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NATO STANDARDIZATION AGENCY
AGENCE OTAN DE NORMALISATION

NSA

11 October 2005 NSA/0922-C3/4214

STANAG 4214 C3 (EDITION 2) – INTERNATIONAL ROUTING AND DIRECTORY FOR TACTICAL COMMUNICATIONS SYSTEMS

Reference:

a. MAS/133-EL/4214 of 29 May 1985 (Edition 1)
b. AC/322(SC/6)N/347 of 16 February 2001 (Edition 2) (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 4214 (Edition 2)

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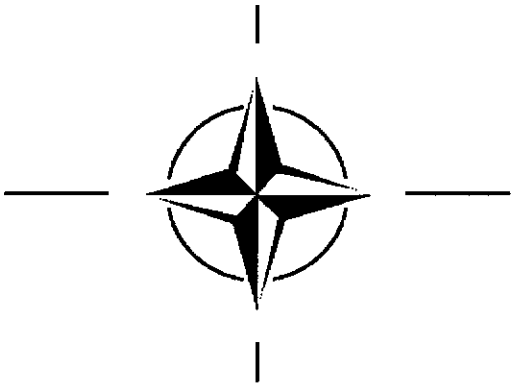
STANAG N° 4214
(Edition 2)

NORTH ATLANTIC TREATY ORGANIZATION
(NATO)



NATO STANDARDIZATION AGENCY
(NSA)

STANDARDIZATION AGREEMENT
(STANAG)

SUBJECT: **INTERNATIONAL ROUTING AND DIRECTORY FOR TACTICAL COMMUNICATIONS SYSTEMS**

Promulgated on 11 October 2005

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

RECORD OF AMENDMENTS

No.	Reference/date of Amendment	Date Entered	Signature
1	NSA/0285(2009)-C3/4214 06.03.2009	19.03.2009	W.Duensing

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 4214
(Edition 2)

NATO STANDARDIZATION AGREEMENT (STANAG)

INTERNATIONAL ROUTING AND DIRECTORY FOR TACTICAL COMMUNICATIONS SYSTEMS

Annexes :
- A. General Characteristics
- B. Allocation of Nationality Identifiers
- C. Allocation of Area Codes
- D. Routing Information to be Exchanged between System Managers
- E. Suggested Routing Rules
- F. Examples
- G. NPICS Proforma

Related Documents :

- STANAG series -	The NATO Multi-channel Tactical Digital Gateway (as listed in STANAG 4206)
- STANAG 5040 -	NATO Automatic and SemiAutomatic Interface between the National Switched Telecommunications Systems of the Combat Zone and between these Systems and the NATO Integrated Communications Systems (NICS) - Period from 1979 to 1990s
- STANAG 5046	The NATO Military Communications Directory System
- STANAG 4578	NATO Digital Strategic /Tactical Gateway

AIM

1. The aim of this STANAG is to specify the routing prefixes and their application in order to route calls from one tactical communications network to another one, from one network to the communications network or facilities of a unit under command or vice-versa, and even from one communications network via that of a unit under command to the communications network or facilities of a unit under command of a unit under command or vice-versa. It also specifies prefixes to route calls from tactical to strategic networks.

AGREEMENT

2. Participating nations agree to use the system specified in this STANAG for international routing and directory for their tactical communications systems, both circuit - and packet-switching connection mode.

GENERAL

3. Throughout this STANAG a unit is termed under command of another nation's network if it is served for its communication needs by that other nation's network. It should, however, be noted that for those communications networks providing area coverage which are not linked to the operational chain of command, differences can occur between the communications situation as dealt with by this STANAG and the actual operational command structure.

4. This STANAG also specifies the routing prefixes from a tactical communications network to the NATO Integrated Communications System or vice-versa, and to national Strategic Networks. It applies as follows :

(a) to gateways as specified in STANAG 4206;

(b) to interfaces as specified in STANAG 5040 but with certain limitations which are identified in STANAG 5040.

