

ISITEP

D7.1.2 – DEMONSTRATOR ACTIVITIES DESIGN

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Publishable extended abstract

This output deliverable documents the plan for the demonstrator in WP71 multi agency demo between Norway and Sweden to showcase the interconnection of the two live TETRA networks Nødnett and Rakel. This demonstration will be a full-scale cross-border exercise where the procedures for a joined operation between public safety agencies from the two countries will be executed. The document provides information on the scenario design and description, test procedures, scenario technical design and security configurations.

This deliverable D7.1.2 is a sequel to D 7.1.1 Demonstrator plan and requirements.

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1. INTRODUCTION

WP 7.1 aims to demonstrate the feasibility of a multiagency cooperation scenario using the ISITEP framework: bilateral agreement, cooperation procedures and migrating terminals functionality enabled by network interoperability. Specific objectives include:

- Verification of ISITEP procedures and processes for cooperation and communication cross border
- Evaluation of cross border communication services available through TETRA interoperability (group calls, one to one calls, short data message communication) for all involved radio users.
- Detailed measurements of the traffic and services used during the demonstration
- Evaluation of all ISITEP developed items (procedures, processes and template agreement)
- Evaluation of the implemented TETRA ISI solution and the ISITEP Functional model with the fleet map configured in the networks

In deliverable D7.1.1 the demonstrator plan and requirements were described. The work of the task to be documented in this deliverable D 7.1.2 is described as follows:

Task 7.1.2 – Demonstrator design.

The task is focused on:

- *Scenario design and description*
- *Test procedures*
- *Scenario technical design*
- *Security configurations*

The first section provides an overview of the demonstrator scenario and general objectives of the demonstrator. The trial is heavily based on end-user support in Norway and Sweden and the agencies involved are elaborated on in the next section. Scenario technical design and ISITEP demonstrated gateways are explained in the following chapters. The section on demonstrator overview includes models illustrating the technologies used in this demonstrator networks and ISI gateway, transmission between gateways, radio terminals and Air Interface Migration and static linked talk groups. The availability of terminals is outside the scope of the ISITEP project, but is being developed by terminal manufacturers with support from DNK as a necessary part of this end-to-end demonstrator and is included in the test plan. The main focus in this document is on describing the testing strategy to evaluate the technical and procedural set-up before the WP 71 demonstration. A three phase test strategy for WP71 has been defined and is described in this document. This test strategy will be more elaborated on in future deliverables. The WP7.1 multi-agency exercise will also demonstrate the usage of ISI compatible radio terminals with migration.

As communicated in Amendment 2, WP7.1 multi-agency demo will only be possible in late autumn 2016 because of dependencies of late technical deliveries (which are outside the scope of ISITEP). Deviations or additional input to this design will be documented in upcoming WP71 deliverables; D71.3 Demonstrator test results first run (M36), D71.4 Demonstrator test results final report (M40) D71.5 Demonstrator final report (M40).

The last chapter describes the security configurations, both the technical measures as well as the security considerations of personal data and restricted information.

2. SCENARIO DESIGN AND DESCRIPTION

2.1. Demonstrator general objectives / Scenario design

The WP 7.1 aims to showcase the interconnection of the two live TETRA networks Nødnett (Norway) and Rakel (Sweden). The Norway-Sweden trial will be a full scale cross-border field exercise where the technology as well as procedures for a joint operation between public safety agencies from the two countries will be played out. Resources from police, fire/rescue, health/ambulance, supported by the control room operators will participate and receive assistance from resources from the neighboring country. Thus the exercise is a realistic cross border scenario. More specifically, the scenario includes a bus accident on the Norwegian side of the border which requires nearby resources from Sweden. After some time, another crashed car is discovered on the Swedish side of the border where the passengers have fled the scene. This initiates a search and rescue mission which requires Norwegian agencies to cross the border. The scenario will imply TETRA (Norway) – TETRA (Sweden) communication over an ISI gateway which allows for interoperability and migration of terminals.

The WP activity is supported by the local authorities and end-user organizations (public safety agencies) in the demonstration region (Trøndelag/Jämtland). This region is a rural area, where available emergency resources can be far away and there is already an existing collaboration between the local Swedish and Norwegian emergency services. So the exercise aims to demonstrate how technology can enhance collaboration and efficient use of the emergency services resources across borders. A close collaboration between Norwegian and Swedish public safety agencies is expected to improve response time and efficient use of resources. The local end-users are responsible for the exercise and will plan this event with input from the ISITEP working group (MSB/DNK). MSB, DNK, Motorola and Airbus are responsible for testing and preparations.

2.2. Scenario description

The ISITEP demonstrator will be part of a full scale field exercise. This implies that personnel from both countries participate in a realistic scenario for cross border collaboration in this region. The local end-user organizations will plan the scenario and playbook in detail, but the main framework is already decided. The scenario will mainly consist of two incidents along the E14 at Meråker in Norway and across the border in Sweden;

- A bus with many passengers has been pushed off the road and overturned on the Norwegian side of the border.
- It is later discovered a car which has overturned on the Swedish side of the border where the drivers have escaped from the scene – initiating a search and rescue mission.

