NATO STANDARDIZATION AGENCY
AGENCE OTAN DE NORMALISATION

3 August 2006 NSA/0661-C3/4249

STANAG 4249 C3 (EDITION 3) – NATO REFERENCE MODEL FOR OPEN SYSTEMS INTERCONNECTION

References:

a. NSA/0240-C3/4249 dated 13 March 2002 (Edition 2)
b. AC/322(SC/6)N/369, dated 21 May 2001(Edition 3)(Ratification Draft)

1. The enclosed NATO Standardization Agreement, which has been ratified by nations as reflected in the **NATO Standardization Document Database (NSDD)**, is promulgated herewith.

2. The references listed above are to be destroyed in accordance with local document destruction procedures.

ACTION BY NATIONAL STAFFS

3. National staffs are requested to examine their ratification status of the STANAG and, if they have not already done so, advise the NHQC3S, through their national delegation as appropriate of their intention regarding its ratification and implementation.

J. MAJ
Brigadier General, POL(A)
Director, NSA

Enclosure:
STANAG 4249 (Edition 3)

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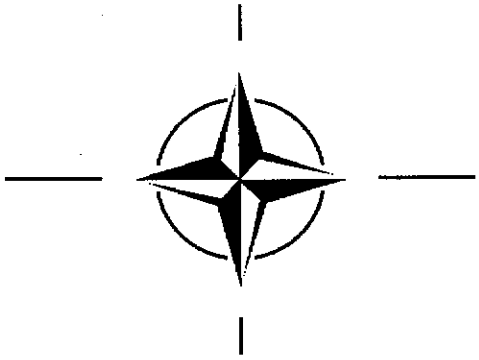
STANAG N° 4249
(Edition 3)

NORTH ATLANTIC TREATY ORGANIZATION
(NATO)



NATO STANDARDIZATION AGENCY
(NSA)

STANDARDIZATION AGREEMENT
(STANAG)

SUBJECT: **NATO REFERENCE MODEL FOR OPEN SYSTEMS INTERCONNECTION**

Promulgated on 3 August 2006

J. MAJ
Brigadier General, POL(A)
Director, NSA

STANAG 4249
(Edition 3)

RECORD OF AMENDMENTS

No.	Reference/date of Amendment	Date Entered	Signature

EXPLANATORY NOTES

AGREEMENT

1. This NATO Standardization Agreement (STANAG) is promulgated by the Director NATO Standardization Agency under the authority vested in him by the NATO Standardization Organisation Charter.

2. No departure may be made from the agreement without informing the tasking authority in the form of a reservation. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.

3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

4. Ratification, implementation and reservation details are available on request or through the NSA websites (internet http://nsa.nato.int; NATO Secure WAN http://nsa.hq.nato.int).

FEEDBACK

5. Any comments concerning this publication should be directed to NATO/NSA – Bvd Leopold III - 1110 Brussels - BE.

STANAG 4249
Edition 3

NATO STANDARDIZATION AGREEMENT (STANAG)

NATO REFERENCE MODEL FOR OPEN SYSTEMS INTERCONNECTION

NATO STANDARDIZED PROFILE - Connection-oriented mode gateway between tactical packet switched data networks using a digital data circuit.

Annexes:
- A. (normative) NATO Standardization Profile
- B. (normative) NSPICS Requirements List (NPRL)
- C. (normative) NATO Protocol Implementation Conformance Statement (NPICS) Proforma for the Data Link Layer – (for short delay links)
- D. (normative) Military Application of the X.75 Packet Layer Protocol with Layer 3 NPICS Proforma

Related Documents

1. STANAG 4250-1 NATO Reference Model for Open Systems Interconnection. Part 1 General Description.

AIM

1. The aim of this NATO Standardized Profile (NSP) STANAG is to promote interoperability within NATO for packet switching. The NSP in this STANAG specifies certain options and parameters of the NATO Reference Model for OSI upon which it is based.

BACKGROUND

2. This document is produced by CNSC SC/6 WG/1.

AGREEMENT

3. Participating nations agree to use the specification in the NSP in this STANAG where the requirement for interconnection is within its scope.

GENERAL

4. This STANAG has been produced in accordance with the agreed policy for the development of a Single Architecture for NATO Technical Interoperability Standards (SANTIS) described in STANAG 4250-1 NATO Reference Model for Open Systems Interconnection - Part 1 General Description (ref. 1).

5. This is one of the series of STANAGs that define and specify the services, protocols and NSPs that shall be used for implementing the SANTIS.

6. This STANAG 4249 consists of a main body and Annexes A to D constituting the NSP material. The NSP is based on the ITU-T Recommendation X.75 protocol specifications and the Tactical Digital Gateway specifications.

DETAILS OF THE AGREEMENT

7. The NSP material in this STANAG 4249 constitutes the details of the agreement.

IMPLEMENTATION OF THE AGREEMENT

8. This STANAG 4249 is implemented when a ratifying nation has issued instructions that all relevant future communication systems for its Forces will be procured in accordance with the specifications detailed in the Attachment to this STANAG which contains the NSP material.

ANNEX A (normative)

Document Title:	NATO STANDARDIZED PROFILE - Connection-oriented mode gateway between tactical packet switched data networks using a digital data circuit.
Document version:	Version 3.0
Date:	5 April 2001
Origin:	CNSC SC/6
Security Classification:	NATO UNCLASSIFIED.

(i) Foreword

This NATO Standardized Profile (NSP) is a Functional Standard produced by NATO SC/6 - WG/1. NATO Functional Standards are functional groupings of NATO Base Standards which are based on International Standards produced by ISO, ITU-T, and other bodies, with the addition of NATO developed military enhancements where necessary.

This document replaces version 2.0 (October 2000). Version 1.0 refered to STANAG 4263 Annex D for military enhancements and a provisional PICS Proforma for ITU-T Rec. X.75. Since STANAG 4263 had not been promulgated (and may never be), version 2.0 included the material in STANAG 4263 Annex D in a new normative Annex D. Further, the informative annexes C and D containing a discussion of military features and a bibliography were removed in version 2.0. Version 3.0 (April 2001) introduces the long delay link layer protocol for operation over long delay links (e.g. satellite).

All annexes A, B, C and D are normative.

(ii) Introduction

A profile defines a combination of base standards that collectively perform a specific well-defined Information Technology function. Profiles standardize the use of options and other variations in the base standards to promote system interoperability.

The Base Standards of this NSP are the STANAG 4250 NATO Reference Model for Open Systems Interconnection (OSI), ITU-T Rec. X.75 and the tactical digital gateway STANAGs 4206-4214.

NATO STANDARDIZED PROFILE - Connection-oriented mode gateway between tactical packet switched data networks using a digital data circuit.

1. SCOPE

1.1 General

This NSP STANAG 4249 is applicable to packet switched networks operating in the military OSI environment as specified in STANAG 4250. It specifies a combination of standards which collectively provides the connection-oriented mode gateway between packet switched networks. The gateway link will exhibit either:

a. short delay characteristics (e.g. short delay terrestrial links) where terrestrial short delay link layer protocols will be used
b. or long delay characteristics (e.g. satellite links) where long link delay protocols will be used.

The objective of this NSP is to maximise interoperability within NATO. The NSP may not necessarily optimise support for one particular environment.

1.2 Position within the Taxonomy

This profile is currently not defined in any ISO or NATO taxonomy.

1.3 Scenario

The scenario of this NSP is shown in Figure 1.1.

This NSP specifies:

- the provision of the OSI connection-mode Network Service between End Systems using ITU-T Recommendation X.25 subnetwork procedures to PSDNs. Communication between the End Systems is via permanent or switched virtual circuit access to a single PSDN or a combination of a PSDN and single or multiple intermediate systems. The OSI connection-mode Network Service is provided across the X.75 based gateway between the two PSDNs where the profile is defined.

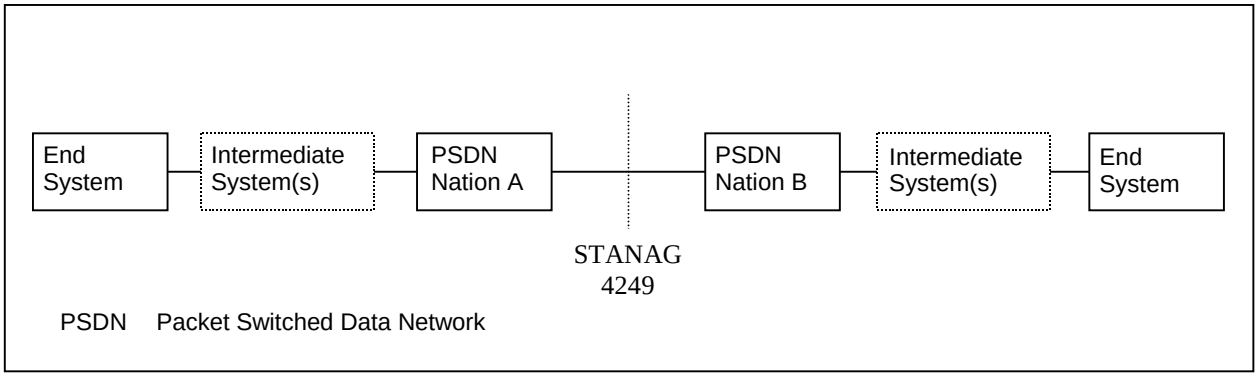


Figure 1.1 Communication across packet switched gateway

1.4 Model Description

This Attachment to NSP STANAG 4249 specifies the requirements for Network, Data Link and Physical layers that apply specifically to configurations where a packet switch of one nation is connected to a packet switch of another nation using a data circuit on the tactical digital gateway.

ITU-T and NATO standards, that comprise this profile are shown in Figure 1.2

NETWORKLAYER	(ITU-T Rec. X.75 § 3 - 5), mil. enhancements in Annex D of this STANAG. STANAG 4214 (Addressing).	This Profile
DATA LINK LAYER	For terrestrial short delay links: ITU-T Rec. X.75 § 2. For long delay links: Annex H to STANAG 4208 Ed 3.	
PHYSICAL LAYER	NATO Tactical digital gateway STANAGs 4206 – 4214.	

Figure 1.2 Profile Protocol Stack

2. NORMATIVE REFERENCES

The following documents contain provisions which, through reference in this text, constitute provisions of this NSP. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this NSP are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by NSPs to such documents is that they may be specific to a particular edition. The standards referenced by a base standard are

applicable to the NSP only to the extent that they are applicable to that base standard and to the extent that the NSP allows.

2.1 Base Standards

A.	STANAG 4206 Edition 3	The NATO Multi-Channel Tactical Digital Gateway - System Standards.
B.	ITU-T Rec. X.75(1988)	Terminal and transit call control procedures and data transfer systems on international circuits between packet-switched data networks, clause 2 (Link Layer).
C.	STANAG 4207 Edition 2	The NATO Multi-Channel Tactical Digital Gateway Multiplex Group - Framing Standards.
D.	STANAG 4208 Edition 3	The NATO Multi-Channel Tactical Digital Gateway - Signalling Standards.
E.	STANAG 4210 Edition 2	The NATO Multi-Channel Tactical Digital Gateway - Cable Link Standards.
F.	STANAG 4211 Edition 2	The NATO Multi-Channel Tactical Digital Gateway - System Control Standards.
G.	STANAG 4213 Edition 3	The NATO Multi-Channel Tactical Digital Gateway -Data Transmission Standards.
H.	STANAG 4214 Edition 2	International Routing and Directory for Tactical Communication Systems.