(c) to gateways as specified in STANAG 4578

5. In the remainder of this STANAG, the interface between systems is generically termed the "gateway".

6. This STANAG contains examples of various tactical deployments to illustrate the allocation of international routing prefixes. These examples are not intended to conform to NATO deployment strategy. Many examples and rules stated herein may seem unnecessarily complicated but it should be noted that they only apply in unusual deployment situations and are included so that the STANAG is capable of dealing with all foreseen situations.

FORMAT OF THE ROUTING PREFIX

7. Routing prefixes shall contain 6-digits comprising a 3-digit Nationality Identifier (NI) together with a 3-digit Area Code (AC).

8. The 3-digit NI will be of the form :

9YX where $0 \leq Y \leq 3$
$0 \leq X \leq 9$

and the 3-digit AC will be of the form :

NYX where $0 \leq N \leq 8$*
$0 \leq Y \leq 3$ where Y = Y of NI
$0 \leq X \leq 9$ where X = X of NI

for tactical systems, or RSX where $0 \leq R \leq 8$*
S = Y + 6 where Y = Y of NI
$0 \leq X \leq 9$ where X = X of NI

for strategic systems.

* In US systems, this range is limited to: $2 \leq N \leq 8$. However, US subscribers are able to call (non US) networks having N=0 or N=1.

9. For tactical systems there will be additional ACs of the form:

ABC where $0 \leq A \leq 8$
$4 \leq B \leq 5$
$0 \leq C \leq 9$

10. Special Nationality Identifiers will be of the form :

9VW where $4 \leq V \leq 5$
$0 \leq W \leq 9$

Together with special NIs it will be possible to identify ACs of the form:
ZZZ where $0 \leq Z \leq 9$

Values of Z can be chosen independently.

11. The full routing prefix (NI AC) will therefore be

either 9YXNYX or 9YXABC to identify tactical systems

or 9YXRSX or 9VWZZZ to identify strategic systems.

12. The matrix below shows an overview code map of NIs and ACs derived from the rules given in paragraph 7 to 9 above. The table is applicable for NIs in the range of 900-939. NIs in the range of 940-959 are Special NIs and have no associated ACs (e.g., ACs in Table 1 App 1 of Annex C). NIs in the range of 960 to 999 are national concerns.

<table>
<tr><th colspan="2" rowspan="2"></th><th colspan="10">FIRST DIGIT (N, R, A or 9)</th></tr>
<tr><th colspan="2">0</th><th colspan="6">1 2 3 4 5 6 7 8</th><th>9</th></tr>
<tr><td rowspan="4">TWO
LAST
DIGITS
(YX, SX</td><td>00-09
10-19
20-29
30-39</td><td colspan="2">TACTICAL
AREA CODES
(Note 1)</td><td colspan="6">TACTICAL
AREA CODES
(TACs)</td><td>NATIONALITY
IDENTIFIERS
(Reserved for
National Use,
see Annex B)</td></tr>
<tr><td>40-49
50-59</td><td colspan="2">Additional TACs
(Note 1)</td><td colspan="6">Additional TACTICAL AREA CODES</td><td>SPECIAL NIs
(Reserved for
National Use,
see Annex B)</td></tr>
<tr><td>VW,BC)</td><td>60-69
70-79
80-89
90-99</td><td colspan="8">STRATEGIC
AREA CODES</td><td>Reserved for
National Use</td></tr>
</table>

Note 1: ACs with first digit 0 or 1 must not be allocated if there is any possibility that US or Canadian formations are to be taken under command.

IMPLEMENTATION OF THE AGREEMENT

13. This STANAG is implemented by a nation when that nation has adopted the international routing and directory system as specified in this STANAG and has reflected the adoption in their relevant documentation.

Note: There can be different implementations of this STANAG within one system for Circuit Switching and Packet Switching. In such cases separate NPICS Proformas should be completed for each.