The incident involves the Swedish resources coming into Norway and that Norwegian resources are going to Sweden. Swedish resources are asked to respond across the border to assist in the rescue of passengers, traffic control and to limit material damage. Both Norwegian and Swedish resources are called to participate in the search and rescue mission. Various teams are assigned international agency specific and/or international multi-agency talk groups. Specific locations of the incidents are not yet decided, but E14 is the only border crossing that will be used. Number of participating resources from police, fire/rescue and health/ambulance services is to be decided while being subject to available resource limitations.

The scenario in planning will be designed to provide a realistic example of cross border collaboration. The demonstrations will be conducted following a detailed playbook and end-users will follow the cross-border procedures supported by radio terminals and known common cross-border functionalities in the networks (WP 32 and 33). The details, milestones and “playbook” will be planned

and developed by the local end user organizations. Representatives from the local end users in Trøndelag/Jämtland have been involved in the SP3 and WP7.1 activities to ensure synergy between ISITEP goals and end user goals for the exercise.

The date for the field exercise is set to November 16, 2016. The demonstrations are not to challenge the procedures or the technology, but to demonstrate the possibilities and support for cross-border collaboration. The field exercise shall demonstrate cross-border procedures between agencies and the use of the technology to support the procedures.

2.3. Trial environment

The full scale exercise will be executed near the E14 border crossing between Norway and Sweden. E14 is the main road connecting the two countries in the Trøndelag/Jämtland area and there will be two incident areas on this road; one on the Norwegian side of the border, and one on the Swedish side. Formal validation from the local authorities and end user organizations is ensured and the trial will be part of the regions annual field exercise.

Main agencies involved in the WP7.1 demonstration are the Swedish police, health, fire and rescue services, customs as well as the associated control room operators (including SOS Alarm). From Norway representatives from police, health, fire and rescue, and customs will participate. In addition will volunteer organizations and helicopter rescue service (which is important contributors in the Norwegian rescue service) participate in the exercise. From Sweden the same type of resources will participate, and in addition the County Administrative Board. The number of participants is still to be decided by local end users and the group planning the exercise scenario. Table 1 is a preliminary list of participating organisations from Norway and Sweden:

Organisation	Role/Responsibility	Country/region of origin	of	Number participants	of	Contact person
Trøndelag district	police Exercise coordinator	Trøndelag, Norway		1		Rune Reinsborg
County Administrative Board, Jämtland	Exercise coordinator	Jämtland, Sweden		1		Gunilla Ågren
Trøndelag district	police Operational	Trøndelag, Norway		TBD		
Trøndelag district /112	police Operations center	Trøndelag, Norway		1		
Police	Operational	Sweden		TBD		
AMK Trøndelag / 113	Nord- Emergency medical communications center	Norway		TBD		
SOS Alarm / 112	Emergency communications center	Sweden		TBD		
Ambulansetjenesten i Nord-Trøndelag	Ambulance services	Norway		TBD		Sturla Hammer
Ambulanstjänsten i Jämtland	Ambulance services	Sweden		TBD		

Meråker brannvesen	Fire & rescue	Norway	TBD
Stjørdal brannvesen			
Nord-Trøndelag 110-sentral	Fire & rescue operations center	Norway	1
Räddningstjänsten Jämtland	Fire & rescue	Sweden	TBD

Table 1 Preliminary WP 7.1 demonstration participant list

3. SCENARIO TECHNICAL DESIGN

3.1 General overview of technical design

The Inter Systems Interface (hereafter ISI) between Nødnett and RAKEL will be the first nationwide implementation to be deployed between a Motorola Dimetra system (SR8.3) and an Airbus System (Release 6.0, CD 3.8 or later) to allow migration for end-users between the Norwegian and Swedish public safety networks.

Motorola and Airbus executed the prelude for customer testing during the first half of 2015 by validating and connecting their Tetra systems for protocol testing (WP4.7). Together with DNK and MSB the results of the executed Interoperability test were evaluated. A public presentation has been made available during the 2nd ISITEP User Forum in Stockholm¹. The tested software versions support ISI as described in the ETSI ISI phase 1, 2 and 3 and deliver the specifications for cross border communication as agreed with MSB and DNK in 2012.

Preparations to shape the test and reference systems in Sweden and Norway have started, but final testing waits Dimetra SR8.3 to be installed in the testbed. The Swedish Rakel Operator Teracom provided an IP transmission between the ISI Gateways to connect the test SwMI's. Late 2015 migrations were possible on the test systems between subscribers from Nødnett and Rakel and the static group linking works. Frequentis in Vienna demonstrated the software for the Norwegian Control rooms, showing migrated Swedish subscribers and taking calls with the visitors, in week 51.