2.2 Standards referenced by the Base Standards

The following standards are referenced by base standard B:

B1.	ITU-T Rec. X.25(1988)	Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit.
B2.	ITU-T Rec. X.75(1988)	Terminal and transit call control procedures and data transfer systems on international circuits between packet-switched data networks.

2.3 Other Normative Documents

I. ISO 9646-1 — Information Technology - OSI conformance testing methodology and framework - Part 1: General Concepts.

3. DEFINITIONS

For the purposes of this NSP, the following terms are defined:

3.1 Terms defined in this Profile

(a) Base Standard
An approved NATO Standard, International Standard, Technical Report or ITU-T Recommendation which is used in the definition of a Profile.

(b) Profile
A set of one or more base standards, and, where applicable, the identification of chosen classes, subsets, options and parameters of those base standards, necessary for accomplishing a particular function.

NOTE - A NATO Standardized Profile includes the specification of one or more Profiles.

(c) NATO Protocol Implementation Conformance Statement (NPICS)
A statement made by a NATO nation or supplier of a system which claims conformance to a base standard, stating the capabilities and options which have been implemented, and all optional features which have been omitted.

(d) NATO Standardized Profile (NSP)
A harmonized document, agreed to within NATO (i.e. a STANAG), which identifies a standard or a group of standards, together with options and parameters, necessary to accomplish a function or set of functions.

(e) NATO Standardized Profile Implementation Conformance Statement (NSPICS)

A statement made by a NATO nation or supplier of a system which claims conformance to an NSP, stating the capabilities and options which have been implemented, and all optional features which have been omitted.

(f) NSPICS Requirements List (NPRL)

The NPRL is the part of an NSP which specifies the Profile's constraints on what may appear in the "Support" and "Supported" (values etc.) columns in the relevant NPICS proformas.

3.2 Terms defined in ISO 9646-1

This Profile uses the following terms defined in ISO 9646-1:

(a) Conforming implementation

(b) Dynamic conformance requirements

(c) Static conformance requirements

4. SYMBOLS AND ABBREVIATIONS

CONS Connection Oriented Network Service

NPICS NATO Protocol Implementation Conformance Statement

NPRL NSPICS Requirements List

NSP NATO Standardized Profile

NSPICS NSP Implementation Conformance Statement

TBS To Be Specified

The other symbols and abbreviations are defined in the referenced base standards.

5. REQUIREMENTS

This NSP has no ISO parallel, but is based on ITU-T rec. X.75 with military enhancements specified in Annex D and NPICS Proforma, and STANAGs 4206 - 4214 with NPICS Proformas.

This NSP mandates the use of the following military network utilities:

- Security
- Priority and pre-emption.

A conforming implementation of this NSP shall satisfy:

- all requirements stated in the remainder of this clause 5;
- all mandatory requirements of the base standards referenced by this NSP;
- all the constraints specified in Annex B (normative) NSPICS Requirements List (NPRL).

5.1 Network Layer requirements

The protocol used to interconnect two X.25 packet switched networks is defined in Annex D which references ITU-T Rec. X.75 (1988).

5.1.1 Static conformance requirements

A conforming implementation shall meet the static conformance requirements specified in Annex D.

5.1.2 Dynamic conformance requirements

a) Addressing.
Addressing is specified in STANAG 4214. All calls traversing the gateway shall include NIACs in the X.75 address fields. Further, DNICs shall be based on the NIACs as specified in Appendix 2 to Annex D.

b) ITU-T-specified DTE Facilities.
All ITU-T-specified DTE Facilities defined in Annex G to ITU-T rec. X.25 shall be carried transparently, allowing for maximum field lengths.

c) Default values agreed for a period of time.

To minimize the amount of information to be exchanged between system managers prior to establishment of a gateway, the following default parameter values shall apply if other values are not agreed bilaterally:

- default packet size, sending	128 octets
- default packet size, receiving	128 octets
- default window size, sending	2 packets
- default window size, receiving	2 packets
- default throughput classes, sending	1200 bits/s
- default throughput classes, receiving	1200 bits/s
- logical channel ranges for VCs (and PVCs if used)	1-255
- logical channel group number (LCGN)	0 for VCs; 15 for PVCs

d) Minimum number of simultaneous logical channels provided at the gateway: 100

NOTE: The requirements in b) and c) above are provided to ensure that the CONS (ref ISO 8878-1) can be performed across the gateway. However, no discrimination against packets that are invalid according to the protocol mapping of ISO 8878 shall be done.

e) Switched virtual calls shall be assigned logical channel numbers as follows:

i) The master end of the STE-X/Y interface shall assign virtual calls with the highest available logical channel number from 255 downwards;
ii) The slave end of the STE-X/Y interface, reference 5.2, shall assign virtual calls with the lowest available logical channel number.

5.2 Data Link Layer requirements

Different protocols are required to provide the Data Link Service for normal terrestrial short delay and long delay gateway links.

The Master STE shall be assigned HDLC address A and the Slave assigned HDLC address B.

5.2.1 Terrestrial Short Delay Gateway Link

The protocol used to provide the Data Link Service across an X.75 packet switched gateway is LAPB as defined in ITU-T Rec. X.75 Layer 2.

5.2.2 Long Delay Gateway Link

The protocol used to provide the Data Link Service across an X.75 packet switched gateway is defined in Annex H to STANAG 4208.

5.3 Physical Layer requirements

A conforming implementation shall support the data bit rate of 9.6 kbit/s class 4 in a 16 kbit/s channel on a 256 kbit/s NATO tactical digital gateway.

By bilateral agreement any of the three options in 3.5 of Annex B may be used.

Other physical layer characteristics are given by the digital gateway used.

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ANNEX B (normative)

NSPICS REQUIREMENTS LIST (NPRL)

NATO Standardized Profile:
Connection-oriented mode gateway between tactical packet switched networks using a digital data circuit.

NSP Implementation Conformance Statement (NSPICS) Requirements List

1. Introduction

This document provides the NSPICS Requirements List (NPRL) for implementation of the NATO Standardized Profile (NSP) for the tactical packet switching gateway. The NSPICS for an implementation is generated by completing the NPRL in accordance with the instructions given below.

The proformas in this document are based on those accompanying the referenced base standards.

A conformant implementation shall satisfy the mandatory conformance requirements of the base standards referenced in this profile.

1.1 Notation

The following notations are used in the NPRL to indicate the status of features:

m - mandatory
o - optional
c - conditional
- - not applicable (ie, logically impossible in the scope of the profile)
x - excluded
¬ - logical negation

In addition, the symbol 'i' is used to indicate an option which it is possible to implement, but whose status is not within the scope of the profile.

The status given shall be interpreted as: "is the stated functionality provided?" and not to imply that a facility or parameter is included in all packets sent.

The following predicate notation is used:

<predicate>: introduces a single item which is conditional on <predicate>.

The predicate may be the identifier of a profile feature, or a boolean combination of predicates.

Finally, the o.*n* notation is used to show a set of selectable options (ie, one or more of the set must be implemented) with the same identifier *n*.

1.2 Footnotes

Footnotes to the proformas are indicated by superscript numerals in brackets[]. The notes so indicated are collected at the bottom of the page.

1.3 Instructions for completing the NPRL

The NPICS proformas for the referenced base standards shall be completed in addition to the proformas provided in this Annex.

Where this profile refines the features of the base standards, the requirements expressed in this NPRL shall be applied (as indicated in NPRLs with no 'Profile Support' column) to constrain the allowable responses in the base standard NPICS proformas.

Where this profile makes additional requirements, the 'Profile Status' column for such NPRLs shall be completed.

Each response shall either be selected from the indicated set of responses, or comprise one or more parameter values as requested. For an inapplicable conditional requirement, a Not Applicable (NA) check-box is provided. If a mandatory requirement is not satisfied, exception information must be supplied, by entering a reference X*i*, where *i* is a unique identifier, to an accompanying rationale for the non-compliance.

2 Standards referenced

This profile specifies the provision of the connection mode interface between two packet switched networks, by reference to Annexes B and C of this Attachment and to the following STANAGs,

4206-4214	Layer 1 (Physical Layer) Protocol Specification (i.e. the NATO Digital Tactical Gateway)
4208 Annex H	Long Delay Link layer protocol.

and the following ITU-T recommendation,

X.75	Clause 2, Layer 2 (Data Link Layer) Protocol Specification.
X.75	Clauses 3-5, Layer 3 (Network Layer) Protocol Specification.

3 NSP Requirements List

3.1 General statement of conformance

Implementation details	
Nation/Supplier:	
Implementation name/version:	
Machine name/version:	
Operating system name/version:	
Other hardware and operating systems claimed:	
System name (if different):	
Are all mandatory features implemented ?	Yes[] No[] (The answer No means that the Implementation does not conform to the STANAG)
Defect/problem reports implemented:	
Date of statement:	

3.2 Protocol overview

Base Standard Features				Profile Features	
Item	Protocol	Clause of base standard	Status	Status	Support
X75n	Network Layer protocol	ST4249/C		m	Yes[]
LLsd	Link Layer protocol for terrestrial links	X.75 §2 (Note 2)		m	Yes[]
LLld	Link Layer protocol for long delay links	ST4208/H		O	Yes[] No[]
4206 (Note 1)	4206 digital gateway	ST4206		m	Yes[]
4213 (Note 1)	4213 data transmission	ST4213		m	Yes[]
4214	Addressing	ST4214		m	Yes[]

Note 1: Other physical layer options may be provided in future versions of the profile.

Note 2: See Annex C for the provisional NPICS proforma.

