDS (selecting a group remotely, polling user's position...).
 - d. Data Base requests from a terminal on the field.
 - e. ...

4 TRANSLATION OF THE INFORMATION FLUXES INTO COMMUNICATION GROUPS

The translation of the standard scheme into talk groups looks as follows (see Final report Three-Country Pilot ‘first phase’ November 2003):

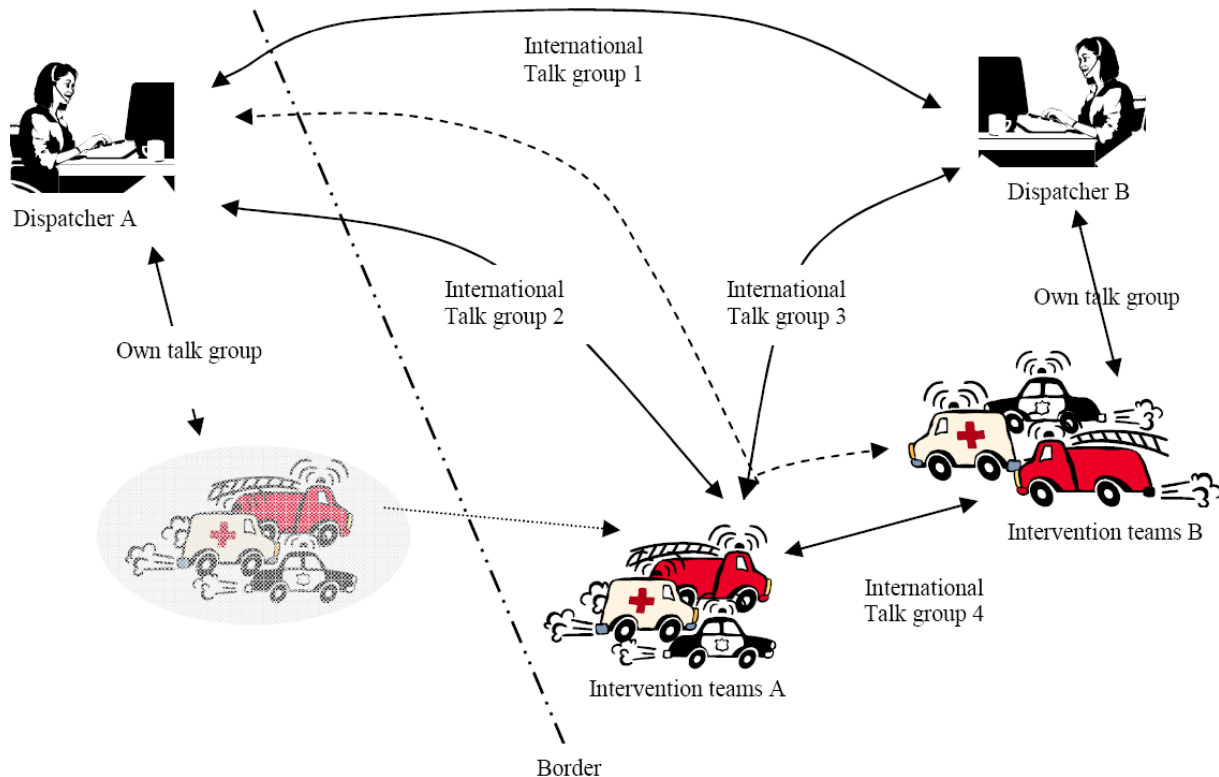


Figure 4 Three-Country Pilot translation of standard scheme in talk groups

4.1 Dispatching level

4.1.1 Coordination network

Each control room along a “common segment of border” has to appoint a dispatcher to, among other things, continuously audio monitor an international talk group 1 (see figure above).

This makes possible a direct and immediate response (information exchange and/or forces involvement) from the concerned control rooms.

4.2 Field level

4.2.1 Home network

Intervention teams going over the border (visiting teams A) need mostly to keep contact with their dispatcher (“home network”).

They are two cases, following the nature of the operational mission:

1. The teams keep using their own national talk group.
2. The teams select a specific international talk group 2.

4.2.2 External network

They also need to enter in contact with a dispatcher and/or other intervention teams abroad ("external network").

Therefore, the visiting team has to select an international talk group 3.