ANNEX A

GENERAL CHARACTERISTICS

NETWORK MODEL

1. The network model uses the following definitions for the purpose of international routing :

Major formation	Tactical communications network of a nation (e.g. complete national network or corps). A nation may have one or more major tactical formations.
Formation under command	A unit (formation) of one or direct formation nation (not a major formation) connected to another nation's major formation.
Formation under command of a formation under command (FUC) or secondary formation	A unit (formation) of one nation (not a major formation) connected to another nation's formation which is itself a formation under command.
Host formation	A major formation is the host formation of directly connected formations under command. A formation under command is the host formation of directly connected formations under command of this formation.
Major formation area	Area comprising the major formation and all formations under command (direct or secondary) of such a major formation.

Figure A.1 shows a network example.

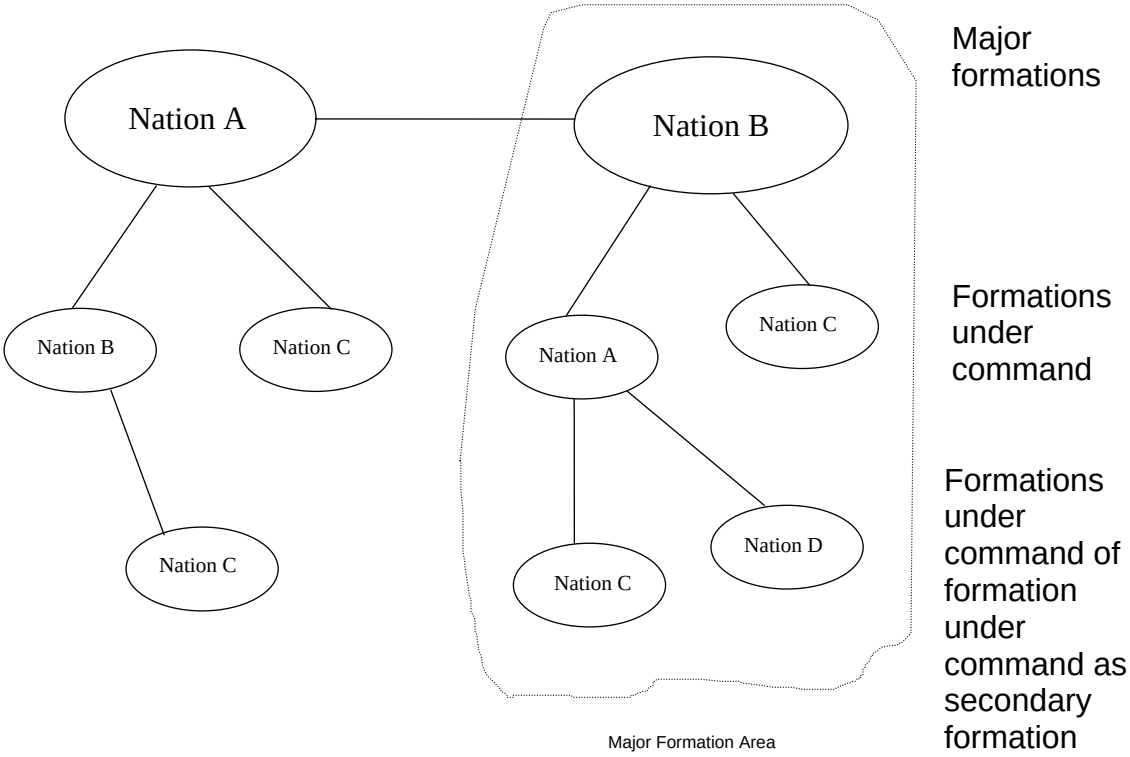


Figure A.1 Network model example

2. The following principles for network interconnection are assumed :

(a) Formations under command are connected in a hierarchical manner. There may in principle be any number of levels under a major formation.