The deliverables for cross border communication between Sweden and Norway are the ISI GWs from Airbus and Motorola, upgraded MS software for TETRA radio terminals as in use in Norway and Sweden and modified software for the control rooms to incorporate addressing and communication with the visiting TETRA terminals as used by the visitors. To connect both countries' public safety networks, a secure transmission from sTESTA is in focus for Norway and Sweden (sTESTA studied in WP2.4). Processes and procedures as used in agency operations are under review and when needed extended to include the benefits and possibilities from of migrating with the Tetra radio to your neighboring public safety network. MSB and DNK are contributors to several other work packages in the ISITEP program related to design, development and implementation of the ISI and where managing the operations are developed and delivered.

The status of technical and functional deliverables for WP 7.1 execution is listed in Table X. Here also the related other ISITEP WPs are listed.

	Norway	Sweden	Related ISITEP WPs
Core network	Nødnett – national 2015 Motorola Dimetra 8.1	Rakel – national 2010 Airbus release 6.0	N/A
ISI Gateway	To be delivered with Dimetra 8.3	Delivered with Airbus release 6.3.8	WP 4.1, 4.2
Transmission	sTESTA secure IP network (TESTA-ng)		WP 2.4, 4.6
Control rooms	ISI compatible software to be delivered Q2 2016	ISI SW upgrade in progress	N/A (described in WP 3.2 and 3.3)

¹ <http://isitep.eu> and the presentation containing the report is <http://isitep.eu/perch/resources/02-150924isitep-user-forum-topic-2x.pdf>

Radio terminals	RT ISI SW development in progress 100 RT ordered for delivery in May.	Loan of RT ISI SW	N/A (described in WP 3.2 and 3.3- WP 5.1, 5.7 focus on TETRA/TETRAPOL)
Functional model	Norway-Sweden fleetmap to be implemented		WP 3.2, WP 2.3
User implementation	Common procedures and communication guidelines to be delivered Q2 2016		WP 3.3, SP 2.
	Training material under development		(WP 3.3) - WP 6.2 focus on TETRA/TETRAPOL
Legal aspects	Norway-Sweden agreement to be completed Q2 2016		WP 3.1 (D31.2)
	End-user agreements	End-user agreements	WP 2.1

Table 2 Current status in the Norway-Sweden ISI implementation

3.2 ISI gateways and services

The main delivery for the Nødnett Raket ISI is in line with the published ISI Phases 1, 2 and 3 by TCCA / ETSI. Any new developments are reviewed with the TCCA ISI Working Group and associated vendors.

The following services will be available over ISI between Nødnett and Raket:

- Group call capability using intersystem group- linking. Here are static linked international TG's providing group call capability using multiple permanent TG's covering both countries.
- Make/receive individual call across both networks.
- Outgoing PSTN / PABX call via visiting network.
- Phone calls routed from home network when migrated.
- Emergency call processed over ISI to home network.
- Group SDS from any visiting terminal to permanent TG's covering both countries.
- Individual SDS from a visiting terminal to any individual destination.
- Group Status message from any visiting terminal to permanent TG's covering both countries.
- AVLS updates to home network.
- E2EE updates on migrated radio terminals.

Before the services are available, the user and radio terminal need to migrate into the visited Network:

- Cross border mobility is based on radio terminals with Air Interface Migration and full ITSI addressing.
- Authentication is done in the Home network for the radio terminals after request from the Visiting network; when approved for migration the visiting network assigns an (V)ASSI to the foreign ITSI

The figure below shows the overall concept of the ISI functionality between Norway-Sweden:

ISI Functionality Norway-Sweden

SwMI and ISI GW

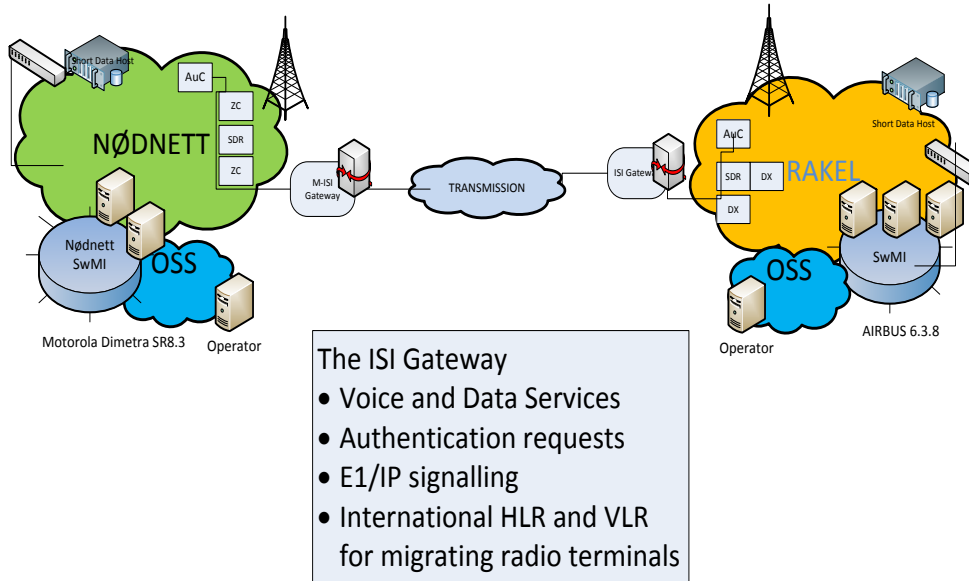


Figure 1 ISI functionality in the Norway-Sweden ISI implementation

3.3 Cross-border talk groups

Cross border communication is based on static linked international talk groups (TG) providing group call capability using multiple permanent TG's covering both countries.

