

## Inter System Interoperability

# D41.41 ISI OVER IP PROTOTYPE FOR DEMONSTRATIONS, FINAL RELEASE

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### Publishable extended abstract

This Document is describing the completion of Task 4.1.2 “Gateway Development” and the corrections performed after the test with other partners as described in WP4.7 “Network Connectivity Integration and Test”.

The objective of WP4.1 is to allow TETRA networks to be interconnected using ISI over IP. As part of the Motorola contribution, a gateway shall be delivered.



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## 1. INTRODUCTION

### 1.1 Introduction

One of the goals for the ISITEP program is to define how Inter System Interface (ISI) signaling between TETRA SwMIs can be conveyed in an SIP/IP network. The current ISI specifications describe how ISI signaling is conveyed in a QSIG/E1 network where the ISI signaling is included in Facility information elements. In order for the systems complying to the current standard to interconnect with the systems complying with the future standard a converter is to be introduced.

In task 4.1.1 a definition of ISI over IP was performed. In this protocol definition the ETSI ISI QSIG ROSE / E1 layer will be translated into SIP / IP protocol suite. The Motorola ISI GW has implemented a preliminary version of the ISI over IP protocol. The standardization of the ISI over IP protocol is ongoing.

In task 4.1.2 the ISI over IP Gateway has been developed and tested with other partners. The result of the tests the standardization documents delivered as part of task 4.1.1 as well as the ISI over IP Gateway product has been modified.

Furthermore the ISI over IP Gateway has been tested during field trials with other partners and experienced users as part of WP7.2.

## 2. DESCRIPTION

### 2.1 ISI Gateway Specification

The Motorola ISI Gateway supports the feature described in TeTRA Implementation Proposals for ISI phase 3. This includes:

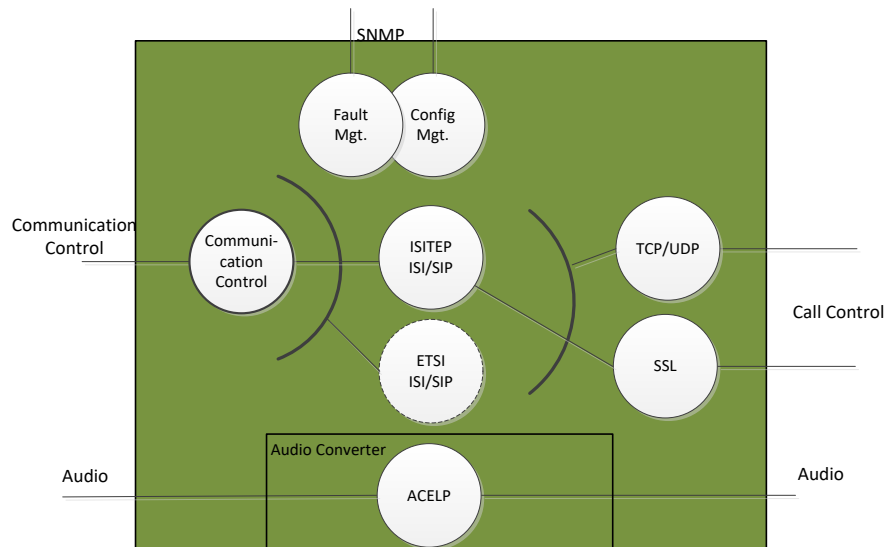
- Migration of MSs in and out of the Motorola TETRA network
- Authentication of visiting and migrating MSs
- Group calls on statically linked groups across the ISI boundary
- Individual calls across the ISI boundary
- Short data and status communication across the ISI boundary

[1] The ISI gateway has been created according to the ISI requirements specified in the preliminary ETSI ISI standards, which have been created based on Ref. [2] "Realization of ISI over IP":