3.3 Network Layer NPRL

3.3.1 General characteristics

Base Standard Features				Profile Features
Item	Protocol feature	References	Status	Status
	Service:			
Vs	Virtual Call (VC)	3	O.1	m
Vp	Virtual Circuit (PVC)	3	O.1	o
	Is the implementation interoperable with:			
Ec/8	1988-version		O.2	m
Ec/4	1984-version		O.2	o
Ec/0	1980-version		O.2	x
	Packet sequence numbering:			
M8	Modulo 8	3.3.2	O.3	m
M128	Modulo 128	3.3.2	O.3	BLI:m ¬BLI:o

3.3.2 Procedures, packet types and packet formats

Base Standard Features				Profile Features
Item	Protocol feature	References	Status	Status
P2	Do all transmitted packets consist of an integral number of octets?	3	O	m

3.3.3 Miscellaneous features and options

Base Standard Features				Profile Features
Item	Protocol feature	References	Status	Status
	Clearing Cause field	4.2.3.1, 4.2.3.2		
Y3a	other cause passed unchanged	table13/X.75	O.6	m
Y3b	other cause changed to "Network Congestion"	table 14/X.75	O.6	x

3.3.4 Network Utilities

Base Standard Features				Profile Features
Item	Protocol feature	References	Status	Status
US3i	Throughput class indication	5.3.3, 5.4.3.3	O	m
US4i	Window size indication	5.3.4, 5.4.3.4	O	m
US5i	Packet size indication	5.3.5, 5.4.3.5	O	m
US6	Fast select indication	5.3.6, 5.4.3.6	O	m
US9	Reverse Charging indication	5.3.9, 5.4.3.6	O	x
US13i	Transit delay indication	5.3.13, 5.4.3.11	O	m
US14	Transit delay selection	5.3.14, 5.4.3.12	O	m
US15i	Tariffs	5.3.15, 5.4.3.13	O	x
US18i	Utility marker	5.3.18, 5.4.3.16	MS:M ¬MS:O	m
MS1	Security level selection	ST4249 C2	O	m
MS2	Priority level selection	ST4249 C2	O	m
MS2a	Priority to gain a connection		MS2:M	m
US3r	Throughput class indication	5.3.3, 5.4.3.3	O	m
US4r	Window size indication	5.3.4, 5.4.3.4	O	m
US5r	Packet size indication	5.3.5, 5.4.3.5	O	m
US13r	Transit delay indication	5.3.13, 5.4.3.11	O	m
US15r	Tariffs	5.3.15, 5.4.3.13	O	x
US18r	Utility marker	5.3.18, 5.4.3.16	MS:M ¬MS:O	m
US15d	Tariffs	5.3.15, 5.4.3.13	O	x
US18d	Utility marker	5.3.18, 5.4.3.16	MS:M ¬MS:O	m
UR9	Reverse charging indication	5.3.9, 5.4.3.6	O	x
UR14	Transit delay selection	5.3.14, 5.4.3.12	O	m
UR15i	Tariffs	5.3.15, 5.4.3.13	O	x
UR18i	Utility marker	5.3.18, 5.4.3.16	MR:M ¬MS:O	m
MR1	Security level selection	ST4249 C2	O	m
MR2	Priority level selection	ST4249 C2	O	m
MR2a	Priority to gain a connection		MR2:M	m
UR15r	Tariffs	5.3.15, 5.4.3.13	O	x
UR18r	Utility marker	5.3.18, 5.4.3.16	MR:M ¬MR:O	m
UR15d	Tariffs	5.3.15,5.4.3.13	O	x
UR18d	Utility marker	5.3.18,5.4.3.16	MR:M ¬MR:O	m

3.3.5 Parameter Values and Ranges

Base Standard Features				Profile Features
Item	Protocol feature	References	Status	Status
PV19	Can different PVCs have different throughput classes?	3.4.1.1	O	m

3.4 Data Link layer NPRL

3.4.1 Terrestrial Short Delay Link Layer NPRL

Base Standard Features				Profile Features
Item	Protocol feature	References	Status	Status
	Frame sequence numbering:			
M8	Basic (modulo-8)	2.1.5, 2.3.2.2.1	O.1	m
M128	Extended (modulo-128)	2.1.5, 2.3.2.2.1	O.1	BLI:m ¬BLI:o
	Octet alignment:			
F1a	Capable of sending non-octet aligned frames	2.3.5.3	O	x
F1b	Received non-octet aligned frame considered as invalid	2.3.5.3	O	m
	Control field formats:			
F2d	frames with I,S and U format modulo-128	Table 4a	M128:O.2	M128:m
F2e	frames with alternative U format modulo-128	Table 4b	M128:O.2	x
F3	Single flag accepted as a separation between two frames	2.2.2	O	m

3.5 Physical layer NPRL (STANAG 4213)

Base Standard Features				Profile Features
Item	Protocol feature	References	Status	Status
Da	Asynchronous data (D)		O	-
Ds	Synchronous data (D)		O	m
Fx	Fax (Fx)		O	-
Tg	Direct Telegraph (Tg)		O	-
SF	Store and Forward (S & F)		O	-
ADa	D @ 16 kbit/s Class 1	C/3 Table 3	Ds:O	o
ADb	D @ 2.4 bit/s Class 3	C/3 Table 3	Ds:O	o
ADc	D @ 2.4 kbit/s Class 4	C/3 Table 3	Ds:O	o
ADd	D @ 9.6 kbit/s Class 4	C/3 Table 3	Ds:O	m
ACS	Is 2.4 kbit/s Class 4 supported for circuit switched data?	C/3 Table 3	Ds:M	-
BII	Do the Transmit and Receive sides support the Bit interleaving protocol ? (for further study)	C/13.a.1	(TBS)	x

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ANNEX C (normative)

NATO PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (NPICS) PROFORMA FOR THE DATA LINK LAYER – (for Short Delay Links)

This NPICS proforma is a provisional PICS proforma developed by NATO (because no PICS proforma exists for ITU-T rec. X.75).

Subclause 1. GENERAL CHARACTERISTICS - FRAME STRUCTURE - LINK PROTOCOLS

Base standard feature				
Item	Protocol feature	References	Status	Support
Ls	Single link protocol	2.2, 2.3, 2.4	M	Y[]
*Lm	Multilink protocol	2.5	O	Y[] N[]
Lab	Assignment of A and B addresses (Note 1)	2.4.2	M	Y[]
Lcd	Assignment of C and D addresses	2.4.2	Lm:M	N/A[]Y[]
	Frame format			
	Frame sequence numbering:			
*M8	Basic (modulo-8)	2.1.5,2.3.2.2.1	O.1	Y[] N[]
*M128	Extended (modulo-128)	2.1.5,2.3.2.2.1	O.1	Y[] N[]
	Octet alignment:			
F1a	Capable of sending non-octet aligned frames	2.3.5.3	O	Y[] N[]
F1b	Received non-octet aligned frames	2.3.5.3	O	Y[] N[]
	General frame formats:			
F2a	for modulo-8 frame sequence numbering	Tables 1	M8:M	N/A[]Y[]
F2b	for modulo-128 frame sequence numbering	Tables 2	M128:M	N/A[]Y[]
	Control field formats:			
F2c	frames with I,S and U format modulo-8	Table 3	M8:M	N/A[]Y[]
F2d	frames with I,S and U format modulo-128	Table 4a	M128:O.2	N/A[]Y[]N[]
F2e	frames with alternative U format modulo-128	Table 4b	M128:O.2	N/A[]Y[]N[]
F3	Single flag accepted as a separation between two frames	2.2.2	O	Y[] N[]
F4	May transmit a single flag to separate two frames	2.2.2	O	Y[] N[]
IF	Invalid frames discarded and no action taken	2.3.5.3	M	Y[]
FAa	Support of abortion for transmitted frames	2.2.10	O	Y[] N[]
FAb	Aborted frames treated as invalid	2.2.10	O	Y[] N[]
ITF	Interframe time filled with contiguous flags	2.2.11	M	Y[]
LCS1	'Idle channel' state characterized by at leeast 15 contiguous ones	2.2.12.2	M	Y[]
LCS2	'Idle channel' state for more than T3 reported to higher layers	2.3.5.5	M	Y[]
	Support of link set up			
LS0	Transmission of contiguous flags to indicate ability to set up the link	2.4.4.1	M	Y[]
LS1	Initiation of link set up	2.4.4.1	M	Y[]
	Response to link set up attempted by the far end by:			
LS4	acceptance and entry into the 'Information transfer' phase	2.4.4.1	M	Y[]
LS5	denial with a DM response	2.4.4.1	M	Y[]
	Support of link disconnection			
LD1	Initiation of link disconnection	2.4.4.5.1	M	Y[]
LD2	Response when sent and received commands are different	2.4.4.5.2	M	Y[]
	Collisions of unnumbered commands			
LCRa	Resolution when sent and received commands are the same	2.4.4.5.1	M	Y[]
LCRd	Resolution when sent and received commands are different	2.4.4.5.1	M	Y[]
	Disconnected phase			
D1	Action taken in the 'Disconnected' phase on receipt of frames	2.4.4.4.1	M	Y[]

Subclause 1. GENERAL CHARACTERISTICS - FRAME STRUCTURE - LINK PROTOCOLS (cont'd)

Item	Protocol feature	References	Status	Support
	Support of information transfer			
	Transmission of I frames	2.4.5.1	M	Y[]
IT	in the 'Information transfer' phase	2.4.5.1	M	Y[]
ITb	continued whilst in a 'Busy' condition	2.4.5.1	O	Y[]N[]
ITfr	in case of a 'Frame rejection' condition			
ITC	Initiation of recovery by transmitting I or S frames with P=1	2.4.3	M	Y[]
ITRJ	I frame retransmission on receipt of REJ	2.4.5.6	M	Y[]
	On receipt of an RNR frame with some N(R) value:			
ITBa	transmission of a last I frame if N(R)=V(S) (see Note 2)	2.4.5.7	O.3	Y[]N[]
ITBb	interruption of I frame (re)transmission (see Note 2)	2.4.5.7	O.3	Y[]N[]
	Reception of I frames:			
IRi	in the 'Information transfer' phase	2.4.5.2	M	Y[]
IRb	data accepted whilst in a 'Busy' condition	2.4.5.2.2	O	Y[]N[]
IRRJ	Initiation of REJ recovery on <r> I frame with N(S) sequence error	2.4.5.4, 2.3.5.2	M	Y[]
	Busy condition			
IRB	Support of the 'Busy' condition	2.3.5.1, 2.4.5.8	M	Y[]
	Link resetting			
	Initiation of Link resetting whilst in the 'Information transfer'phase			
LR1a	after a Busy condition is cleared	2.4.7.2	M	Y[]
LR1b	on receipt of an FRMR response	2.4.7.3	M	Y[]
LR2	Request to the far end to reset the link by <s> FRMR	2.3.4.9, 2.4.7.3	M	Y[]
LR3	Support of link resetting procedures on <r> SABM/SABME	2.4.7.3	M	Y[]
	Frame rejection condition			
FR1	Conditions to enter the 'Frame rejection' condition	2.3.4.9	M	Y[]
FR3	Support of the 'Frame rejection' condition	2.3.5.4	M	Y[]
	Timer recovery			
	Support of timer controlled repetition up to N2 times at T1 intervals for:			
T1a	I frames	2.4.5.1, 2.4.5.9	M	Y[]
T1b	SABM/SABME	2.4.4.1	M	Y[]
T1c	DISC	2.4.4.3	M	Y[]
*T1d	FRMR	2.4.7.3	O	Y[]N[]
T1f	RR or RNR commands with P=1	2.4.5.9	M	Y[]
	Actions taken after N2 unsuccessful attempts with the following frames:			
N2c	I frame with P=1 : link resetting	2.4.5.9	M	Y[]
N2b	SABM/SABME : appropriate recovery action	2.4.4.1	M	Y[]
N2a	DISC: recovery at a higher layer	2.4.4.3	M	Y[]
N2d	FRMR : link resetting	2.4.7.3	T1d:M	N/A[]Y[]
N2f	RR or RNR commands with P=1 : link resetting	2.4.5.9	M	Y[]

Note 1: Addresses A and B are defined according to the rules in STANAG 4208, Annex E, - the defined master being allocated address A.

Note 2: in the Base Standard, exactly one of Items ITBs and ITBb shall be implemented.