The figure below shows the overall concept of static linked TGs between Norway-Sweden:

ISI Functionality Norway-Sweden

Static linked Talk Groups

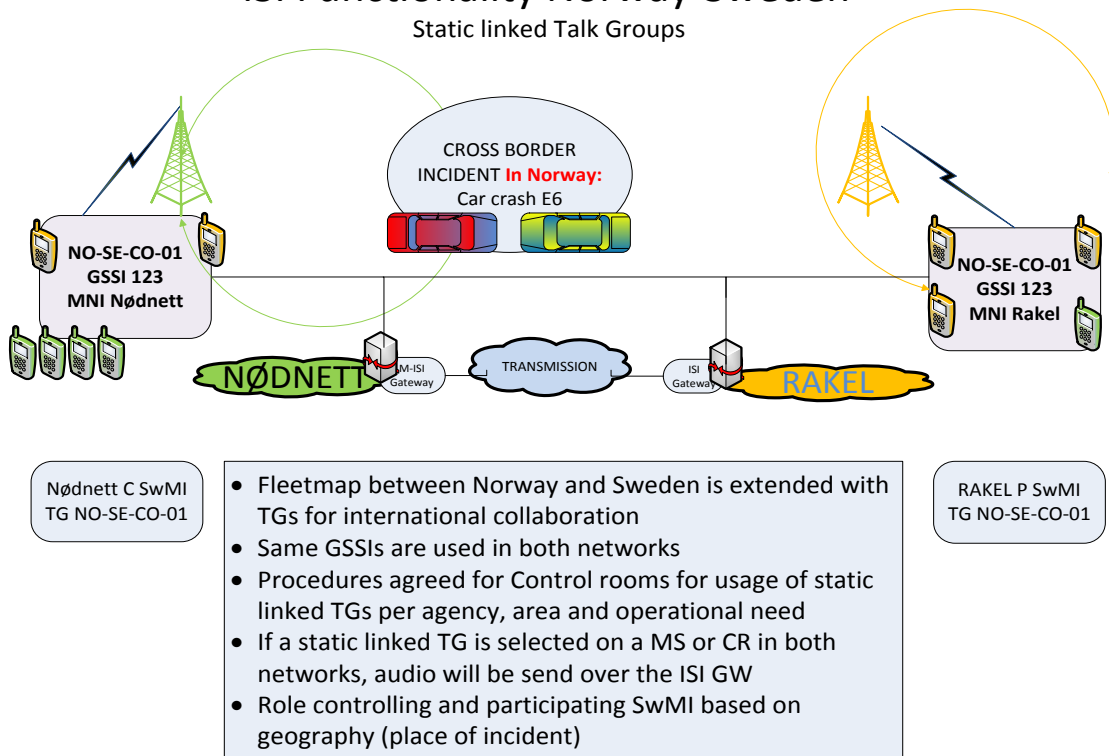


Figure 2 ISI functionality between Norway and Sweden

3.4 Radio terminals and Air Interface Migration

New ISI software in ordinary radio terminals will be demonstrated in WP 7.1. This is outside the scope of ISITEP, but is vital for ISI to function and for the success of this end-to-end demonstrator. ISI software is developed for end-users in Norway and Sweden to enable use of the ISI functionality. DNK and MSB are working with terminal suppliers outside the ISITEP project to make ISI ready terminals available for the WP7.1 demonstrator. The expected number of radio terminals in Norway and in Sweden to participate in the demonstration is estimated up to 100 radio terminals on both sides, a maximum of 200 radio terminals.

Cross border mobility is based on Air Interface Migration for the radio terminals (MS) with full ITSI addressing (TCCA TIP TTR 001-06). Some additional terminal functionality is defined in the radio requirement document² compiled by DNK and MSB.

Authentication is done in the Home network for the radio terminal after request from the Visiting network; when approved for migration the visiting network assigns an (V)ASSI to the foreign ITSI.

Beta release of radio terminal software is acceptable for testing and training in live networks and will be used during the ISITEP demonstration WP 71 Multi agency demo. Official releases from vendors will be required for nationwide ISI rollout and is to be handled as part of normal software release and certification.