- TS 100 392-3-8  
"Generic Speech Format Implementation";
- TS 100 392-3-9  
"Transport Layer Independent Specification General design, Common Part";
- TS 100 392-3-11  
"General design, SIP/IP as transport layer ";
- TS 100 392-3-12  
"Transport Layer Independent, Additional Network Feature Individual Call (ANF-ISIIC)";
- TS 100 392-3-13  
" Transport Layer Independent, Additional Network Feature Group Call (ANF-ISIGC)";
- TS 100 392-3-14  
" Transport Layer Independent, Additional Network Feature Short Data Service (ANF-ISISDS)";
- TS 100 392-3-15  
" Transport Layer Independent, Additional Network Feature for Mobility Management (ANF-ISIMM)";

### 2.2 ISI Gateway Development

The ISI over IP gateway is developed in modules as shown in **Figure 1**. This makes it possible to replace protocol layers with new version as the ISI over IP protocol evolves or new transport or security requirements appear.



**Figure 1 ISI Gateway Architecture**

The **Communication Control** entity handles the interface between the Motorola TETRA SwMI and the ISI communication.

The **ISI/IP** entity handles the formatting of the SIP messages to transport the ISI PDUs. As the ISI over IP protocol is not yet approved in the ETSI standardization body the Motorola design is prepared for several versions of ISI/IP; hence the ISITEP ISI/IP and the ETSI ISI/IP entity.

The **Audio Converter** entity is responsible for the necessary conversion of the internal audio format to the ISI audio format and vice versa.

The **Fault Management** entity reports the status of the servers and interfaces to an external event manager.

The **Configuration Manager** handles the interface to an external system management GUI. The ISI GW can communicate via TCP, UDP or secure links via the entities TCP/UDP and SSL.

## 2.3 Testing and Validation

Test of the software for ISI over IP Gateway has been performed together with Finmeccanica to prove the interoperability. The test set up is shown on Figure 2.

The test is performed as described in D4.7.3 “Integration and test plan for Network Interconnections” and the results of the tests is described in D4.7.4 “Test Report of Integration and Testing of Network Interconnections”.

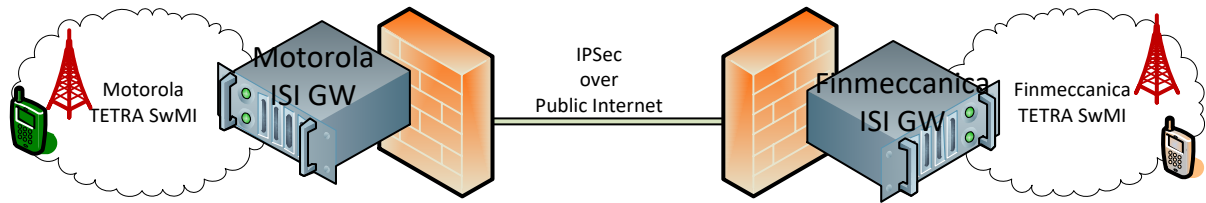


Figure 2 ISI over IP Gateway Interconnection

## 2.4 ISI GW Realization

The realization of the ISI GW is shown in Figure 3.





Figure 3 Motorola ISI GW

### 3. REFERENCES

- [1] ISITEP D2.3.2 V 1.1 End-User Requirements, November 2014
- [2] TCCE03(14)000015 – Realization of ISI over IP
- [3] TS 100 392-3-8 V1.3.1  
"Generic Speech Format Implementation"
- [4] TS 100 392-3-9 V0.0.3  
"Transport Layer Independent Specification General design, Common Part"
- [5] TS 100 392-3-11 V0.0.3  
"General design, SIP/IP as transport layer "
- [6] TS 100 392-3-12 V0.0.2  
"Transport Layer Independent, Additional Network Feature Individual Call (ANF-ISIIC)"
- [7] TS 100 392-3-13 V0.0.1  
" Transport Layer Independent, Additional Network Feature Group Call (ANF-ISIGC)"
- [8] TS 100 392-3-14 V0.0.2  
" Transport Layer Independent, Additional Network Feature Short Data Service (ANF-ISISDS)"
- [9] TS 100 392-3-15 V0.0.1  
" Transport Layer Independent, Additional Network Feature for Mobility Management (ANF-ISIMM)"