Subclause 2. LIST OF SYSTEM PARAMETERS

Item	Protocol feature	References	Status	Support
SPT1	Timer T1	2.4.8.1		
	minimum value		value	[ ]
	maximum value		value	[ ]
SPT2	TimerT2	2.4.8.2		
	minimum value		value	[ ]
	maximum value		value	[ ]
SPT3	Timer T3	2.4.8.3		
	minimum value		value	[ ]
	maximum value		value	[ ]
SPN2	Maximum number of attempts to complete a transmission (N2>1)	2.4.8.4	value	[ ]
	Maximum number of bits in an I frame:			
SPN1b	Modulo-8 numbering (N1≥1080 bits)	2.4.8.5	value	[ ]
SPN1e	Modulo-128 numbering (N1≥1088 bits)	2.4.8.5	value	[ ]
	Maximum number of outstanding I frames:			
SPK8	Modulo-8 numbering k≥7	2.4.8.6	M8:M	N/A[]Y[]
SPK128	Modulo-128 numbering k≥127	2.4.8.6	M128:M	N/A[]Y[]

Value in seconds. No specific values are given in the base standard.

Subclause 3. GENERAL FEATURES OF THE MULTILINK PROCEDURE

If the STE does not support Multilink operation i.e. Item Lm, mark N/A and skip all remaining
Subclauses of this Appendix

N/A[]

Item	Protocol feature	References	Status	Support
	Multilink frame			
MFF	Multilink frame structure	2.5.2	M	Y[]
MFFa	Mulitlink Control field format and parameters	2.5.3	M	Y[]
	Multilink procedures			
MPI	Initialization procedure	2.5.4.1	M	Y[]
MPrp	Multilink resetting procedure	2.5.4.2	M	Y[]
MPIs	Multilink frame transmission procedure	2.5.4.3	M	Y[]
MPIr	Multilink frame reception procedure	2.5.4.4	M	Y[]
MPIb	Multilink frame retransmission procedure	2.5.4.5	M	Y[]
MPo	Procedure for taking an SLP out of service	2.5.4.6	M	Y[]
MPV	Void sequencing bit (V)	2.5.3.2.1	O	Y[] N[]
MPS	Sequence check option bit (S)	2.5.3.2.2	O	Y[] N[]
MPR	MLP reset request bit (R)	2.5.3.2.3	O	Y[] N[]
MPC	MLP reset confirmation bit (C)	2.3.5.2.4	O	Y[] N[]
MPW	Multilink windows size (MW)	2.5.3.2.9	M	Y[]
MPX	Receive MLP window guard region (MX)	2.5.3.2.10	M	Y[]
MPLt	Lost frame detection under timer control (MT1)	2.5.4.4	M	Y[]
MPBt	Group busy detection under timer control (MT2)	2.5.4.4	O	Y[] N[]
MPRt	MLP reset under timer control (MT3)	2.5.4.2	M	Y[]

Subclause 4. MULTILINK PROCEDURE - LIST OF SYSTEM PARAMETERS

Item	Protocol feature	References	Status	Support
SPN1	Maximum number of bits in I frame N1≥1080	2.4.8.5	value	[ ]
SPMW	Multilink window size MW≥4095-MX	2.5.3.2.9	value	[ ]
SPMX	Receive MLP window guard region MX	2.5.3.2.10	value	[ ]
SPMT1	Lost frame timer MT1	2.5.5.1	value	[ ]
SPMT2	Group busy timer MT2	2.5.5.2	value	[ ]
SPMT3	MLP reset confirmation timer MT3	2.5.5.3	value	[ ]

ANNEX D

MILITARY APPLICATION OF THE X.75 PACKET LAYER PROTOCOL WITH LAYER 3 NPICS PROFORMA

Appendices

1. NATO Protocol Implementation Conformance Statement (NPICS) Proforma
2. Procedures and Formats for Military Enhancements to ITU-T Rec. X.75 (1988)

Related Documents

1.	STANAG 4250	NATO reference Model for Open Systems Interconnection.
2.	AC/302(SG/9)D48 incorporated in	NATO OSI Security Architecture (NOSA). (To be STANAG 4250 Part 2 - security.)
3.	STANAG 4214	International routing and directory for tactical communication systems.
4.	ITU-T Rec. X.1(1988)	International user classes of service in public data networks and Integrated Services Digital Networks (ISDNs).
5.	ITU-T Rec. X.2(1988)	International data transmission services and optional user facilities in public data networks and ISDNs.
6.	ITU-T Rec. X.25(1988)	Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit.
7.	ITU-T Rec. X.75(1988)	Packet-switched signalling system between public networks providing data transmission services.

AREA OF USE

1. This annex specifies a protocol to be used in NATO for the interconnection at the network layer of two packet-switched data networks. It is based on the appropriate civil standards, specifically the packet layer protocol (PLP) of ITU-T rec. X.75 (1988) (ref. 7) but provides for enhancements in order to meet the specific military requirements identified by NATO (ref. 1).

2. This specification applies to the interconnection of subnetworks whose access protocol conforms to ITU-T rec. X.25.

OVERVIEW OF THE PROTOCOL

3. X.75(88) defines a subnetwork interface protocol (the PLP) which includes the following characteristics and services:

   a. connection mode operation (i.e. there are connection establishment and release phases);

   b. statistical multiplexing of several virtual circuits on to a data link;

   c. flow control;

   d. Quality of Service (QOS) negotiation (between the two networks);

   e. operation on 64 kbit/s, 32 kbit/s or 16 kbit/s (optionally 48 kbit/s) or any other internationally recognized rate by bilateral agreement;

   f. interrupt packets;

4. The X.75(88) PLP requires an underlying Data Link Layer service which provides a:

   a. negligible residual bit-error rate
   b. negligible out-of-sequence rate
   c. negligible duplication rate
   d. negligible packet loss rate

PROTOCOL SPECIFICATION

5. The protocol between subnetworks shall be as specified in ITU-T rec. X.75 (1988) (ref. 7) together with the military enhancements specified in Appendix 2 to this Annex. The following sections of ref. 7 apply:

   a. Section 3: Packet layer procedures between signalling terminals
   b. Section 4: Packet formats for virtual calls and permanent virtual circuits
   c. Section 5: Procedures and formats for user facilities and network utilities
   d. Annexes A through F.

Note:

D1. The ITU-T rec. X.75(88) does not contain a PICS Proforma. A preliminary NATO PICS (NPICS) Proforma has therefore been developed by NATO which can be found in Appendix 1 to this Annex.

PROVISION OF SPECIFIC MILITARY FEATURES

6. The following Specific Military Features can be accommodated, to varying degrees, by extensions to the X.75 PLP:

   a. Security
   b. Precedence and pre-emption

Both these require STE and transit network action and are therefore mapped into X.75 network utilities. The procedures and formats are specified in Appendix 2 to this Annex.

Note:

D2. The military interface bit rates (16 and 32 kbit/s) are not included in the signalling aspects of this STANAG, due to a potential conflict between ISO and NATO in the choice of available codes. In circumstances where a Throughput Class has to be signalled, and where 16 or 32 kbit/s would be the correct value, it is recommended that a Throughput Class nearest in value to the correct value is selected from the STANAG and signalled in its place.

SECURITY

7. Annex D specifies three mechanisms for providing security at the DTE-DCE interface in the NATO OSI Network service:

   a. The subnetwork-independent Trusted Communications Sub-layer TCS), as defined in NOSA (ref. 2);

   b. The Protection Quality of Service parameter, mapped in the protocol to the X.25(88) Protection facility.

   c. Enhancements to the X.25(88) protocol which enable exchange of security related information between the DTE and the subnetwork for the case when the subnetwork is capable of providing security services (presently only confidentiality).

Since TCS operates above the X.25 and X.75 PLP, it is transparent to this protocol. As specified in X.75(88), the Protection facility is relayed unchanged by the protocol and no action is taken based on its value(s). Enhancements of X.75(88) to provide for signalling

of security related information are specified in Appendix 2 to this Annex (i.e. relaying between subnetworks of DTE-DCE signalling in item c. above).

PRECEDENCE AND PREEMPTION

8. The requirement for preferential handling of calls and traffic in military networks differs from that in present day PTT systems. The DTE facility specified in ITU-T rec. X.25(88) is not intended for signalling to the subnetwork, and therefore does not solve this problem.

This specification therefore extends the precedence and pre-emption user facility specified in Annex D for DTE-DCE operation according to ITU-T rec. X.25(88) to X.75(88) for operation across a gateway.

9. There are three priority parameters, each associated with a particular use in the subnetwork:

a. Priority to gain a connection. This is used to handle call setup packets according to priority rather than on a first come, first served, basis.

b. Priority to keep a connection. This is used to decide which connection to set up or preempt when there is insufficient capacity in the network or at the DTE-DCE interface.

c. Priority to transfer data over a connection. This is used to handle data packets according to priority rather than on a first come, first served, basis.

If a network does not support all three parameters, the "Priority to keep a connection" and "Priority to transfer data over a connection" may be set to "not set" and the value given for "Priority to gain a connection" is used by the subnetwork for all precedence and pre-emption handling.

10. Enhancements to X.75(88) to handle precedence and pre-emption are specified in Appendix 2 to this Annex.

PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT

11. As ITU-T recommendation X.75(88) does not contain a PICS Proforma, a provisional one has been included with this Annex in Appendix 1.

APPENDIX 1 (NORMATIVE) TO ANNEX D

NATO PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (NPICS) PROFORMA

1. INTRODUCTION

For a protocol implementation which is claimed to conform to Annex D to STANAG 4249 the following NATO Protocol Implementation Conformance Statement (NPICS) proforma shall be completed.

For a NATO standard, the NPICS corresponds to the Protocol Implementation Conformance Statement (PICS) defined in ISO/IEC 9646-1 for an International Standard. The term NPICS is used to avoid confusion where the requirements for NPICS and PICS differ. Since no PICS proforma for ITU-T recommendation X.75 exists, a complete NPICS proforma has been developed by NATO.

A completed NPICS proforma is the NPICS for the implementation in question. The NPICS is a statement of which capabilities and options of the protocol have been implemented. The NPICS can have a number of uses, including use:

- by the protocol implementor, as a check-list to reduce the risk of failure to conform to the standard through oversight;

- by the supplier and acquirer - or potential acquirer - of the implementation, as a detailed indication of the capabilities of the implementation, stated relative to the common basis for understanding provided by the standard NPICS proforma;

- by the user - or potential user - of the implementation, as a basis for initially checking the possibility of interworking with another implementation (note that, while interworking can never be guaranteed, failure to interwork can often be predicted from incompatible NPICSs);

- by a protocol tester, as the basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

Note:

D1.1. All material in the base standard, i.e. Annex D to STANAG 4249 and the referenced ITU-T recommendation X.75 (1988), is considered mandatory unless another status is specifically indicated in this NPICS Proforma.

2 ABBREVIATIONS AND SPECIAL SYMBOLS

2.1 Status symbols

M	mandatory
O	optional
O.<n>	optional, but support of at least one, or exactly one, of the group of options labelled by the same numeral <n> is required
X	prohibited
<pred>:	conditional-item symbol, including predicate identification, see 3.4
¬	logical negation, applied to a conditional item's predicate

2.2 Abbreviations

GFI	General Format Identifier
LC	Logical Channel
LCGN	Logical Channel Group Number
LCN	Logical Channel Number
N/A	Not Applicable
NPICS	NATO Protocol Implementation Conformance Statement
PTI	Packet Type Identifier
PVC	Permanent Virtual Circuit
VC	(switched) Virtual Call
<r>	Receive (packet)
<s>	Send (packet)

2.3 Item references

Items in the NPICS proforma are identified by mnemonic item references. NPICS items dealing with related functions are identified by item references sharing the same initial letter or letter-pair (in capitals). There follows a list of those initials, in the order in which the groups of items occur in the NPICS proforma.