² Radio terminal requirements for ISI :

<http://www.dinkom.no/Global/Dokumenter/Radio%20Terminal%20Requirements%20for%20ISI.pdf>

The figure below shows the overall concept of radio terminal Air Interface Migration:

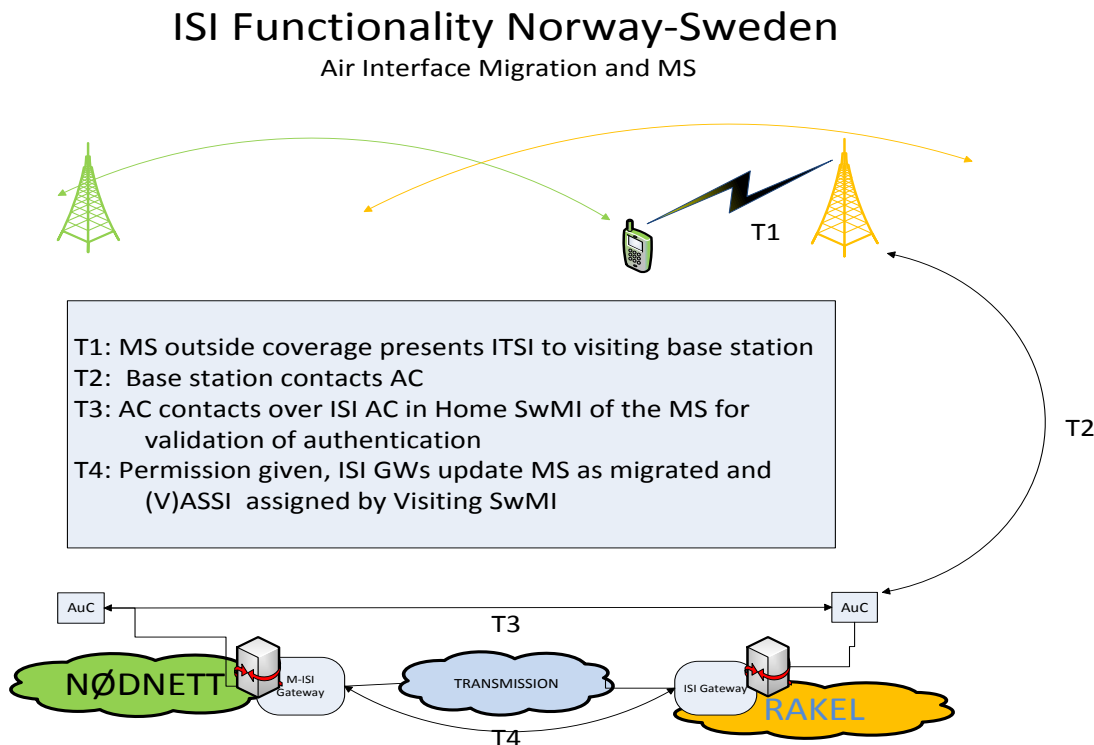


Figure 3 Radio terminals (MS) outside coverage of home network

3.5 Control rooms

New ISI software in control rooms will also be demonstrated in WP 7.1. In Sweden the control room owner report that they are compliant with use of ISI. For Norway the current control room software does not support addressing full ITSI. The key challenge regarding control rooms was to be able to show and address full ITSI numbers including country and network code (MNI). New software to control rooms in Norway are also outside the scope of ISITEP, but is vital for ISI to function and for the success of this end-to-end demonstrator. DNK have together with the control room supplier initiated a development process to ensure this within 2016. DNK and MSB are working with suppliers outside the ISITEP project to make ISI control room software available for the WP7.1 demonstrator. A total of 2-4 control rooms will be involved in the demonstration, not all of them with new software to handle visiting radio terminals, but all using cross-border talk groups.

3.6 End-user implementation and operations

MSB and DNK, be it in their role, as both authority and customer, need to develop and implement the following work packages to make the means available for ISI:

- A Norwegian Swedish Fleetmap for the existing customers that have a cross border assignment. Procedures and workarounds are getting in place for cross border communication (WP 32).

- A legal framework between authorities in Sweden and Norway covering frequency allocation, usage, service descriptions, legislation, collaboration, operational support assignments, responsibilities and processes (WP 31).
- Transmission agreement and connectivity between the ISI GWs over sTESTA IP network for secure and redundant transmission (WP 31).
- Define additional requirements for the control rooms and radio terminals that are not available per today (described in WP 31).
- Develop and evaluate with end user organisations the development for GUI and interfaces (to be described in WP 33 and WP 71).

3.7 Supporting tools (SP6)

DNK and MSB have provided input to the Infrastructures dimensioning tool (WP6.1) and the Training and simulation tool (WP6.2) and will consider using these when demoed and considered applicable.

4. TEST PROCEDURES

4.1 General overview of test procedures

This chapter will describe in short the different applicable test phases for the ISI project deliveries and aspects of the implementation as will be handled during 2016 and 2017.