Notes:

1. If operationally needed, an international talk group will be dedicated for the communications with the visited dispatcher B (international talk group 3) and another one to communicate with the visited teams B (international talk group 4).
2. If visiting teams A are coming to reinforce an existing structure of deployed (or in deployment phase) forces abroad, they have to integrate national talk groups of the visited country B. In such a case, the international talk group 3 has to be combined (synonyms: patched, merged), by the dispatcher of the visited country, with the appropriate national talk group (integration mechanism).

4.2.3 Specific external networks

4.2.3.1 *International usual business group*

In cross-border regions where:

1. first line intervention teams from both countries regularly intervene together, in the framework of their usual business missions,
2. first line intervention teams regularly intervene, in the framework of their usual business missions, on a predefined portion of their neighbouring country (e.g. cross-border regions where the nearest fire station firstly intervenes, no matter if it is in country A or B),
3. usual business interventions radio traffic has to be audio monitored by the teams from both countries, seeing the possible impact of interventions in a country on the other one (e.g. agglomeration crossed by a border, where first line police intervention teams, while operating on their own territory, scan or share a common talk group with their local foreign counterparts),

dedicated talk groups 3 named "international usual business group", regularly or continuously active, have to be created.

4.2.3.2 *International alert group*

In case of unplanned and urgent intervention over the border requiring an escalation (unusual larger coordination and/of forces engaging), talk group 3 should be a dedicated "international alert group", continuously audio monitored by the control rooms on both sides of the border, and easily selectable by the intervention teams, e.g. by mean of a short key on the terminals (reflex manipulation).

This makes possible a direct and immediate response to face an unexpected cross-border incident involving teams and dispatchers from both countries.

Notes:

1. Each common segment of border should have its own international alert group (plus a backup, if two urgent cross-border incidents have to be managed at the same time).
It is then spoken about the “common segment international alert group” (plus a backup).
2. In a country A where “national alert groups¹” are in use, the “national alert groups” whose district runs along the border with country B should be re-programmed as international group A-B (it is then spoken about an “international alert group for country A”).
So, the A teams’ usual reflex group is kept as the one to be selected in case of escalation, including the escalations due to international events. Moreover, if a usual national incident requesting an escalation extends (static incident) or moves (dynamic incident) over the border, no group reselection or extra group combination is needed.
On the other side of the border, intervention teams B will have to select the concerned *international alert group for country A*, on dispatcher B request, or much better, in order to facilitate B teams’ manipulation, dispatcher B will firstly combine the *international alert group for country A* with the *common segment international alert group*, before asking teams B to select this last talk group.

4.2.4 Internal network

If the visiting intervention teams are organised in convoy, an “internal network”, relying on a specific national talk group, is used. Crossing the border should have no influence on this talk group.

4.3 Radio scheme

In order to have an overview of all the needed information fluxes to realise an operation, all the involved operational entities have to be represented, with all their related functional networks and complementary communication means, on an operationally structured communication scheme.
By defining besides the talk groups supporting the functional networks, you obtain the radio scheme of the operation.

¹ A national “*alert group*” is a dedicated talk group that is used by the first responders that are on the front line of an unplanned incident requiring an escalation.

An escalation is needed when the response to the incident requires a rapid, large scale involvement of first line and second line intervention teams, under control of an operation leader and the support of the different related dispatchers of the intervention teams.

The incident can be static, like a natural or a man-made disaster, or dynamic, like a police hot pursuit.

Each district has one “*alert group*” and a back-up. The used “*alert group*” is this of the district where the incident requiring the escalation rose. Selecting its own “*alert group*” must be limited to a reflex manipulation.

5 RELATED INTER SYSTEM INTERFACE SERVICES

The functional approach above relies on a list of ISI services:

Note:

Notions below are developed in the TCCA document “TIP phasing for ISI”, N°TF10-56-22 of 30-03-2010.

1. Subscriber migration (ISI phase 3).
2. Subscriber authentication.
3. Pre-provisioning of subscriber profiles.

Note:

Each country has to define its policy related to the visiting subscribers.

Seeing the impact on the capacity load of a visited country and the universal use of mobile phones (GSM), individual call capability for migrated subscribers will probably often be barred.