V	permanent Virtual circuit or Virtual call service
E	Environment
M	Modulo 8 or 128 packet sequence numbers
L	Link layer interactions
P	general Packet formatting
Z	packet layer functions independent of logical channels (packets with logical channel identifier = Zero)
S	call Setup
C	call Clearing

RS	ReSetting of logical channels
I	Interrupt transfer
DB	Delivery confirmation Bit (D bit)
MB	More data Bit (M bit)
QB	Qualifier Bit (Q bit)
DN	D bit in Call Setup packets
Y	cause and diagnostic code values (whY resets, etc., initiated)
B	X.75 (1980) and X.75 (1984) interworking: Backward compatibility
US	Utilities Sent during call setup and clearing
MS	Military utilities Sent during call setup and clearing
UR	Utilities Received during call setup and clearing
MR	Military utilities Received during call setup and clearing
MP	Military Preemption utility
FP	Facilities Prohibited in user facility field
FT	Facilities conveyed Transparently
PV	Parameter Values and ranges
T	Timers
LC	Logical Channel ranges

2.4 Base Standard References

The generic format of a reference of the NPICS proforma is:

<Paragraph>

for a reference to main STANAG part, and

[<Part>]<Annex>[<Appendix>]/<Paragraph>

for all other STANAG references.

<Part>	= A capital Roman number	(I, II, etc.)
<Annex>	= An uppercase letter	(A, B, etc.)
<Appendix>	= A number or uppercase letter	(A, B, etc., 1, 2, etc.)
<Paragraph>	= <n>.[<n>] or <n>.[<x>] as appropriate	
[ ]	enclose an optional entry	
<>	denote a generic identifier	
<n>	A numeral (1, 2, 3 etc.)	
<x>	A lowercase letter (a, b, c etc.)	

In the case when there are references to one or more ITU-T or ISO base standards in addition to STANAG references, the STANAG references shall be prefixed by "STxxxx", while the ITU-T or ISO references are direct to chapters, paragraphs etc.

Such ITU-T or ISO base standards shall be listed in the "Related Documents"-sections of this STANAG or STANAG Annex, to which this PICS Proforma is attached. If more than one ITU-T or ISO standard is referenced in the NPICS Proforma, only one reference should be used in each table, with the reference stated above the table.

3. INSTRUCTIONS FOR COMPLETING THE NPICS PROFORMA

3.1 General Structure of the NPICS Proforma

The first part of the NPICS proforma - Implementation Identification and Protocol Summary - is to be completed as indicated with the information necessary to identify fully both the supplier and the implementation.

The main part of the NPICS proforma is a fixed-format questionnaire, divided into a number of major subclauses; these can be divided into further subclauses each containing a group of individual items. Answers to the questionnaire items are to be provided in the rightmost column, either by simply marking an answer to indicate a restricted choice (usually Yes or No), or by entering a value or a set or range of values. There are some items where two or more choices from a set of possible answers can apply: all relevent choices are to be marked.

Each item is identified by an item reference in the first column; the second column contains the question to be answered; the third column contains the reference or references to the ITU-T recommendation X.75, 1988 version, except that references to Appendix 2 of this Annex follows 2.4 above. Also some references are to ITU-T Rec. X.25 (1988), but these are clearly marked. The remaining columns record the status of the item - whether support is mandatory, optional, prohibited or conditional - and provide the space for the answers: see also 3.4 below.

A supplier may also provide - or be required to provide - further information, categorized as either Additional Information or Exception Information. When present, each kind of further information is to be provided in a further subclause of items labelled A<i> or X<i> respectively for cross-referencing purposes, where <i> is any unambigious identification for the item (e.g. simply a numeral): there are no other restrictions on its format and presentation.

A completed NPICS proforma, including any Additional Information and Exception Information, is the NATO Protocol Implementation Conformance Statement for the implementation in question.

Note:

D1.2. Where an implementation is capable of being configured in more than one way, a single NPICS may be able to describe all such configurations. However, the supplier has the choice of providing more than one NPICS, each covering some subset of the implementation's configuration capabilities, in case that makes for easier and clearer presentation of the information.

3.2 Additional Information

Items of Additional Information allow a supplier to provide additional information intended to assist the interpretation of the NPICS. It is not intended or expected that a large quantity will be supplied, and an NPICS can be considered complete without any such information. Examples might be an outline of the ways in which a (single) implementation can be set up to operate in a variety of environments and configurations; or a brief rationale - based perhaps upon specific application needs - for the exclusion of features which, although optional, are nonetheless commonly present in implementations of this protocol.

References to items of Additional Information may be entered next to any answer in the questionnaire, and may be included in items of Exception Information.

3.3 Exception Information

It may occasionally happen that a supplier will wish to answer an item with mandatory or prohibited status (after any conditions have been applied) in a way that conflicts with the indicated requirement. No pre-printed answer will be found in the Support column for this: instead, the supplier shall write the missing answer into the Support column, together with an X<i> reference to an item of Exception Information, and shall provide the appropriate rationale in the Exception item itself.

An implementation for which an Exception item is required in this way does not conform to Annex C to the attachment to STANAG 4249.

Note:

D1.3. A possible reason for the situation described above is that a defect in the standard has been reported, a correction for which is expected to change the requirement not met by the implementation.

3.4 Conditional status

3.4.1 Conditional items

The NPICS proforma contains a number of conditional items. These are items for which the status - mandatory, optional or prohibited - that applies is dependent upon whether or not certain other items are supported, or upon the values supported for other items.

In many cases, whether or not the item applies at all is conditional in this way, as well as the status when the item does apply.

Where a group of items is subject to the same condition for applicability, a separate preliminary question about the condition appears at the head of the group, with an instruction to skip to a later point in the questionnaire if the "Not Applicable" answer is selected. Otherwise, individual conditional items are indicated by one or more conditional symbols (on separate lines) in the status column.

A conditional symbol is of the form "<pred>:<x>" where "<pred>" is a predicate as described in 3.4.2 below, and "<x>" is one of the status symbols M, O, O.<n> or X.

If the value of the predicate in any line of a conditional item is true (see 3.4.2), the conditional item is applicable, and its status is that indicated by the status symbol following the predicate; the answer column is to be marked in the usual way. If the value of a predicate is false, the Not Applicable (N/A) answer is to be marked in the relevant line. Each line in a multi-line conditional item should be marked.

3.4.2 Predicates

A predicate is one of the following:

a. an item-reference for an item in the NPICS proforma: the value of the predicate is true if the item is marked as supported, and is false otherwise; or

b. a predicate name, for a predicate defined elsewhere in the NPICS proforma item: see below; or

c. the logical negation symbol "¬" prefixed to an item-reference or predicate name; the value of the predicate is true if the value of the predicate formed by omitting the "¬" is false, and vice versa.

The definition for a predicate name is a boolean expression constructed by combining simple predicates, as at a. or b. above, using the boolean operators AND, OR and NOT, and parentheses, in the usual way. The value of such a predicate is true if the boolean expression evaluates to true when the item-references are interpreted as at a. above.

Each item whose reference is used in a predicate or predicate definition is indicated by an asterisk in the Item column.

4 IDENTIFICATION

4.1 Implementation identification

Nation/Supplier	
Contact point for queries about the NPICS	
Implementation Name(s) and Version(s)	
Other information necessary for full identification - e.g. name(s) and version(s) of machines and/or operating systems; system names	

NOTES

1. Only the first three items are required for all implementations; other information may be completed as appropriate in meeting the requirement for full identification.

2. The terms Name and Version should be interpreted appropriately to correspond with a supplier's terminology (e.g. Type, Series, Model).

4.2 Protocol identification

Identification of protocol specification	STANAG 4249 Annex D (X.75)
Identification of amendments and corrigenda to this NPICS proforma which have been completed as part of this NPICS	Am. : Corr. : Am. : Corr. : Am. : Corr. : Am. : Corr. :
Have any Exception items been required (see 3.3)? (The answer Yes means that the implementation does not conform to STANAG 4249 Annex D (X.75)	No [] Yes[]

Date of Statement	

5 GENERAL CHARACTERISTICS

Item	Protocol Feature	References	Status	Support
	Service:			
* Vs	- Virtual Call (VC)	3	0.1	Yes[] No []
* Vp	- Permanent Virtual Circuit (PVC)	3	0.1	Yes[] No []
	Is the implementation interoperable with:			
Ec/8	- 1988-version		0.2	Yes[] No []
*Ec/4	- 1984-version		0.2	Yes[] No []
*Ec/0	- 1980-version		0.2	Yes[] No []
	Packet sequence numbering:			
*M8	- Modulo 8	3.3.2	0.3	Yes[] No []
*M128	- Modulo 128	3.3.2	0.3	Yes[] No []
	Addressing:			
A4214	- Is addressing according to ST 4214 supported		M	Yes[]
Ax121	- Is addressing according to ITU-T Rec . X.121 supported		O	Yes[] No []
Adnni	- Is DNIC coding according to ST 4249 supported	ST 4249 D2	M	Yes[]
Adnx	- Is DNIC coding according to ITU-T supported		Ax121:M	N/A[] Yes []

Predicate usage:

Vs is used in items (PV20), T31, T33, LC8; and in 6.4, 7.1, 7.2, 7.3, 8, 11.1
Vp is used in item LC7; and in 11.2
Ec/O is used in 7.2
Ec/4 is used in 7.3
M8 is used in items PV2s, PV2r, PV10s, PV10r, PV15s, PV15r
M128 is used in items PV2s, PV2r, PV10s, PV10r, PV15s, PV15r

Support for group of options:

O.1 Support for at least one of these options is required.
O.2 Support for at least one of these options is required.
O.3 Support for at least one of these options is required.

6 PROCEDURES, PACKET TYPES AND PACKET FORMATS

6.1 Link Layer Interactions

Item	Protocol Feature	References	Status	Support
	Is restarting of the packet layer initiated:			
L1a	- on completion of Link Layer initializ	3.6	M	Yes[]
L1b	- on recovery from failure of the Lin Layer?	3.6	M	Yes[]
* L2	- Can packets consisting of a non-integral number of octets be received from the Link Layer?	3	O	Yes[] No []

Predicate usage: L2 is used in item P1.