(b) A major formation or formation under command "knows" the routing prefixes of formations under its direct or secondary command, - i.e. below in the hierarchy. Traffic to other formations under command is routed via hosts, i.e. up and down in the hierarchy.

Direct links between formations under command (except when one is the host of the other) can corrupt the whole routing system and should be avoided.

(c) A call shall not be routed back to a formation where it came from, neither on the same nor on a parallel gateway (see parallel gateways in para 3).

ROUTING CAPABILITIES

3. The following definitions are used in this STANAG in the specification of required routing capabilities :

single routing system	routing system that requires that all formations under command have different routing prefixes. (This STANAG only addresses single routing systems)
parallel gateways	two or more gateways between the same two formations. A call must be sent only on one of these gateways.
3-digit routing system	a routing system capable of routing separately on the NI and AC parts of the prefix.
6-digit routing system	a system that requires to know the full 6-digit prefixes of all possible destination formations.

4. A system claiming to conform to this STANAG can implement either a 3-digit or 6-digit single routing system.

5. A capability to handle parallel gateways should be implemented.

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ANNEX B

ALLOCATION OF NATIONALITY IDENTIFIERS

The Nationality Identifiers shall be allocated as follows:

900	Belgian Systems
901	Canadian Tactical Systems
902	Danish Systems
903	French Systems
904	German Tactical Systems
905	Greek Systems
906	Icelandic Systems
907	Italian Systems
908	Luxembourg Systems
909	Netherlands Systems
910	Norwegian Systems
911	Portuguese Systems
912	Turkish Systems
913	United Kingdom Tactical Systems
914	Bulgarian System
915	NATO Communications Systems
916	United States/Canadian Tactical Systems
917	Spanish Systems
918	Czech Systems
919	Hungarian Systems
920	Polish Systems
921	Romanian Systems
922	Estonian Systems
923	Latvian Systems
924	Lithuanian Systems

925	Slovakian Systems
926	Slovenian Systems
927	Albania
928	Croatia
929– 939	Spares
940 – 949	Spare for special NIs (see note below)
950	United States/Canadian Strategic Systems (Ultimately)
951	German Strategic Systems
952	United Kingdom Strategic Systems
953	French Strategic Systems
954	Belgian Strategic Systems
955	Italian Strategic Systems
956 – 959	Spare for special NIs (see note below)

Note: Normally, all nations are assigned the same NI for identification of their national tactical and strategic systems. Exceptionally, special NIs in the range 940 -959 are allocated for identifying strategic systems.
Special NIs where V = 4 shall only be allocated if all others are exhausted as those NIs may be used for identification of additional nations if needed.

ANNEX C

ALLOCATION OF AREA CODES

GENERAL

1. Area codes shall be allocated so that they are unique across all interconnected major formations, thereby allowing the possibility of routing on the AC between those.

2. The rules for allocating Area Codes will thus be defined for single routing tactical formations and for strategic systems.

3. The AC is stringently specified in this STANAG in order to realize the following operational/system management benefits:

(a) to make it possible to simplify and reduce the amount of information to be held at gateway switches;

(b) to reduce the need to distribute system management information across the networks when the status of a formation under command changes;

(c) to make the definition of the subscribers international directory as deducible as possible;

(d) to make the routing prefix to be transferred across the gateway a standard format of 6-digits consisting of :

NI = Nationality Identifier
+
AC = Area Code

AREA CODES FOR MAJOR TACTICAL FORMATIONS

4. Major tactical formations shall be assigned sufficient area codes to cater for the maximum foreseen number of formations under command and formations under command of formations under command from any one other nation. At least one AC will be known as the master prefix for the formation and the other area codes will be known as subsidiary area codes. The rules for the allocation of subsidiary area codes are given in Appendix 1 to this Annex.