4. Individual Call (IC).
5. Individual subscriber Database Recovery (IDR).
6. *Group migration (+ complete Group Attachment, complete Group Detachment) (ISI phase 4).*

Note:

This means the ability for a national talk group to extend transparently its coverage area on a foreign country as soon as a group member is abroad.

7. Group management using ISI Static Group Linking concept (ISI phase 3)
- Needed options:

- a. Limited form of group attachment /detachment by Controlling SwMI (CSwMI).

Note:

This allocation of resources over ISI optimisation is very useful in case of international talk group X where, practically, group members remain confined in one country, e.g. international talk groups used by intervention teams coming from different countries to manage the same local international event.

- b. Combining (synonyms: patching, merging) a statically-linked group with a national group, both defined in the same SwMI.
- c. *Combining a statically-linked group with a national group able to migrate, both defined in the same SwMI.*
- d. *Combining a statically-linked group forming an International talk group X, with a second statically-linked group forming an International talk group Y, both defined in the same SwMI.*

8. Pre-provisioning of group profiles.
9. Group Call (GC) using ISI Static Group Linking.
10. Group Database Recovery (GDR).
11. Air Interface Encryption (AIE).
12. Emergency call.

- a. All the dispatchers following the talk group selected by a user, no matter from which country, have to be warned, typically with a ring tone, in case of the user launches an emergency call.

It must then be possible to establish an individual call with the dispatcher that picks up the call.

- b. If no dispatcher follows the selected talk group or answers in due time, the call will be routed to a pre-defined TSI (ITSI or GTSI).

13. End to End Encryption.

14. Status and situation indicator (i.e. status sent to a pre-defined TSI).

15. SDS.

Note:

This service is necessary to ensure a data exchange between applications belonging to different systems and managing the same functionality, but it is not sufficient to make them compatible.

Adopting some existing complementary radio standards, like the TETRA LIP (Location Information Protocol) as regards the automatic radio positioning for the TETRA systems, can help to reach this interoperability².

16. *Broadcast Call (ISI phase 4)*.

17. Supplementary Services:

1. Calling Line Identification Presentation (CLIP)
2. Talking Party Identification (TPI)
3. Late Entry (LE)
4. Pre-emptive Priority Call (PPC)
5. Air-Ground-Air operation (AGA)
6. Telephone calls and ISI.
7. *DGNA (ISI phase 4)*.

² For this specific matter, a solution could be investigated in the framework of ISITEP WP 6.4 and 6.5 “Interoperability enabling applications”, from the requirements described in point 7.

6 TRADE-OFF BETWEEN THE END-USER WISHES AND THE SHORT TERM AVAILABLE TECHNOLOGY

If it can be assumed that services and supplementary services that will be implemented in the framework of ISITEP roughly correspond to the TETRA ISI phase 3 features, for TETRA-TETRA, TETRAPOL-TETRAPOL and TETRA-TETRAPOL interfaces as well as for a combining of these interfaces, the main constraint comes from the lack of the services *mentioned in italic and bright blue* in point 5 above:

1. No group migration. This means that the area of a national talk group can not be extended abroad.
So, a user A having selected a national talk group, when crossing the border, will migrate to network B, but will no longer be able to use this group. An error message like “Talk group not available” will appear on its terminal screen.
Therefore, he will be obliged to select an international talk group X to keep contact with somebody else.
- If operationally needed, the *home network* and/or the *internal network* of an intervention team can only be supported by international talk group(s).

This implies:

- a. First option: group reselection(s) for intervention team A crossing the border.
This is a serious operational drawback, because it implies a manipulation on terminal(s), either directly by the intervention team self, or – if possible – remotely by the dispatcher (via AT commands over SDS).
- b. Second option: using international talk groups for the *home* and/or the *internal network* of the intervention teams.
 - i. This should be systematically applied for intervention teams (organised in convoy or not) having a mission abroad.
 - ii. For intervention teams that can exceptionally cross the border in the framework of their usual business missions, it is recommended to analyse the possibility to re-program the existing talk groups they usually use as an international one.
This could be conceivable for most of the common police intervention teams, which basically use one terminal with one “routine talk group³”.
Applying this option would mean that the “routine talk groups” of a country A, whose district are bordering another country B, would be systematically re-programmed as international talk groups A-B.