6.2 General Packet Formatting

Item	Protocol Feature	References	Status	Support
P1	If Yes to item L2, are such packets treated as erroneous?	3. Table C4/X.75	L2: O	N/A[] Yes[] No []
P2	Do all transmitted packets consist of an integral number of octets?	3	O	Yes[] No []
P3	Do all transmitted packets contain the fields specified in the referenced clauses and tables?	4	M	Yes[]
P4	Are all received packets that do not contain valid GFI, LCGN, LCN and PT treated as erroneous?	4.1.1, table 11/X.75, 4.1.2, 4.1.3, 4.1.4, table 12/X.75	M	Yes[]

6.3 Packet Layer Functions Independent of logical channels

Item	Protocol Feature	References	Status	Support
	Are the following PL functions supported? Restarting the packet layer:			
Z1i	- as initiator <s> RESTART REQUEST <r> RESTART CONFIRMATION	3.5, 3.5.1, 3.5.2, 3.5.1 4.5.1 4.5.2	M	Yes[]
Z1r	- as responder <r> RESTART REQUEST <s> RESTART CONFIRMATION	3.5.1 4.5.1 4.5.2	M	Yes[]

6.4 Call setup and clearing

If the Virtual Call service, item Vs, is not supported, mark N/A and continue at 6.5: N/A[]

6.4.1 Call Setup

Item	Protocol Feature	References	Status	Support
	Outgoing VCs supported (Note 1):	3.1, 3.1.2, 3.1.4		
S1a	- Fast Select, no restriction on response?	5.3.6	M	Yes[]
S1b	- Fast Select with restricted response?	5.3.6	M	Yes[]
S1c	- non-Fast-Select?	3.1.2, 3.1.3	M	Yes[]
SP1b	<s> CALL REQUEST, basic format	4.2.1	M	Yes[]
SP1e	<s> CALL REQUEST, extended format (Note 2)	4.2.1	O	Yes[] No []
SP2b	<r> CALL CONNECTED, basic format	4.2.1	M	Yes[]
SP2e	<r> CALL CONNECTED, extended format (Note 2)	4.2.2	M	Yes[]
	Incoming VCs supported:	3.1, 3.1.3, 3.1.4		
S2a	- Fast Select, no restriction on response?	5.3.6	M	Yes[]
S2b	- Fast Select, with restricted response?	5.3.6	M	Yes[]
S2c	- non-Fast-Select	3.1.3	M	Yes[]
SP3b	<r> CALL REQUEST, basic format	4.2.1	M	Yes[]
SP3e	<r> CALL REQUEST, extended format (Note 2)	4.2.1	M	Yes[]
SP4b	<s> CALL CONNECTED, basic format	4.2.2	M	Yes[]
SP4e	<s> CALL CONNECTED, extended format (Note 2)	4.2.2	O	Yes[] No []

Note 1: The "master" according to the rules stated in STANAG 4208, Annex E, shall allocate logical channels in ascending order."

Note 2: "extended format" relates to the maximum length allowed to the user data field when the Fast Select network utility is invoked for the virtual call.

6.4.2 Call Clearing

Item	Protocol Feature	References	Status	Support
CP1b	<r> CLEAR REQUEST, basic format	4.2.3	M	Yes[]
CP1e	<r> CLEAR REQUEST, extended format	4.2.3	M	Yes[]
CP2b	<s> CLEAR REQUEST, basic format	4.2.3	M	Yes[]
CP2e	<s> CLEAR REQUEST, extended format	4.2.3	M	Yes[]

6.5 Resetting of Logical Channels

Item	Protocol Feature	References	Status	Support
	Is resetting supported:	3.4.2		
RSi	- as initiator?	3.4.2.1, 3.4.2.2, 3.4.2.3	M	Yes[]
	<s> RESET REQUEST	4.4.3		
	<r> RESET CONFIRMATION	4.4.4		
RSr	- as responder?	3.4.2.1, 3.4.2.2, 3.4.2.3	M	Yes[]
	<r> RESET REQUEST	4.4.3		
	<s> RESET CONFIRMATION	4.4.4		

6.6 Interrupt transfer

Item	Protocol Feature	References	Status	Support
	Is the interrupt procedure supported?	3.3.5		
Ii	- as initiator?		M	Yes[]
	<s> INTERRUPT	4.3.2		
	<r> INTERRUPT CONFIRMATION	4.3.3		
Ir	- as responder?		M	Yes[]
	<r> INTERRUPT	4.3.2		
	<s> INTERRUPT CONFIRMATION	4.3.3		

6.7 M, D and Q-Bit Procedures

Item	Protocol Feature	References	Status	Support
	For DATA packets are the following supported:			
DB	- Delivery confirmation (D bit) protocol?	3.3.4	M	Yes[]
MB	- More data (M bit) protocol?	3.3.4	M	Yes[]
QB	- Qualifier (Q bit) protocol?	3.3.4	M	Yes[]
DN	Is the use of D bit in Call Setup packet supported	3.1.2, 3.1.3	M	Yes[]

7. MISCELLANEOUS FEATURES AND OPTIONS

7.1 Values of Cause and Diagnostic Code Fields

Item	Protocol Feature	References	Status	Support
	Restarting Cause and Diagnostic Code fields:	4.5.1.1, 4.5.1.2		
Y1a	- other cause passed unchanged		O.4	Yes[] No []
Y1b	- other cause changed to Network Congestion"	table 17/X.75 table 18/X.75	O.4	Yes[] No []
	Resetting Cause and Diagnostic Code fields:	4.4.3.1, 4.4.3.2		
Y2a	- other cause passed unchanged		O.5	Yes[] No []
Y2b	- other cause changed to Network Congestion"	table 15/X.75 table 16/X.75	O.5	Yes[] No []
	If the Virtual Call service, item Vs, is not supported, mark N/A and continue at 7.2 below.			N/A[]
	Clearing Cause and Diagnostic Code fields:			
Y3a	- other cause passed unchanged	4.2.3.1, 4.2.3.2	O.6	Yes[] No []
Y3b	- other cause changed to "Network Congestion"	table 13/X.75 table 14/X.75	O.6	Yes[] No []

Support for group of options:

O.4 Support of exactly one of these options is required.
O.5 Support of exactly one of these options is required.
O.6 Support of exactly one of these options is required.

7.2 Interoperation with X.75 (1980)

If interoperation with X.75 (1980), item Ec/O, is not supported, mark N/A and continue at 7.3 N/A[]

Item	Protocol Feature	References	Support (Note 1)
	When interoperating with X.75 (1980) are any of the following ever transmitted:		
B1	INTERRUPT packets with User Data field longer than one octet?	3.3.5, 4.3.2	Yes[] No []
B2	RESTART REQUEST, CLEAR REQUEST or RESET REQUEST packets with bit 8 of the Cause code set to 1?	4.5.1.1, 4.2.3.1 4.4.3.1	Yes[] No []
	If the Virtual Call service item Vs is not supported mark N/A and continue at 7.3		N/A[]
B3	Packet size indication utility element offering a packet size of 2048 (Note 2)?	5.3.5	Yes[] No []
B4	CALL REQUEST, CALL CONNECTED or CLEAR REQUEST packets with User Facility fields longer than 63 octets?	Figure 5/X.75 figure 6/X.75 figure 7/X.75	Yes[] No []
B5	CLEAR REQUEST packets with non-zero Address Length or Facility Length fields?	4.2.3.1	Yes[] No []
B6	Called line address modified notification utility	5.3.10, Table 21/X.75	Yes[] No []
B7	Clearing network identification code utility	5.3.11, ST4249 C2 Table 21/X.75	Yes[] No []
B8	Transit delay indication utility	5.3.13, Table 21/X.75	Yes[] No []
B9	Transit delay selection utility	5.3.14, Table 21/X.75	Yes[] No []
B10	Tariffs	5.3.15, Table 21/X.75	Yes[] No []
B11	Network user identification	5.3.16,Table 21/X.75	Yes[] No []
B12	RPOA Selection	5.3.17, Table 21/X.75 ST4249 C2	Yes[] No []

NOTES

1. A "Yes" answer for any item indicates that operation is not compatible with X.75 (1980).
2. This item also covers the case of packet size 4096.

7.3 Interoperation with X.75 (1984)

If interoperation with X.75 (1984), item Ec/4, or Virtual Call Service, Item Vs, is not supported, mark N/A and continue at 8 N/A[]

Item	Protocol Feature	References	Support (Note 1)
	When interoperating with X.75 (1984) are any of the following ever transmitted:		
B13	Packet size indication utility element offering a packet size of 2048 (Note 2)?	5.3.5	Yes[] No[]
B14	Transit delay selection utility	5.3.14, Table 21/X.75	Yes[] No[]
B15	Tariffs	5.3.15, Table 21/X.75	Yes[]No[]
B16	Network user identification	5.3.16, Table 21/X.75	Yes[] No[]
B17	RPOA Selection	5.3.17, Table 21/X.75, ST4249 C2	Yes[] No[]

NOTES

1. A "Yes answer for any item indicates that operation is not compatible with X.75 (1984).
2. This item also covers the case of packet size 4096.

8 NETWORK UTILITIES

If the Virtual call services, item Vs, is not supported, mark N/A and continue at 11: N/A[]

8.1 Utilities sent During Call Setup and Clearing

Item	Protocol Feature	References	Status	Support
US0	General coding of utilities in transmitted packets	5.4.1, 5.4.2 table 21/X.75	M	Yes[]

8.1.1 Utilities sent in Call Request packets

Item	Protocol Feature	References	Status	Support
US1i	Transit network identification	5.3.1, 5.4.3.1 ST4249 D2	M	Yes[]
US2i	Call identifier	5.3.2, 5.4.3.2	M	Yes[]
*US3i	Throughput class indication	5.3.3, 5.4.3.3	O	Yes[] No []
*US4i	Window size indication	5.3.4, 5.4.3.4	O	Yes[] No []
*US5i	Packet size indication	5.3.5, 5.4.3.5	O	Yes[] No []
US6	Fast select indication	5.3.6, 5.4.3.6	O	Yes[] No []
US7	Closed user group indication	5.3.7, 5.4.3.7 ST4249 D2	O	Yes[] No []
US8	Closed user group with outgoing access indication	5.3.8, 5.4.3.7 ST4249 D2	O	Yes[] No []
US9	Reverse Charging indication	5.3.9, 5.4.3.6	O	Yes[] No []
US13i	Transit delay indication	5.3.13, 5.4.3.11	O	Yes[] No []
US14	Transit delay selection	5.3.14, 5.4.3.12	O	Yes[] No []
US15i	Tariffs	5.3.15, 5.4.3.13	O	Yes[] No []
US16i	Network User idenfication	5.3.16, 5.4.3.14	O	Yes[] No []
US17	RPOA Selection	5.3.17, 5.4.3.15 ST4249 D2	O	Yes[] No []
US18i	Utility marker	5.3.18, 5.4.3.16	MS:M ¬MS:O	N/A[] Yes[] N/A[] Yes[] No []

Predicate usage:

US3i is used in 11.1
US4i is used in 11.1
US5i is used in 11.1

8.1.2 Military utilities sent in Call Request packets

Item	Protocol Feature	References	Status	Support
MS1	Security level selection	ST4249 D2	O	Yes[] No []
MS2	Priority level selection	ST4249 D2	O	Yes[] No []
MS2a	- Priority to gain a connection		MS2:M	N/A[] Yes[]
MS2b	- Priority to keep a connection		MS2:O	N/A[] Yes[] No []
MS2c	- Priority to transfer data		MS2:O	N/A[] Yes[] No []

Predicate definitions and usage:
MS = MS1 OR MS2is used in US18i
MS2 is used in 8.2.2

8.1.3 Utilities sent in Call Connected packets

Item	Protocol Feature	References	Status	Support
US1r	Transit network identification	5.3.1, 5.4.3.1 ST4249 D2	M	Yes[]
US2r	Call identifier	5.3.2, 5.4.3.2	(Note 1)	Yes[] No []
*US3r	Throughput class indication	5.3.3, 5.4.3.3	O	Yes[] No []
*US4r	Window size indication	5.3.4, 5.4.3.4	O	Yes[] No []
*US5r	Packet size indication	5.3.5, 5.4.3.5	O	Yes[] No []
US10r	Called line address modified notification	5.3.10, 5.4.3.8	O	Yes[] No []
US13r	Transit delay indication	5.3.13, 5.4.3.11	O	Yes[] No []
US15r	Tariffs	5.3.15, 5.4.3.13	O	Yes[] No []
US16r	Network User idenfication	5.3.16, 5.4.3.14	O	Yes[] No []
US18r	Utility marker	5.3.18, 5.4.3.16	O	Yes[] No []

Predicate usage:
US3r is used in 11.1
US4r is used in 11.1
US5r is used in 11.1

Note 1: For further study.