E.g. a United States Corps may be assigned a master prefix of 914814 and subsidiary area codes 214, 250 if it is expected that a maximum of 3 formations under command

belonging to any one other nation is possible (i.e. giving the possibility of routing prefixes 9YX814, 9YX214, 9YX250 for formations under command).

AREA CODES FOR TACTICAL FORMATIONS UNDER DIRECT COMMAND OF HOST MAJOR FORMATIONS

5. The first tactical formation from each nation under command of a host formation capable of single routing will be assigned a routing prefix consisting of the NI of the parent nation together with the AC of the master prefix for the host formation. Subsequent additional formations under command from the same parent nation will be assigned a prefix consisting of the NI of the parent nation together with a subsidiary AC from the set allocated to the host nation (in accordance with Appendix 1) which has not previously been used. The essential rule is that a different AC will only be used when all previously allocated ACs for the host formation have been exhausted.

E.q. Example 1

If a United States Corps has been allocated a master prefix 916814, and subsidiary area codes 550, 250 then :

The 1st French formation under command will be assigned 903814.
The 2nd French formation under command will be assigned 903550.
The 1st German formation under command will be assigned 904814.
The 2nd German formation under command will be assigned 904550.
The 3rd German formation under command will be assigned 904250.

E.q. Example 2

If another United States Corps has been only allocated 916714 (and ACs 350 and 750 have not been allocated elsewhere) then:

The 1st French formation under command will be assigned 903714.
The 2nd French formation under command will be assigned 903350.
The 1st German formation under command will be assigned 904714.
The 2nd German formation under command will be assigned 904350.
The 3rd German formation under command will be assigned 904750.

AREA CODES FOR STRATEGIC SYSTEMS

6. Area Codes for strategic systems of all nations, other than the exceptions as described in para.8, shall be assigned as follows :

If the NI or the parent nation is 9YX where $0 \leq Y \leq 3$ and $0 \leq X \leq 9$

then the AC of a strategic system of that nation shall be

RSX	where	$0 \leq R \leq 8$	(for the US: $2 \leq R \leq 8$)
		$S = Y + 6$	where Y = Y of NI
		X = X of NI	

This allocates a maximum of 9 ACs for each nation to be used to identify strategic systems.

E.g. for the Netherlands whose NI = 909 examples of strategic system prefixes are :

909069	909369	909669
909169	909469	909769
909269	909569	909869

7 For some nations only, a special NI has been allocated (see Annex B) because they need more than 9 ACs to address all their strategic systems. National tactical networks which have to carry traffic either because they have formations under command of those nations or because they provide transit facilities for such traffic, will either route on the special NI and ignore the AC or use the full 6-digit prefix (see Annex E).

8. The allocation of area codes for formations under command of strategic systems is not covered by this STANAG as no requirement has been stated.

AREA CODES FOR FORMATIONS UNDER COMMAND OF FORMATIONS UNDER COMMAND

9. Area codes for secondary formations under command of formations under direct command shall be assigned unique prefixes consisting the NI of the nation together with one of the subsidiary ACs allocated to the major host formation. (see Fig. F.2 extreme right side):

APPENDIX 1 to
ANNEX C to
STANAG 4214
(Edition 2)

ALLOCATION OF SUBSIDIARY AREA CODES

1. Table 1 indicates those master and subsidiary area codes which have been pre-allocated to each nation.

2. Additional subsidiary area codes shall be allocated from the series described below in the indicated preferred order:

(a) Unused area codes in the series NYX;

(b) area codes in the series N40 to N59 which have not been pre-allocated;

(c) area codes in the series N00 to N39 which correspond to the NIs of nations whose troops are not involved in the theatre of operation or NIs not used generally.

3. As previously identified N in the above area codes may lie between 0 and 8, but must not be 0 or 1 if US or CA formations are to be taken under command.