³ The “routine network” is the unique radio network used by most of the police intervention teams, typically the first line intervention teams, to perform their daily usual business missions. Each “routine network” relies on a “routine talk group”. In principle, each spot in a country is functionally covered by a “routine talk group” used by the locally competent first line police service.

“Routine talk groups” fulfil both home (link with control room) and external (link with the other intervention teams of the same district) intervention teams communication needs.

First line police intervention teams intervene, in principle, inside their own beat or district, but their mission are mostly unplanned and unforeseeable. So, they sometimes can unexpectedly operate far away from their district, e.g. in case of a hot pursuit.

So, if a common intervention team A has to cross the border, its home network abroad can be ensured by its routine talk group, without any group reselection or other manipulation.

2. Impossibility to combine two International talk groups (both based on ISI static group linking)⁴.

➔ If an intervention team A, working on an international talk group (e.g. its routine talk group, see above), has to unexpectedly cross the border from A to B and to talk with intervention teams B, dispatcher A will not be able, if needed, to establish the right *external network* for team A.

As a matter of fact, dispatcher A will not be able, if needed, to combine the talk group previously selected by team A with the right international talk group 3 (e.g. the *international alert group* of the concerned border segment, see point 4.2.3.2).

This implies:

- a. A necessary group reselection for intervention team A (excepted if team A has an extra terminal with an international talk group 3 selected, which will be practically only the case if the team is properly equipped and prepared for a cross-border mission).
This is a serious operational drawback, because it implies a manipulation on a terminal, either directly by the intervention team self, or – if possible – remotely by the dispatcher (via AT commands over SDS).
Therefore *international alert groups* must be all the more easily selectable.
- b. The practical impossibility to use existing *national alert group* of country A as international alert group for intervention teams coming from country A.
As a matter of fact, contrary to the procedure described in point 4.2.3.2, note 2, it will not be possible for dispatcher B to combine the *national alert group for country A* with the *common segment international alert group*. On the other hand, asking a team of country B to rapidly select a specific national alert group for country A is either no efficient solution.
- c. In regions where 3 countries A, B and C (or more) are joining, *international alert groups* will stretch over these 3 countries, seeing the impossibility, if needed, to combine smaller *international alert group* entities (A-B, B-C, C-D).

3. No end to end encryption.

➔ International group and individual calls will not be end to end protected. This should not definitively prevent user organisations that need international communication from using ISI.

4. No broadcast calls.

➔ International radio procedure will do without this functionality which is, in principle, operationally not too strategic.

5. No DGNA.

➔ In the context of pre-provisioned statically linked groups forming an International talk group X, all the international talk groups that are available abroad for a subscriber from country A,

⁴ This limitation is under investigation near the manufacturers. Maybe solutions exist in some specific cases, e.g. when the concerned international talk groups cover the same countries.

have a corresponding linked group in country A. With other words, all the international talk groups are statically programmable in terminals from country A.

This implies:

That all the useful international talk groups for a terminal can be pre-programmed in advance via a programming tool or sent via DGNA by home SwMI, if terminal stays under the radio coverage of its home network.

This mitigates the operational impact of no DGNA.

The abovementioned limitations will be taken into account in the following point describing the approach for a structured and coherent creation and management of international talk groups, i.e. the international “fleet map”.

7 INTERNATIONAL “FLEET MAP”

The whole international “fleet map” proposal is based on the determination of the *common segments of border* between the countries.

The segments have to be defined by analysing which the functional coherent cross-border regions are.

Have to be taken into account: the existing administrative districts, the agglomerations, the common (vehicular) language, the existing macroscopic persons and goods traffic exchanges, the criminality, the radio communication traffic load on the coordination network...

For efficient multi agency cooperation processes, it is furthermore essential that agreements are made to have the same common segments of border for all the “blue light agencies”.

If we take Belgium as an example, possible border segmentation is showed on figure below:

Note:

The names mentioned with the segments below are the names of the police coordination talk groups.

CO_P B-NL is a “Dutch speaking” talk group.

CO_P EUREGIO is a “Dutch or German speaking” talk group.

CO_P B-D-LUX is a “German speaking” talk group.

CO_P B-F-LUX and CO_P B-F 1 are “French speaking” talk groups”.



Figure 5 Possible Belgium’s border segmentation

7.1 Dispatching level

7.1.1 Mono-agency international coordination talk groups

One coordination (CO) talk group is to be used, per segment and per agency (or discipline).