The demonstrator for WP 7.1 is the ISI functionality in Norway and Sweden which are divided in three technical deliveries:

- The ISI gateways in the infrastructures, integration with the SwMI in live and test network.
- The radio terminals using Air interface migration with Full ITSI from Sepura, Airbus and Motorola
- The ISI features for control rooms connected to the network. In Norway Frequentis delivers the control rooms, in Sweden Ericsson, Carmenta, Airbus, Saab, APD, TC Connect and Zodiac are providing control rooms

These three deliveries will be tested in separate work streams and at a later stage in end-to-end (E2E) setups. The testing and implementation is coordinated by MSB and DNK and is referred to as customer testing ISI. Per delivery, a test plan is aligned with the involved vendors, including activities as the scope definition for testing the requirements, allocation of time, material and resources because all deliveries are to a degree tested against equipment and services in another network, where logistic is challenging.

The main priority is to validate the Swedish and Norwegian ISI requirements (see chapter 3.2) and this will be done in advance to any formal (as in IOP) testing in TCCA. IOP test cases are used in addition to specific Nødnett and Rakel tests for the cross border implementation, but the certification itself and the IOP approval is scheduled for 2017 and will be called for according the normal procedures by Airbus and Motorola, where the connected Nødnett and Rakel test systems can be used.

The test strategy for WP 7.1 has three stages:

1. Supplier testing of ISI gateways. Supplier testing of ISI gateways is described in D 4.7.1 Gateways integration and testing plan.
2. Customer testing

The customer test strategy for the Norway-Sweden ISI has three phases:

- Phase 1: The ISI gateway in the infrastructure/test system
- Phase 2: The radio terminals using Air interface migration with full ITSI and service provided by visiting SwMI
- Phase 3: Control rooms connected to the network - Q2 2016

3. End-user testing, education and training

In this document the testing stage 2 will be described. Stage 1 was carried out by suppliers in 2015. Stage 3 will be documented in the coming deliveries: D 7.1.3 Demonstrator test results first run and D 7.1.4. Demonstrator test results run final.

Table 3 shows planned test sessions between Norway and Sweden and related to WP 7.1.

	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Supplier testing (Motorola, Airbus)											
Customer testing (MSB, DNK and											
Phase 1: ISI GW		wk 13, 14-15		wk 20- 23							
Phase 2: RT			wk 17		wk 24		wk 34				
Phase 3: CR					wk 24		wk 34				
End-user testing and training							wk 34		wk 43	16-11-16 Demo	
WP 7.1 deliverables						D71.3					D71.4

Table 3 Test and training timeline for WP 71 (plan as of Feb 2016)

4.2 Phase 1: The ISI gateway in the infrastructure/test system

Phase 1 test goals:

1. Transmission test and integration
2. ISI functionalities in SwMIs
3. Configuration of ISI GWs

The system setup will be as follows:

Nødnett: The ISI Gateways installed and configured with a line connected to the Test SwMI. Connectivity to the Swedish ISI gateway is via E1overIP with the Rakel test SwMI. The setup will involve migrations from subscribers by having home subscribers physically in the visiting system. All ISI authentication protocols are to be tested. Air interface migration is active on the BTS connected to the test SwMI's. All basic voice and data services (V+D) are to be tested.

RAKEL: Configuration of the ISI functionality and defining the Dx and SwMI to be connected to Nødnett. Connecting the GW and finalize the configuration of the user databases. Validate the functionality in RAKEL

The test scenarios will involve the following features:

- a) Setting up group and private calls from a radio terminal and a dispatch in the Nødnett TG which is part of the static link with a RAKEL TG and backwards (no migration for radio terminal, use static linked TG)
- b) Sending SDS messages in a linked TG
- c) Link failure and recovery between the ISI GWs
- d) Performance /ISI Delay over the ISI GW between SwMIs

This test scenario validates the infrastructure and adjustment of system parameters depending for the SwMI.

Work Packages to be delivered:

- Agreement between operators to be made for: specifications for connection

- Test scripts for the individual tests (ref IOP SwMI)
- Provisioning Live Nødnett
- Transmission ordered and delivery

Schedule for testing

- Latest start November 2015 (integration, basic V+D, authentication)
- Duration 5 days after preparation is completed
- Latest start March 2016 (integration, basic V+D continued, ISI PDUs)
- Dimetra System release 8.3 M2 will be on the SwMI

This test phase is divided in several packages. The first tests have been executed with success. The next test phase is scheduled for weeks 13-15 and finally weeks 20-23 with live networks.

4.3 Phase 2: Radio terminals using Air interface migration with Full ITSI and service provided by visiting SwMI

Phase 2 test goals:

1. Validation of the ISI user requirements for radio terminals as published by MSB/DNK
2. Registration and attachment in visiting SwMI
3. Feature test basic V+D for radio terminals in visiting SwMI

The cross border specifications for radio terminals involve two major features, which are the MS to broadcast the full ITSI and support of the Air Interface migration. New developments are introduced to make some features MNI specific, for example TG, status codes and EME calls per MNI to be configurable.

The ISI infrastructure is as part of the framework agreement available for radio vendors to test radios with an alfa and beta release prior to IOP certification. Depending on development of radio terminals and delivery agreements, this test phase contains two parts:

- A) Vendor can test alfa software on ISI infrastructure test systems (Q2 2016).
- B) Vendor and customers test beta software on ISI infrastructure test and live SwMI (August – September 2016).