8.1.4 Utilities sent in Clear Request packets

Item	Protocol Feature	References	Status	Support
US1d	Transit network identification	5.3.1 5.4.3.1 ST4249 D2	M	Yes[]
US10d	Called line address modified notification	5.3.10 5.4.3.8	O	Yes[] No []
US11	Clearing network identification code	5.3.11 5.4.3.9 ST4249 D2	O	Yes[] No []
US15d	Tariffs	5.3.15 5.4.3.13	O	Yes[] No []
US18d	Utility marker	5.3.18 5.4.3.16	O	Yes[] No []

8.2 Utilities received During Call Setup and Clearing

Item	Protocol Feature	References	Status	Support
UR0	General coding of utilities in received packets	5.4.1, 5.4.2, table 21/X75	M	Yes[]

For items in the following subclauses of 8.2 which are optional, mark "Ignore" for unsupported facilites that are ignored on receipt; mark "Error" for unsupported facilities that cause call clearing on receipt.

8.2.1 Utilities received in Call Request packets

Item	Protocol Feature	References	Status	Support
UR1i	Transit network identification	5.3.1, 5.4.3.1	M	Yes[]
UR2i	Call identifier	5.3.2, 5.4.3.2	M	Yes[]
*UR3i	Throughput class indication	5.3.3, 5.4.3.3	M	Yes[]
*UR4i	Window size indication	5.3.4, 5.4.3.4	M	Yes[]
*UR5i	Packet size indication	5.3.5, 5.4.3.5	M	Yes[]
UR6	Fast select indication	5.3.6, 5.4.3.6	M	Yes[]
UR7	Closed user group indication	5.3.7, 5.4.3.7 ST4249 C2	O (Note 1)	Yes[]Ignore[]Error[]
UR8	Closed user group with outgoing access indication	5.3.8, 5.4.3.7 ST4249 D2	O (Note 1)	Yes[]Ignore[]Error[]
UR9	Reverse Charging indication	5.3.9, 5.4.3.6	O	Yes[]Ignore[]Error[]
UR13i	Transit delay indication	5.3.13, 5.4.3.11	M	Yes[]
UR14	Transit delay selection	5.3.14, 5.4.3.12	O	Yes[]Ignore[]Error[]
UR15i	Tariffs	5.3.15, 5.4.3.13	O	Yes[]Ignore[]Error[]
UR16i	Network User idenfication	5.3.16, 5.4.3.14	O	Yes[]Ignore[]Error[]
UR17	RPOA Selection	5.3.17, 5.4.3.15 ST4249 D2	O	Yes[]Ignore[]Error[]
UR18i	Utility marker	5.3.18, 5.4.3.16	MR:M ¬MR:O	N/A[]Yes[] N/A[]Yes[]Ign[]Err[]

Predicate usage:
UR3i is used in 11.1
UR4i is used in 11.1
UR5i is used in 11.1

Note 1: This utility is given as mandatory in X.75 (1988). However, it will be considered to be optional in NATO networks.

8.2.2 Military utilities received in Call Request packets

Item	Protocol Feature	References	Status	Support
MR1	Security level selection	ST4249 D2	O (Note 1)	Yes[]Ignore[]Error[]
MR2	Priority level selection	ST4249 D2	O (Note 1)	Yes[]Ignore[]Error[]
MR2a	- Priority to gain a connection		MR2:M	N/A[] Yes[]
MR2b	- Priority to keep a connection		MR2:O	N/A[] Yes[] No []
MR2c	- Priority to transfer data		MR2:O	N/A[] Yes[] No []

Predicate definitons and usage:
MR = MR1 OR MR2 is used in item UR18i
M2 = MS2 OR MR2 is used in item MP

Note 1: `Mark "Ignore" if unsupported and ignored on receipt. Mark "Error" if unsupported and call clearing is caused on receipt.

8.2.3 Utilities received in Call Connected packets

Item	Protocol Feature	References	Status	Support
UR1r	Transit network identification	5.3.1, 5.4.3.1 ST4249 D2	M	Yes[]
UR2r	Call identifier	5.3.2, 5.4.3.2	M	Yes[]
*UR3r	Throughput class indication	5.3.3, 5.4.3.3	M	Yes[]
*UR4r	Window size indication	5.3.4, 5.4.3.4	M	Yes[]
*UR5r	Packet size indication	5.3.5, 5.4.3.5	M	Yes[]
UR10r	Called line address modified notification	5.3.10, 5.4.3.8	O (Note 1)	Yes[]Ignore[]Error[]
UR13r	Transit delay indication	5.3.13, 5.4.3.11	M	Yes[]Ignore[]Error[]
UR15r	Tariffs	5.3.15, 5.4.3.13	O	Yes[]Ignore[]Error[]
UR16r	Network User idenfication	5.3.16, 5.4.3.14	O	Yes[]Ignore[]Error[]
UR18r	Utility marker	5.3.18, 5.4.3.16	O	Yes[]Ignore[]Error[]

Predicate usage:
UR3r is used in 11.1
UR4r is used in 11.1
UR5r is used in 11.1

Note 1: This utility is given as mandatory in X.75 (1988). However, it will be considered to be optional in NATO networks.

8.2.4 Utilities received in Clear Request packets

Item	Protocol Feature	References	Status	Support
UR1d	Transit network identification	5.3.1, 5.4.3.1 ST4249 D2	M	Yes[]
UR10d	Called line address modified notification	5.3.10, 5.4.3.8	O (Note 1)	Yes[]Ignore[]Error[]
UR11	Clearing network identification code	5.3.11, 5.4.3.9 ST4249 D2	O	Yes[]Ignore[]Error[]
UR15d	Tariffs	5.3.15, 5.4.3.13	O	Yes[]Ignore[]Error[]
UR18d	Utility marker	5.3.18, 5.4.3.16	O	Yes[]Ignore[]Error[]

Note 1: This utility is given as mandatory in X.75 (1988). However, it will be considered to be optional in NATO networks.

9 PREEMPTION

Item	Protocol Feature	References	Status	Support
MP	Preemption	ST4249 D2	M2:O	N/A[] Yes[] No []

10 USER FACILITIES

10.1 X.25 user facilities mapped to network utilities

The following X.25 user facilities, if supported by the network are required to be mapped into the network utility field and removed from the user facility field of any packet. All references are to ITU-T rec. X.25 (1988).

Item	Protocol Feature	References	Support
	Are the following user facilities mapped into network utilities if present?		
FP1p	Flow Control Parameter Negotiation packet size	6.12, 7.2.2.1.1	N/A[] Yes[]
FP1w	Flow Control Parameter Negotiation window size Throughput Class Negotiation 6.13	6.12, 7.2.2.1.2	N/A[]Yes[]
FP2	Closed User Group Selection basic format	6.13, 7.2.2.2	N/A[] Yes[]
FP3b	Closed User Group Selection extended format	6.14.6, 7.2.2.3.1	N/A[] Yes[]
FP3e	Closed User Group With Outgoing Access Selection, basic format	6.14.6, 7.2.2.3.2	N/A[] Yes[]
FP4b	Closed User Group With Outgoing Access Selection extended format	6.14.7, 7.2.2.4.1	N/A[] Yes[]
FP4e	Fast Select Reverse Charging	6.14.7, 7.2.2.4.2	N/A[] Yes[]
FP6a	Network User Identification	6.16, 7.2.2.6	N/A[] Yes[]
FP6b	RPOA Selection, basic format	6.18, 7.2.2.6	N/A[] Yes[]
FP7	RPOA Selection, extended format	6.21, 7.2.2.7	N/A[] Yes[]
FP9b	Called Line Address Modified Notification	6.23.2, 7.2.2.9.1	N/A[] Yes[]
FP9e	Transit Delay Selection And Indication	6.23.2, 7.2.2.9.2	N/A[] Yes[]
FP10		6.26, 7.2.2.12	N/A[] Yes[]
FP12		6.27, 7.2.2.13	N/A[] Yes[]

10.2 Military user facilities mapped to network utilities

The following STANAG 4249 military user facilities, if supported by the network, are required to be mapped into the network utility field following a utility marker, and removed from the user facility field of any packet.

Item	Protocol Feature	References	Support
	Are the following military user facilities mapped into network utilities if present?		
FPm1	Security Level selection and indication	ST4249 D2	N/A[] Yes[]
FPm2	Priority Level selection and indication	ST4249 D2	N/A[] Yes[]

10.3 User Facilities not mapped to network utilities

Item	Protocol Feature	References	Status	Support
FT	Does the STE convey transparently the ITU-T-specified DTE facilities, and other facilities that do not require STE or transit network action?	5.1	M	Yes[]

11 PARAMETER VALUES AND RANGES

11.1 Values for flow control parameters and throughput class, Virtual Call service

If the Virtual Call service, item Vs, is not supported, mark N/A and continue at 11.2: N/A[]

Item	Protocol Feature	References	Status	Support
	What values are supported for :			
PV1s	- Default packet sizes, sending (octets)?	5.3.5, 5.4.3.5		16[] 32[] 64[] 128[] 256[] 512[] 1024[]2048[]4096[]
PV1r	- Default packet sizes, receiving (octets)?	5.3.5, 5.4.3.5		16[] 32[] 64[] 128[] 256[] 512[] 1024[]2048[] 4096[]
PV2s	- Default window sizes, sending?	5.3.4, 5.4.3.4		(M8: in the range 1-7): (M128: in the range 1-127):
PV2r	- Default window sizes, receiving?	5.3.4, 5.4.3.4		(M8: in the range 1-7): (M128: in the range 1-127):
PV3s	- Default throughput classes, sending (bits per second)	5.3.3, table 22/X.75		75[] 150[] 300[] 600[] 1200[] 2400[] 4800[] 9600[] 19200[]48000[] 64000[]
PV3r	- Default throughput classes, receiving (bits per second)	5.3.3, table 22/X.75		75[] 150[] 300[] 600[] 1200[] 2400[] 4800[] 9600[] 19200[]48000[] 64000[]
PV5	Can different default packet sizes be set for sending and receiving?	3.3.3, 5.3.5	O	Yes[] No []
PV7	Can different default window sizes be set for sending and receiving?	3.4.1.1. 5.3.4	O	Yes[] No []
PV8	Can different default throughput classes be set for sending and receiving?	5.3.3	O	Yes[] No []