CO talk groups are intended to react rapidly on all the unplanned events. This subsequently implies that speech exchange have to be kept brief, allowing the management of possible concurrent events. Consequently too, planned operations or unexpected incidents that extend in operations will be handled by talk groups on “field level”.

Mono-disciplinary CO talk groups are to be continuously audio-monitored by all the concerned control rooms, and, in case of operational need, immediately activated by pressing on PTT.

7.1.2 Multi-agency international coordination talk groups

One CO talk group has to be created for the multi-agency coordination.

The multi-disciplinary CO talk group has, in principle, not to be continuously audio-monitored. Therefore, its activation, via a selection on a terminal or a workstation of all the involved control rooms, will need more time. This is not an issue because multi-agency coordination comes, as a matter of fact, in principle, in a second phase.

7.1.3 Characteristics of the dispatching level talk groups

7.1.3.1 Group names proposal:

1. “CO” for “coordination”.
2. Indication of the agency:
 - a. “F” for “Fire brigade”.
 - b. “V” for “ciVilian protection”⁵.
 - c. “R” for “Rescue” (emergency health care).
 - d. “P” for “Police”.
 - e. “C” for “Customs”.
 - f. “B” for “Border guards”.
 - g. ...
 - h. “M” for “Multi-agency”.
3. Name of the segment (see figure 5 above):
 - the first letter(s) of the involved countries, in alphabetical order, or the name of the cross-border region,
 - both followed, if needed, by a suite number.

7.1.3.2 Each CO talk group has, at least, to technically geographically cover all the control rooms included in the coordination network.

7.1.3.3 CO talk groups should be programmed only in the terminals or workstations of the concerned control rooms.

⁵ If it is assumed that civilian protection forces intervene in support of fire brigades, which are in charge of the first line, civilian protection doesn't need to have its own international coordination talk group.

7.1.3.4 In order to avoid any lack of coordination, some control rooms have to simultaneously listen at two CO groups.

7.2 Field level

7.2.1 Existing National talk groups Made International (NMI)

NMI groups (please see point 6.1, b, ii) are used only by the original country users, as home or internal network.

This type of talk groups will disappear as soon as the functionality “group migration” will be available.

The name of all the statically-linked groups is kept the same as this of the original national talk group.

7.2.2 International multi-purpose talk groups

7.2.2.1 *Pool of multi-purpose international talk groups*

Each national agency should create a pool of bi-national, tri-national (and more if needed) multi-purpose, all networks (home, external and/or internal, in the sense of point 4.2) international talk groups.

The multi-purpose (MP) talk group pool should be distributed in sub-pools, with one sub-pool related to:

1. Each common segment of border.
2. Each “international control room”, outside a common segment of border, like this in charge of an airport, a harbour or a railway station with a border checkpoint.

Note:

Following the operational configuration, an international railway station could be considered as an isolated “international control room” or as a control room integrated in a specific border segment formed by several railway stations (e.g. high-speed train stations of London, Paris and Brussels).

7.2.2.2 *Follow-up*

MP talk groups are inactive and not monitored as long as no operation uses them to ensure its communications.

7.2.2.3 *Reservation of multi-purpose talk groups*

The use of the international multi-purpose talk groups should be settled by international conventions.

The basic mechanism should be:

1. Take contact with a control room of the concerned common border segment or the concerned “international control room”.
2. The control room will grant you international MP talk group(s) following your operational needs.
3. Select the granted talk group on your terminal.

Note:

Some pre-reservations can be agreed, at sub-pool level, to manage more easily some recurrent missions.

7.2.2.4 Group names proposal:

1. "MP" for Multi-Purpose
2. Indication of the agency:
 - a. "F" for "Fire brigade".
 - b. "V" for "ciVilian protection".
 - c. "R" for "Rescue" (emergency health care).
 - d. "P" for "Police".
 - e. "C" for "Customs".
 - f. "B" for "Border guards".
 - g. ...
 - h. "M" for "Multi agency".
3. Name of the border segment or the name of (the city of) the airport, harbour, railway station...
4. Suite number.

7.2.2.5 Radio coverage

MP talk groups coverage will be designed following the area where they can be used. In particular, their radio coverage will be modulated following:

1. The number of involved countries
2. The common segment of border or the "international control room" from which the MP talk groups functionally depend.