4. The allocation of area codes in the series as described above must be co-ordinated amongst nations.

AREA CODES ALLOCATED TO NATIONS

Nation	Number of Major Formations	Master ACs	Subsidiary ACs Note 1	
Albania	1	827	227,327,427	
Belgium	2	800 700	200,300,400	
Bulgaria	1	814	214,314,414	
Canada	1	801	201,301,401	
Croatia	1	828	228,328,428	
Czech Republic c	1	818	218,318,418	
Denmark	1	802	202,302,402	
Estonia	1	822	222,322,422	
France	4	803 703 603 503	203,253,553 303,353,653 403,453,753	Note 2
Germany	4	804 704 604 504	204,251,551 304,351,651 404,451,751	Note 2
Greece	1	805	205,305,405	
Hungary	1	819	219,319,419	
Iceland	1	806	206,306,406	
Italy	3	807 707 607	207,307,407 507,852,853	Note 2
Latvia	1	823	223,323,423	
Lithuania	1	824	224,324,424	
Luxembourg	1	808	208,308,408	
Netherlands	1	809	209,309,409	
Norway	1	810	210,310,410	
Poland	3	820 720 620	220,320,420	
Portugal	1	811	211,311,411	
Romania	1	821	221,321,421	

TABLE 1

Nation	Number of Major Formations	Master ACs	Subsidiary ACs Note 1	
Slovakia	1	825	225,325,425	
Slovenia	1	826	226,326,426	
Spain	2	817 717	217,317,417	
Turkey	3	812 712 612	212,312,412	
UK	5	813 713 613 513 413	213,313,252	
USA	4	816 716 616 516	216,250,550 316,350,650 416,450,750	Note2
NATO	2	815 715	315,415,615	

Table 1 continued

NOTES

1. Single routing systems are assigned 3 subsidiary area codes. They will thus be able to take 4 formations under command from any one other nation.

2. Additional subsidiary area codes are allocated from the additional tactical area codes to allow each of several major formations to take formations under command.

APPENDIX 2 to
ANNEX C to
STANAG 4214
(Edition 2)

RESERVED ADDRESSES FOR SPECIAL FACILITIES

1. Addresses 79999xx, where XX = 00 ..99, are reserved for special facilities (see STANAG 5046).

2. The following 7-digit addresses have been allocated and, when recognized, shall cause the gateway switch to establish a connection to the identified special facility :

FACILITY ADDRESSES	DESCRIBED	7-DIGIT ADDRESSES
Packet Gateway	STANAG 4249	7999961
G1	STANAG 4578	7999971
G2	STANAG 4578	7999972
G3	STANAG 4578	7999973
G4	STANAG 4578	7999974
G5	STANAG 4578	7999975
G6	STANAG 4578	7999976
CDR	STANAG 4578	7999979
Pers	STANAG 4578	7999980
G1 Ops	STANAG 4578	7999981
G2 Ops	STANAG 4578	7999982
G3 Ops	STANAG 4578	7999983
G4 Ops	STANAG 4578	7999984
S5	STANAG 4578	7999985
S6	STANAG 4578	7999986
Subscriber Assistance	STANAG 4211, 4578	7999990
System Management	STANAG 4211, 4578	7999991

Note 1: These addresses apply to routing in the circuit-switched system, only.
Note 2: Facility addresses marked as STANAG 4578 are intended for mapping to numbers in Strategic networks where the strategic network does not support STANAG 5046

3. These addresses shall always be preceded by the NIAC when crossing a gateway.

ANNEX D

ROUTING INFORMATION TO BE EXCHANGED BETWEEN SYSTEM MANAGERS

1. This Annex describes the information to be passed between system managers when a new gateway is brought into operation. Two situations are foreseen :

(a) when all systems interconnected by gateways are capable of routing on the two 3-digit parts of the 6-digit routing prefix separately (i.e. on the NI or AC alone);

(b) the interim period when some systems route on the basis of the full 6-digit prefix only.