The radio terminal beta software release is the release scheduled to use during the ISITEP demonstration WP 71 Multi agency demo on 16.11.2016.

The system setup will be as follows:

Nødnett: Radio terminals provisioned in Nødnett/Dimetra SR8.3 will migrate out of the home network and present themselves towards a RAKEL AIM supported base station with full ITSI. The authentication will be checked against the home network and the radio user will receive a (V)ASSI from the visited RAKEL SwMI. Swedish provisioned radio terminals to present themselves towards a Nødnett BTS with AIM. The M-ISIGW in Nødnett will have an assigned range for several Swedish end user organisations.

RAKEL: Radio terminals provisioned in RAKEL will migrate out of the home network and present themselves for a Nødnett BTS with AIM active. The phase 2 radio terminal testing is the possible test phase for radio terminal vendors to acquire an IOP certificate and approval to be used in RAKEL for Sweden.

The test scenarios will involve the following functionalities:

- a) Migration from Nødnett to RAKEL and vice versa (migration location update)
- b) Participating radio in TG handled by CSwMI and when PSwMI for Norwegian and Swedish MS
- c) Setup group call, private call, telephony call between migrated MS, Home MS and Control Rooms in Norway and Sweden
- d) Check the ISI GW for registrations, (V)ASSI assignment
- e) SDS message send from MS to CR
- f) Emergency call migrated MS to target TG Nødnett
- g) Emergency call per network
- h) E2EE update on migrated MS
- i) Status code in linked TG
- j) Status code per MNI
- k) Call out to a population MS's spread over the two SwMIs
- l) SDS with LIP over GW to home network
- m) SDS LIP to visiting AVLS server (option)
- n) Network operation functionalities on MS in Home and visited network

Work Packages to be delivered

- Minimal 2 types of a production model radio per vendor for testing
- Radio software that will support full ITSI and AIM to be used with ISI
- ISI certificate/ type approval for beta release radio terminals to be used in Nødnett and RAKEL
- User scenarios to be checked and made into test cases (if applicable and if IOP testing is limited)

Schedule for testing

- Pending availability of production radios with AIM TIP implemented, but production radios from Motorola, Sepura and Airbus to be tested
- Beta release of radio program software is acceptable in test in live networks. Certification to be done if beta release becomes official release from vendors and handle outside test scope as part of normal software release and certification.
- Duration max 5 days per MS vendor. With two networks, minimal 3 vendors and two locations to test, some logistics involved.
- Week 17 testing with Alpha sw, week 24 with Beta sw.

4.4 Phase 3: Test of control rooms connected to the network

Phase 3 test goals:

1. Functionality testing CR software for ISI
2. Check that ISI updates for CR do not affect existing platforms CR and third party software

There is no IOP testing available for Control rooms. DNK / agencies will make test procedures with relevant counterparts to validate and test the Control room software (Nødnett with MSI/ Frequentis, RAKEL customer control room and vendors)

The system setup will be as follows:

Nødnett: Frequentis will develop new software to handle migrations from RAKEL users into Nødnett and migrations from Nødnett radios out of Nødnett. This specification contains 34 agreed requirements that will be integrated in the FR release. The functionality is planned to be delivered early 2016 as an addition to FR6, to facilitate in delta testing and not a complete release. After testing on the test bed and with migrating Swedish radios in the Control room, the software is made available for the Norwegian Agency support centres to test the release before rolling it out on the Control Rooms that participate in the exercise.

RAKEL: The Swedish Control rooms have several vendors for the ICCS. The AIRBUS API to all control rooms is delivered. Depending on vendor, several tests (almost per CR) are to be made.

MSB and DNK plan to have a workshop where E2E testing can be done in late august 2016. The workshop will give vendors, customers, users and operators the possibility to test in the live network with beta releases MS and CR based on the developed user scenarios, which started the Norwegian Swedish Cross Border communication specifications in 2012 as input.

The test scenarios involve the following functionalities:

- Configuration check, look and feel GUI for ISI functionality (all locations in GUI where migrated radio is or can be displayed)
- Ingoing and outgoing voice calls (TMO, individual) between MS RAKEL, MS Nødnett and RAKEL CR /Nødnett CR
- Receive and send SDS to MS in Nødnett and RAKEL from CR
- Handling of Emergency call migrated MS Nødnett to Target TG Emergency call
- Telephony call (home and visiting SwMI)
- Private call (all scenario's)
- Generic call back request
- Status codes per MNI
- Handling emergency call visiting MS and migrated MS
- Assignment TG from SOS Alarm to Norwegian CR
- Stun /disable MS
- Normal CR operations with software regression tested

- Group combining on international linked groups

Work Packages to be delivered

- Test specification document for ISI functionality ICCS
- Test documentation from relevant CR Vendors
- User scenarios to be checked and made into test cases, if needed
- Check and adapt AVLS server, Map for neighbour country.