7.2.2.6 Terminal programming

MP talk groups will be programmed in all the terminals of the concerned (sub)agency(ies) (belonging to the same geographical zone) of the concerned countries.

Note:

A "Sub agency" is a set of users inside an agency. So, if some services, like the police Special Units, want to use reserved international groups inside the agency "Police", these will be only programmed in their terminals.

7.2.2.7 Multi-purpose talk groups and radio schemes

International multi-purpose talk groups can be used following three operational modes as regards the *radio schemes*:

1. A common operation is planned between countries A and B.
In this case, a specific *communication scheme* has to be developed, and, subsequently, MP talk groups will be directly allocated to the functional networks to obtain the *radio scheme*.
2. Country A comes to reinforce an operation managed and leaded by country B, e.g. support from A to B in case of a disaster in country B, under control of B.
In this case, the *radio scheme* is determined by country B. Talk groups are those foreseen by country B, e.g. in case of calamity. MP talk groups are used by A teams to integrate (some of) the talk groups of country B.

3. Country A has to intervene in country B in an autonomous way, e.g. support from A to B in case of a disaster in country B, without or with a minimum control from B.
In this case, country A uses its own intervention *radio scheme*. As it is a question of international mission, the usual national talk groups will be converted in MP talk groups.

7.2.3 International alert groups (see point 4.2.3.2)

7.2.3.1 Introduction

Because of point 6, 2, international alert groups (AG) will be only *common segment international alert groups* (see point 4.2.3.2, note 2).

7.2.3.2 Follow-up

AG talk groups are to be continuously audio-monitored by all the control rooms along the concerned common segment of border.

7.2.3.3 No reservation needed.

7.2.3.4 Group names proposal:

1. "AG" for "Alert Group".
2. Indication of the agency:
 - a. "F" for "Fire brigade"
 - b. "V" for "ciVilian protection".
 - c. "R" for "Rescue" (emergency health care).
 - d. "P" for "Police".
 - e. "C" for "Customs".
 - f. "B" for "Border guards".
 - g. ...
3. Name of the segment.
4. Suite number: 1 or 2 (back-up).

7.2.3.5 Radio coverage

AG talk groups coverage will be designed following the area where they can be used. In particular, their radio coverage will be modulated following:

1. The number of involved countries.
2. The common segment of border from which they functionally depend.
3. Point 6, 2, c.

7.2.3.6 Terminal programming

AG talk groups will be programmed in all the terminals of the concerned agency (belonging to the same geographical zone) of the concerned countries.

7.2.4 International usual business groups (see point 4.2.3.1)

7.2.4.1 Introduction

The creation of these talk groups depends on the locally applied operational processes, further to bi- or multi-national cooperation agreements.

Note:

The region where the international usual business (UB) groups are used can correspond to a common border segment or be smaller.

7.2.4.2 *Follow-up*

International usual business (UB) groups are regularly or continuously active and mostly followed by the local concerned control rooms.

7.2.4.3 Following the operational processes, reservation will be needed or not.

7.2.4.4 No group name standardisation is needed seeing UB groups are local specific solutions.

7.2.4.5 Radio coverage will be an area around the competency district.

7.2.4.6 *Terminal programming*

UB talk groups will be programmed in all the terminals of the concerned agency(ies) (belonging to the same geographical zone) of the concerned countries.

7.3 “Fleet map” summary

The international “fleet map” of a country can be built up using the following steps:

1. Determination, with the neighbouring countries, of the common segments of border.
2. Creation of the related CO_Ai (Ai = Agency i) and the CO_M talk groups.
3. Creation of the related AG_Ai_1 and AG_Ai_2 talk groups.
4. Creation, if needed, of local international usual business groups.
5. Determination, by each country, of their “international control rooms” outside a border segment.
6. Creation of sets of MP_Ai and MP_M talk groups (one set per border segment and one per “international control room”) which will be functionally managed (reservation...) by the control rooms.
7. Extension of some existing national talk groups over the border.

CO_Ai and AG_Ai_1 talk groups are to be audio monitored by the concerned control rooms along the borders.

If information exchanges over the border are quite rare, procedures will be settled for organising periodic radio checks between related control rooms.

