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Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 2: Additional Network Feature Individual Call (ANF-ISIIC)

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Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 2: Additional Network Feature Individual Call (ANF-ISIIC)

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Project Terrestrial Trunked Radio (TETRA).

The present document is part 3, sub-part 2 of a multi-part deliverable covering the Voice plus Data (V+D), as identified below:

EN 300 392-1: "General network design";

EN 300 392-2: "Air Interface (AI)";

EN 300 392-3: "Interworking at the Inter-System Interface (ISI)";

EN 300 392-3-1: "General design";

EN 300 392-3-2: "Additional Network Feature Individual Call (ANF-ISIIC)";

EN 300 392-3-3: "Additional Network Feature Group Call (ANF-ISIGC)";

EN 300 392-3-4: "Additional Network Feature Short Data Service (ANF-ISISDS)";

EN 300 392-3-5: "Additional Network Feature for Mobility Management (ANF-ISIMM)";

TS 100 392-3-6: "Speech format implementation for circuit mode transmission";

TS 100 392-3-7: "Speech Format Implementation for Packet Mode Transmission";

ETS 300 392-4: "Gateways basic operation";

EN 300 392-5: "Peripheral Equipment Interface (PEI)";

EN 300 392-7: "Security";

EN 300 392-9: "General requirements for supplementary services";

EN 300 392-10: "Supplementary services stage 1";

EN 300 392-11: "Supplementary services stage 2";

EN 300 392-12: "Supplementary services stage 3";

ETS 300 392-13: "SDL model of the Air Interface (AI)";

ETS 300 392-14: "Protocol Implementation Conformance Statement (PICS) proforma specification";

TS 100 392-15: "TETRA frequency bands, duplex spacing and channel numbering";

TS 100 392-16: "Network Performance Metrics";

TS 100 392-17: "TETRA V+D and DMO Release 1.1 specifications".

National transposition dates	
Date of adoption of this EN:	2 January 2004
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Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 October 2004
Date of withdrawal of any conflicting National Standard (dow):	31 October 2004

1 Scope

The present document defines the Terrestrial Trunked Radio (TETRA) system supporting Voice plus Data (V+D). It specifies:

- general design aspects (e.g. reference points, numbering and addressing, or protocol architecture);
- the system bearer and mobility management services, and the corresponding air interface protocols;
- the interworking between TETRA networks;
- the interworking of TETRA networks with other networks, via gateways;
- the peripheral equipment interface on the mobile station;
- the Line Station (LS) interface with TETRA networks;
- the security protocols and mechanisms applicable to TETRA networks and to TETRA terminal equipment;
- the supplementary services applicable to the basic TETRA tele- or bearer services.

The TETRA V+D interworking - basic operation part defines the interworking between TETRA networks over the corresponding interface: the Inter-System Interface (ISI). It comprises the following subparts:

- ISI general design;
- Additional Network Feature - ISI Individual Call (ANF-ISIIC);
- Additional Network Feature - ISI Group Call (ANF-ISIGC);
- Additional Network Feature - ISI Short Data service (ANF-ISISD);
- Additional Network Feature - ISI Mobility Management (ANF-ISIMM);
- 8 kbit/s encoding of user information at the ISI.

The present document is the ANF-ISIIC sub-part.

ANF-ISIIC enables calls to be set-up by a user registered in one TETRA network to another user registered in another TETRA network, operating at the ISI of both SwMIs. It also supports call restoration when a user has migrated to another TETRA network during an established call. Additionally, ANF-ISIIC allows TETRA signalling information to be passed from a TETRA SwMI to another TETRA SwMI supporting the TETRA individual call procedures as defined in clauses 11 and 14 of EN 300 392-2 [1].

Like all other Additional Network Feature (ANF) specifications, those of ANF-ISIIC are produced in three stages, according to the method described in ITU-T Recommendation I.130 [11]. The present document contains the stage 1 and 2 descriptions of ANF-ISIIC, and its partial stage 3 description. The stage 1 description specifies the ANF as seen by its users, which are essentially the individual call control entities in both TETRA networks. The stage 2 description identifies the functional entities involved in the ANF and the information flows between them. And the partial stage 3 description of ANF-ISIIC specifies its protocol.

NOTE: According to ITU-T Recommendation I.130 [11], the stage 3 description of a bearer or tele-service addresses the network implementation aspects. Consequently, it comprises two steps: the specifications of all protocols at the various reference points involved in any of the service procedures (notably the service operation) are the first step of the stage 3 description, and the specifications of the functions of the corresponding network entities are its second step.

The latter have not been provided since they can be derived from the specification of the functional entity actions in the stage 2 description.

The present document applies to TETRA networks which support inter-TETRA individual calls. More specifically, it applies to their Circuit Mode Control Entities (CMCE), as defined in clause 14.2 of EN 300 392-2 [1], and to their ANF-ISIIC entities defined in the stage 2 description.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

[1] ETSI EN 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

[2] ETSI EN 300 392-3-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 1: General design".

[3] ETSI EN 300 392-3-5: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 5: Additional Network Feature for Mobility Management (ANF-ISIMM)".

[4] ETSI EN 300 392-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 7: Security".

[5] ETSI EN 300 392-9: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 9: General requirements for supplementary services".