2. It is the ultimate aim that all systems should be capable of routing on the 3-digit NI or AC so as to minimize the transfer of system management information and reduce the storage required for routing tables in gateway switches.

3. To systems capable of routing on the NI or AC separately, the following information should be provided when a new gateway between major formations is brought into operation :

(a) the Master ACs of major tactical formations and ACs of strategic networks that can be reached via the gateway;

(b) any subsidiary ACs of formations under command (direct or secondary) reached via major formations in (a) above;

(c) Any special NI addressing strategic systems that can be reached via the gateway.

4. In the interim period, systems which route on the full 6-digit prefix, should be provided with the full 6-digit NIAC prefixes for tactical formations and strategic networks that can be reached via the gateway, including NIACs with special NIs.

5. In determining the NIACs to be used at individual Gateways for the purposes of performing routing through these Gateways, the System Managers must take account of the following:

(a) care must be taken to avoid network configuration and routing possibilities which could result in "looping" of traffic involving different national networks;

(b) care must be taken to ensure that access to strategic networks as required is possible, bearing in mind national and NATO routing implementations (Note : in particular, the suggested rule in Annex E, Section 2(e) does not always work, and some nations may impose limitations for multitransit connections);

(c) any limitations of the number of NIACs which may be stored at individual Gateways.

6. When gateways to formations under command are brought into operation, similar rules to those stated above can be applied.

ANNEX E

SUGGESTED ROUTING RULES

1. This Annex provides some suggested routing rules in order to indicate the sort of decisions which will be necessary to take in gateway switches. The order in which the rules are given is not important and it will be necessary for each system implementor to decide his own priorities.

2. For systems which can route on the 3-digit AC or 3-digit NI separately:

   (a) If your AC equals the location AC and your NI equals the nationality NI in the prefix, then route the call to the wanted subscriber or special facility as defined in Appendix 2 to Annex C.

   (b) If the NI in the prefix is a special NI, route the call to a gateway which leads to the corresponding strategic system, ignoring the contents of the AC field.

   (c) If your AC equals the location AC in the prefix but NI is different, then route the call to all gateways giving access to formations under command (direct or secondary) with the required NI; (but observe statement in Annex A, para 2. (c)).

   (d) If the NI in the prefix is equal to your NI and the AC is for one of your strategic networks, route the call to the required strategic network.

   (e) If your AC does not equal the location AC in the prefix and NI is not a special NI, route the call to a gateway which leads to the location AC.

3. For systems which route on the full 6-digit prefix only:

   (a) If the 6-digit prefix is the same as your NIAC, route the call to the subscriber or special facility as defined in Appendix 2 to Annex C.

   (b) If the 6-digit prefix is not the same as your NIAC, route the call to a gateway which leads to the required NIAC.

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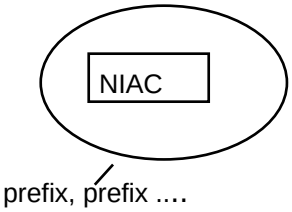
ANNEX F to
STANAG 4214
(Edition 2)

ANNEX F

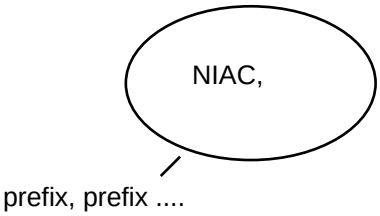
EXAMPLES

1. In order to illustrate the principles defined, a number of examples are included in the figures in this Annex.

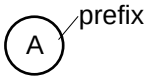
2. **INDEX OF SYMBOLS USED IN EXAMPLES**



Major Formation with its NIAC, routing system R and prefixes for gateways to other networks.



Formation under command, notation NIAC, R as for major formation.



Subscriber (A) and the routing prefix for the call.

Strategic network with its NIAC.