Item	Protocol Feature	References	Status	Support
	What values are supported in Packet Size indication, item US5.. UR5.. for:			
PV9s	- Packet sizes sending (octets)?	5.3.5		16[] 32[] 64[] 128[] 256[] 512[] 1024[] 2048[] 4096[]
PV9r	- Packet sizes receiving (octets)?	5.3.5		16[] 32[] 64[] 128[] 256[] 512[] 1024[] 2048[] 4096[]
	What values are supported in Window Size indication, item US4.. UR4.. for:			
PV10s	- Window sizes sending?	5.3.4		(M8: in the range 1-7): (M128: in the range 1-127):
PV10r	- Window sizes receiving?	5.3.4		(M8: in the range 1-7): (M128: in the range 1-127):

Item	Protocol Feature	References	Status	Support
	What values are supported in ThroughpuT, Class indication, items US3.., UR3.. for:			
PV11s	- Throughput classes, sending (bits per, second)	5.3.3 table 22/X.75		75[] 150[] 300[] 600[] 1200[] 2400[] 4800[] 9600[] 19200[] 48000[] 64000[]
PV11r	- Throughput classes, receiving (bits per second)	5.3.3 table 22/X.75		75[] 150[] 300[] 600[] 1200[] 2400[] 4800[] 9600[] 19200[] 48000[] 64000[]
PV12	Is the packet size of 128 octets supported for sending and receiving?	5.3.5	M	Yes[]
PV13	Is the window size of 2 supported for sending and receiving?	5.3.4	M	Yes[]

11.2 Values for flow control parameters and throughput class, Permanent Virtual Circuit service

If the Permanent Virtual Circuit service, item Vp, is not supported mark N/A and continue at 11.3: N/A[]

Item	Protocol Feature	References	Status	Support
	For PVCs, what values are supported for:			
PV14s	Packet sizes, sending (octets)?	3.3.3		16[] 32[] 64[] 128[] 512[] 1024[] 2048[] 4096[]
PV14r	Packet sizes, receiving (octets)?	3.3.3		16[] 32[] 64[] 128[] 512[] 1024[] 2048[] 4096[]
PV15s	Window sizes, sending?	3.4.1.1.		(M8: in the range 1-7): (M128: in the range 1-127):
PV15r	Window sizes, receiving?	3.4.1.1		(M8: in the range 1-7): (M128: in the range 1-127):
PV16s	Throughput classes, sending (bits per second)?	5.3.3 table 22/X.75		75[] 150[] 300[] 600[] 1200[] 2400[] 4800[] 9600[] 19200[] 48000[] 64000[]
PV16r	Throughput classes, receiving (bits per second)?	5.3.3 table 22/X.75		75[] 150[] 300[] 600[] 1200[] 2400[] 4800[] 9600[] 19200[] 48000[] 64000[]

Item	Protocol Feature	References	Status	Support
	If only one PVC can be supported mark N/A and continue at (PV20) below			N/A[]
PV17	Can different PVCs have different packet sizes?	3.3.3	O	Yes[] No []
PV18	Can different PVCs have different window sizes?	3.4.1.1	O	Yes[] No []
PV19	Can different PVCs have different throughput classes?	3.4.1.1(Note 1)	O	Yes[] No []
(PV20)	If VC, item Vs, is not supported, mark N/A and continue at 11.3			N/A[]
PV20	Can the packet sizes for a PVC be different from the Virtual Call defaults?	3.3.3 (Note 1) 5.3.5	O	Yes[] No []
PV21	Can the window sizes for a PVC be different from the Virtual Call defaults?	3.4.1.1(Note 1) 5.3.4	O	Yes[] No []
PV22	Can the throughput classes for a PVC be different from the Virtual Call defaults?	3.4.1.1(Note 1) 5.3.3	O	Yes[] No []

Note

This reference is not sufficiently explicit on the protocol feature, but it is agreed that the question is valid.

11.3 Timers and logical channel ranges

Item	Parameters	References	Status	Support
	Timer Parameters (s = seconds):	Annex D/X.75		
T30	Restart Request Response Timer - 180s	3.5.1	M	Yes[]
T31	Call Request Response Timer - 200s	3.1.2	Vs:M	N/A[] Yes[]
T32	Reset Request Response Timer - 180s	3.4.2.3	M	Yes[]
T33	Clear Request Response Timer - 180s	3.1.5	Vs:M	N/A[] Yes[]
	Logical Channel Range Parameters:	3		
LC1	Lowest channel			From: To:
LC2	Highest channel			From: To:
LC7	Maximum number of LCs for PVCs		Vp:M	N/A[] Value:
LC8	Maximum number of LCs for VCs		Vs:M	N/A[] Value:
LC9	Maximum total LCs (PVCs and VCs)		M	Value:

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APPENDIX 2
ANNEX D
STANAG 4249
(Edition 3)

APPENDIX 2 (NORMATIVE) TO ANNEX D

PROCEDURES AND FORMATS FOR MILITARY ENHANCEMENTS TO ITU-T REC X.75(1988)

General

1. The enhancements to ITU-T rec. X.75(88) has been organized in sections corresponding to the sections in X.75.

Packet layer procedures between signalling terminals

2. No enhancements to section 3 of X.75(88) ("Packet layer procedures between signalling terminals") are required.

Packet formats for virtual calls and permanent virtual circuits

3. No enhancements to section 4 of X.75(88) ("Packet formats for virtual calls and permanent virtual circuits") are required.

Procedures and formats for user facilities and network utilities

4. A new category of network utilities is added (ref. para 5.3 in X.75 (88))

- *NATO Optional network utilities:* These have the same characteristics as the ”International Optional network utilities”, except that they are always separated from standard X.75 network utilities by a utility marker as described in X.75(88) para 5.3.18.

5. The list of network utilities in Table 19/X.75 needs to be extended as follows:

NATO optional network utilities	*Section*
Security level selection	para 7 in this appendix
Priority level selection	para 8 in this appendix

6. Similar to the network identification coding rules for the DNIC given in para 5.3 (and referenced in 5.3.1, 5.3.11 etc.) of X.75, NATO tactical networks are identified by a 4-digit number derived from the NIAC in STANAG 4214 as follows:

- Major formations: AC of 4214 prefixed by the digit “9”
- Formations under command: (serial number 0-8) + (1st digit of the AC) + (2 last digits of the NI)

The serial number (0-8) is only used when necessary to make the network identifier unique, ie in the

Following cases:

i) Duplicated prefixes,- these will always be in the same area, under command of the same major formation, and it should be easy to allocate serial numbers

ii) When subsidiary area codes are used, that have the same 1st digit, for the same nation. This is probably possible to avoid by operational rules for subsidiary AC allocation.

Note:
It should be possible to require that these codes are cleared when entering a public network.

Security level selection

7. To "5.3 Procedures for network utilites", add the following:

Security level selection (NATO optional)

The *security level selection* utility is a network utility that signals the security level requested by the calling DTE in the *security level selection and indication*

facility, or added to the call by the originating DCE. This utility will be signalled transparently from the originating network to the destination network in the call request packet.

The *security level selection* should not be present in *call connected* or *clear request* packets.

No indication of *security level selection and indication* should be present in the user facility field of the *call request, call connected* or *clear request* packets.

Note: The *security level selection* utility may not be supported by all NATO networks.

Priority level selection

8. To "5.3 Procedures for network utilities", add the following:

Priority level selection (NATO optional)

The *priority level selection* is a network utility that signals the priority level requested by the calling DTE in the *priority level selection and indication* facility, or added to the call by the originating DCE. This utility will be signalled transparently from the originating network to the destination network in the call request packet.

Three different priority values can be signalled,

- priority to gain a connection (i.e. call handling priority)
- priority to keep a connection (used to resolve priorities related to preemption during call setup)
- priority to transfer data on a connection (i.e. traffic handling priority)

The *priority level selection* should not be present in *call connected* or *clear request packets.*

No indication of *priority level selection and indication* should be present in the user facility field of the *call request, call connected* or *clear request* packets.

Note: The *priority level selection utility* may not be supported by all NATO networks.

Formats for network utilities

9. To Table 21/X.75 "Coding of the utility field" add the following:

Utility	Packet types in which It may be used			Utility code Bits
	Call request	Call connected	Clear request	8 7 6 5 4 3 2 1
Security level selection	X	X	X	0 0 1 1 0 0 0 1
Priority level selection	X	X	X	0 1 1 1 0 0 0 1

10. To "5.4.3 coding of the utility parameter field", add the following:

Coding of the security level selection utility parameter

The requested security level is coded in the LSB as follows:

Bit	8	7	6	5	4	3	2	1
Code	0	0	0	0	0	0	0	X

where X denotes the security level as follows:

0 = nonsecure
1 = secure

The security level to be used in a network when the other network does not support the *security level selection* utility is subject to a bilateral agreement between NATO nations.

Coding of the priority level selection utility parameter

The requested priority level is coded as follows:

Bit	8	7	6	5	4	3	2	1
Code	p	p	p	p	q	q	q	q
	r	r	r	r	0	0	0	0

where

p p p p	=	priority to gain a connection
q q q q	=	priority to keep a connection
r r r r	=	priority to transfer data over a connection.

Each priority field is of the form:

x x y y

where

x x - selects one of four levels (00 is low, 11 is high)
y y - set to zeroes (reserved for future use)

qqqq and rrrr may be ones (1111), in which case the value of pppp is assigned to qqqq and rrrr.

The maximum priority level values allowed for each of the fields at the STE X/Y interface are subject to a bilateral agreement between NATO nations. The priority level to be used in a network when the other network does not support the *priority level selection* utility is subject to a bilateral agreement between NATO nations.

Coding of network generated diagnostic fields in X.75 clear, reset and restart packets

11. The list of diagnostic codes in Annex E to X.75(88) needs to be extended as follows:

Diagnostics	Bits 8 7 6 5 4 3 2 1	Decimal
NATO specific diagnostic information		
Network cannot support requested security level	1 0 1 1 1 1 1 0	190
Remote DTE cannot support requested security level	1 0 1 1 1 1 1 1	191
Unauthorized priority level requested	1 1 0 0 0 0 0 1	193
Preempted within the subnetwork	1 1 0 0 0 0 1 1	195
Pre-empted at the remote DCE	1 1 0 0 0 1 0 0	196

Association of error conditions with cause and diagnostic codes

12. The list of error conditions in Annex F to X.75(88) needs to be extended as follows:

a) Call request packet

Error condition	Cause	Specific diagnostics (see Note 3 of Annex E)
N1. A connection with the security level requested in the *call request* packet cannot be set up through the network	Network Congestion	#190
N2. The remote DTE is not allowed to receive calls at the requested security level	Invalid facility request	#191
N3. A priority level above the maximum agreed is requested	Invalid facility request	#193
N4. Insufficient priority to set up connection through subnetwork	Network Congestion	#195
N5. Insufficient priority to connect to remote DTE	Network Congestion	#196

13. Extensions to the tables associated with the other packet types are not required.

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