[6] ETSI EN 300 172: "Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Circuit-mode basic services [ISO/IEC 11572 (2000) modified]".

[7] ETSI ETS 300 921: "Digital cellular telecommunications system; Service accessibility (GSM 02.11 version 5.0.1)".

[8] ETSI EN 300 392-10-19: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 19: Barring of Incoming Calls (BIC)".

[9] ETSI EN 300 392-12-4: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 4: Call Forwarding (CF)".

[10] ETSI ETS 300 395-2: "Terrestrial Trunked Radio (TETRA); Speech codec for full-rate traffic channel; Part 2: TETRA codec".

[11] ITU-T Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[12] ITU-T Recommendation I.140: "Attribute technique for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[13] ITU-T Recommendation I.210: "Principles of telecommunication services supported by an ISDN and the means to describe them".

[14] ITU-T Recommendation Z.100: "Specification and Description Language (SDL)".

[15] ITU-T Recommendation V.110: "Support by an ISDN of data terminal equipments with V-Series type interfaces".

[16] ISO/IEC 11572: "Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode bearer services - Inter-exchange signalling procedures and protocol".

[17] ISO/IEC 11574: "Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode 64 kbit/s bearer services - Service description, functional capabilities and information flows".

[18] ISO/IEC 11582: "Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Generic functional protocol for the support of supplementary services - Inter-exchange signalling procedures and protocol".

[19] ITU-T Recommendation I.460: "Multiplexing, rate adaption and support of existing interfaces".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 300 392-3-1 [2] and the following apply:

called SwMI or SwMI B: Switching and Management Infrastructure to which ANF-ISIIC routes the first call attempt

forward switching: network routeing algorithm which performs the routeing from SwMI A to SwMI C by joining together the first connection, from SwMI A to SwMI B, and a second connection from SwMI B to SwMI C

home SwMI: SwMI which is the home of the MS (or LS) ITSI, i.e. to which the Mobile Network Identity (MNI) which is part of the ITSI belongs

loop connection: ISI connection which has both its ends in the same SwMI

originating SwMI or SwMI A: Switching and Management Infrastructure in which the calling user has registered

SwMI C: Switching and Management Infrastructure in which the called user has registered after having migrated from SwMI B, in the case where its home SwMI is SwMI B

re-routeing: network routeing algorithm which performs the routeing from SwMI A to SwMI C by replacing the connection from SwMI A to SwMI B by another connection from SwMI A to SwMI C

terminating SwMI: Switching and Management Infrastructure in which the connected user is registered

NOTE: Unless an interaction with one or more supplementary services which modify the routeing of the call (e.g. call forwarding) has occurred, the connected user will be the called user; and the terminating SwMI will be the SwMI where the called user is registered, i.e. SwMI B or SwMI C.

trombone connection: special case of loop connection where all inter-TETRA connections making up the loop connection are used twice

NOTE: If no interaction occurs with supplementary services which modify the routeing of the call (e.g. call forwarding), the only loop connection which can be established by an invoked ANF-ISIIC is a trombone connection (i.e. when SwMI C coincides with SwMI A).

3.2 Abbreviations

For the purpose of the present document, the following abbreviations apply:

AL	Ambience Listening
ANF	Additional Network Feature
AoC	Advice of Charge
AP	Access Priority
AS	Area Selection
BIC	Barring of Incoming Calls
BOC	Barring of Outgoing Calls
CAD	Call Authorized by Dispatcher
CC	Call Control (PISN functional entity)

CCAp	Call Control Application (SwMI functional entity)
CCBS	Call Completion to Busy Subscriber
CCNR	Call Completion on No Reply
CF	Call Forwarding
CFB	Call Forwarding on Busy
CFNRc	Call Forwarding on Not Reachable
CFNRy	Call Forwarding on No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identification Presentation
CLIR	Calling/connected Line Identification Restriction
CMCE	Circuit Mode Control Entities
COLP	COnnected Line identification Presentation
CR	Call Report
CRT	Call ReTention
CRV	Call Retention Value
CW	Call Waiting
DGNA	Dynamic Group Number Assignment
DL	Discreet Listening
FE	Functional Entity
HOLD	Call Hold
IC	Include Call
IPE	In-band Parameter Exchange
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ISIGC	Inter System Interface Group Call
ISIMM	Inter System Interface Mobility Management
ISISD	Inter System Interface Short Data Service
ISISS	Inter System Interface Supplementary service
ITSI	Individual TETRA Subscriber Identity
LE	Late Entry
LS	Line Station
LSC	List Search Call
MNI	Mobile Network Identity
MS	Mobile Station
MSC	Message Sequence Charts
NFE	Network Facility Extension
PC	Priority Call
PDU	Protocol Data Unit
PINX	Private Integrated services Network eXchange
PISN	Private Integrated Services Network
PPC	Pre-emptive Priority Call
PSS1	Private Integrated Signalling System number 1
QSIG	Q interface SIGnalling protocol
SDL	Specification and Description Language
SNA	Short Number Addressing
SS	Supplementary Service
SSI	Short Subscriber Identity
SwMI	Switching and Management Infrastructure
TC	Transfer of Control
TPI	Talking Party Identification
TSSI	Time Slot Sequence Integrity