Schedule for testing

- Q4 2015 demonstration handling incoming calls from RAKEL MS
- Q1 2016 FR6 live test in Berlin with ISI between two Motorola SwMI
- Week 19-22 installed FR6 reference system for testing
- Q2 2016 Agency testing and configuration in Norway and Sweden
- Workshop E2E ISI with all 3 deliverables in live context
- Q3 2016 upgrade for usage under ISITEP demonstration

5. SECURITY CONFIGURATIONS

Security configurations are described both in regards to the technical security configurations as well as the functional configurations to ensure that security rules are not breached.

5.1 Security considerations

ISI is a functionality within and between national PPDR networks and is to be further investigated in WP4.6. Security issues are thus regulated for each national network, and in agreements between national network owners. For this demonstrator scenario both Nødnett and Rakel have security class 3 and is protected from unauthorized use. The challenges arise because of the transmission between these two networks. In the WP 71 scenario dedicated transmission lines (E1 over IP) will be used over the STESTA network to ensure that this connection is protected.

5.2 Secure transmission

A connection needs to be made available for the ISI functionality. There are various possible solutions to connect the two networks. The options that the DNK-MSB technical group has investigated are connections based on E1 / 2Mbit and sTESTA. Leased E1 connections are a proven but old technology. The cost of E1 connections are in short term lower than the alternative sTESTA. A standard leased E1 line doesn't include any encryption solutions. sTESTA with its built-in security, future-proof investment can also be used by other services. sTESTA have high reliability. Practical ping tests over sTESTA were carried out in February 2014 from various locations in Sweden to Oslo including cryptography and firewalls on both ends. The result shows an acceptable RTT (round trip times).

sTESTA as a secure transmission will be further analysed in WP 2.4.

The figure illustrates how the transmission will function over the sTESTA network:

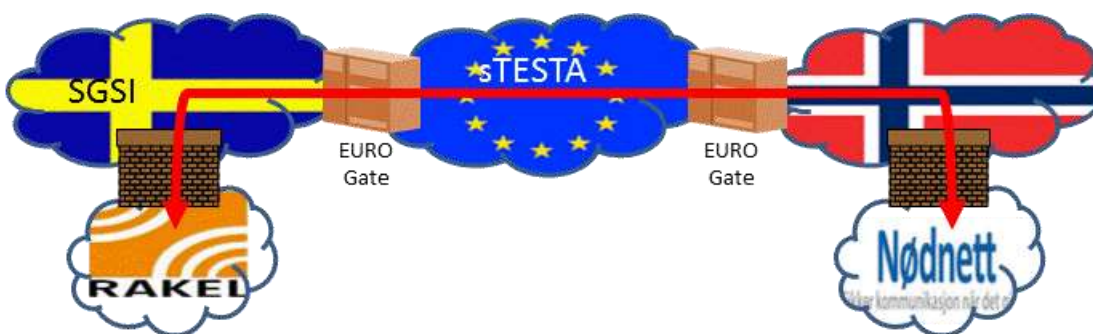


Figure 4 Transmission over the sTESTA network

5.3 E2E encryption considerations

E2E encryption is not inherently enabled by default when connecting two live networks. Specific to the WP 71 scenario E2E encryption is ensured in Nødnett and in Rakel in their respective KMF. When connecting the two networks some issues are yet to be solved to ensure that linked talk groups and

migrated radios establish the E2E encryption. One way to solve this is to ensure that relevant Swedish terminals and talk groups are provisioned in the other country's KMF. DNK and MSB are in dialogue with the police agencies to find a solution to this.

5.4 Personal data and restricted information

For the demonstrator scenario the only data regarded as personal and sensitive information is that of the PPDR users (see also D 8.5.1 where the Norway-Sweden case was analysed). In Norway the identification numbers of the radio terminals (ISSI numbers) are regarded as personal data since they can be tracked to specific PPDR users. Norway has ensured that these numbers are removed when storing of traffic data (meta data such as number of calls on a basestation, conversation length, which talk groups that have been used etc). In this demonstrator the participant will loan specific radio terminals with ISSI numbers other than their own, so no exchange of sensitive information is needed.

The lawyers in Norway and Sweden are currently looking into whether there is a difference in practice in the two countries and how this sensitive information can be treated (WP 3.1). No personal data of citizens is processed over the gateway since this is a local control room task.

Regarding sharing of restricted information between emergency agencies, this is regulated in agreements and legal framework between the respective countries. The security configuration is designed in the functional model for the scenario in addition to guidelines developed by the end users to avoid this. For example, the police will have talk groups that only police officers can join, health services will have talk groups only health personnel can join and the same with fire. These are the default talk groups the participants will use. They will also use "emergency" and "cooperation" talk groups where participants from other agencies can hear them – but they will be aware of that since they must change talk groups manually. Also, this is the same way Norwegian and Swedish end-users work today in their own countries and is not unique for the ISITEP framework. What is unique for the ISITEP framework is the awareness that users from the same agency – but different country – can listen to the cross-border talk groups (to be described more in WP 3.3).