8 SERVICES INCREASING THE TERMINALS EFFICIENCY IN AN INTERNATIONAL CONTEXT

8.1 Services running on radio terminals (voice and short data)

1. Displaying on terminal screen the network name/code with which it is currently attached. This will notify the user if its national talk groups are all available or mostly (see the case of the NMI, point 7.2.1) not.
2. Displaying on terminal screen the full ITSI of the calling party (individual calls) or of the talking party (group calls).
3. Sending terminal positions to all the concerned control rooms or Mobile Data Terminals using the same position protocol (LIP...).

Note:

Concerned control rooms are:

- a. The home control room, except when the team is not followed by it, like in case of an operation far away from the visiting country.
 - b. The control room(s) territorially competent.
 - c. The control room(s) in charge of the operation.
4. Displaying in grey all the group names that are not available because of the SwMI where the subscriber is currently registered.
 5. Predefined text messages library for sending and related predefined text messages translator for receiving.

To be completed in D23.2.

8.2 Application running on a smartphone/tablet (wirelessly) connected or integrated with radio terminal(s)

1. Roaming manager between TETRA and TETRAPOL terminals.

Note:

In this case, working with a smartphone/tablet integrated with a radio terminal (TETRA or TETRAPOL) would be a great benefit for the user on foot, because he should only bear 2 mobile devices in place of 3.

2. Position converter allowing sending terminal positions to all the concerned control rooms or Mobile Data Terminals, included those using another location protocol.
3. Displaying geographic maps (own position centred) with the foreign agencies districts (their borders, their contact persons and procedures...) and all the points of interest for cross-border cooperation along the border (codes of all the possible crossing points...).

To be completed in D2.3.2.

9 MAN MACHINE INTERFACE (MMI) FOR THE DISPATCHERS IN THE CONTROL ROOM

This point addresses the definition of the Man Machine Interface (MMI) principles for the international groups and users management by the control room operators.

1. “Fleet map” programming

1. International “fleet map” has to be previously negotiated between the countries before talk groups programming.
Programming workstations have to be previously determined too.
2. Pre-provisioning of an international talk group

Each statically-linked talk group should be programmed starting with the one homed in the Controlling SwMI (CSwMI).
A group attribute would point out the other involved countries.

After validation by CSwMI, these indications should activate a request for group linking on the programming workstations of the other concerned countries.

After acceptation, each concerned country would receive the attributes and relevant parameters (on a simplified and standardised way) of the CSwMI group: name, operational type (CO, MP, AG, UB or national made international (NMI)), GITSI, coverage, priority...).

Each concerned country should then create its own group (same name, same operational type, GITSI, coverage, priority, attachment rights...), link it with the CSwMI group and validate.

Each validation from a country should be bounced back to the CSwMI programming workstation(s).

CSwMI, in turn, would notify all the programming workstations concerned by the creation of the international talk group, of the static linking progression.

2. Pre-provisioning of subscriber profiles
3. Monitoring traffic generated by visitors

A simple way to keep a minimum control on its own network channel capacity is:

1. to bar any individual call capability for migrated subscribers,
2. giving instructions to the control rooms to “data monitor” (existing feature of radio dispatch consoles) all the international talk groups (local statically-linked groups) related to their own common border segment.

This approach requires no specific development.

It assumes however that common individual calls (emergency calls excluded) can be ensured by using mobile phones.

To be completed in D23.2.

10 MANIPULATIONS REQUESTED TO THE USER ON THE FIELD

This point defines the manipulations requested to the user in order to operate his terminal during international missions.

1. Network swapping

Network selection mode, manual or automatic, has to be set by the radio user.

In case of automatic mode, the user has no manipulation to make when crossing the border, but he will maybe migrate too fast to another network whilst he preferred to remain longer attached to his first network, e.g. in case of a border guard riding along a border.

2. International talk group selection

Selecting an international talk group should be done on the same way as selecting a national talk group.

It could be functionally agreed, on European level, to dedicate some mandatory standardised group folder numbers/names where CO and AG international talk groups would be programmed in the terminals.

(Some of) these international groups could be besides freely programmed in other terminal folders.

3. International Alert Group selection

Each terminal should have a short key for a rapid selection of the local “AG_Ai_[border segment name]_1” talk group.