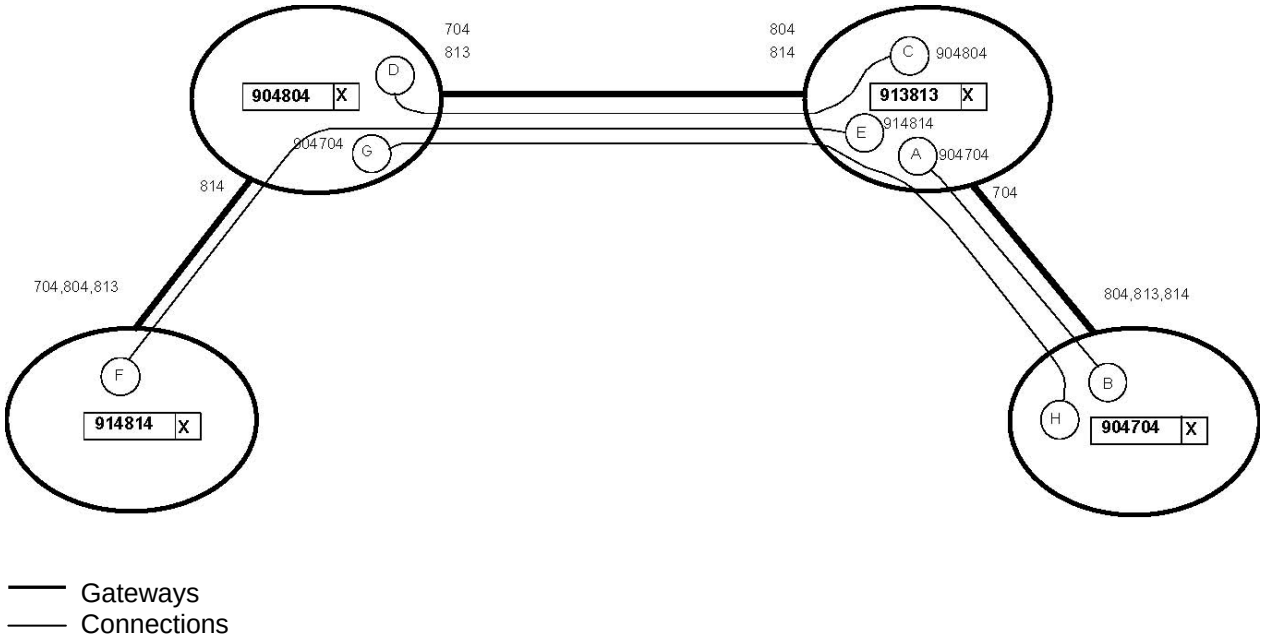


Figure F.1. - Routing between Major Formations

Comments to Figure F.1 : Routing between Major Formations

1. Allocation of area codes

   The major formations are allocated master area codes according to Annex C, para 5 and as listed in Appendix 1 to Annex C. For example, the figure shows two German major formations that are allocated 804 and 704, respectively.

2. Gateway_prefixes

   In Figure F.1, each gateway (of 3-digit systems) has stored the ACs of all formations that can be reached via the gateway. 6-digit routing systems will store the 6-digit NIAC of those formations.

3. Examples for calls

   Explanations are given for 3-digit-systems only. 6-digit-systems will route on NIACs according to Annex E, para 3.(a) and (b).

A - B (904704)
Call from a network that has two major formations of the same national force on each flank : Route on AC, i.e. rule 2.(e) in Annex E.

C - D (904804)
Calls between adjacent networks ; Route on AC, i.e. rule 2.(e) in Annex E.

E - F (914814)
Call between two networks which transits a third network :

In networks 913813 and 904804, route on AC, i.e. rule 2.(e) in Annex E.

G - H (904704)
Call between two major formations of the same nation :

In networks 904804 and 913813, route on AC, i.e. rule 2.(e) in Annex E.

For each of the calls, where the prefix is equal to the local prefix i.e. at the destination formation, apply rule 2.(a) in Annex E.

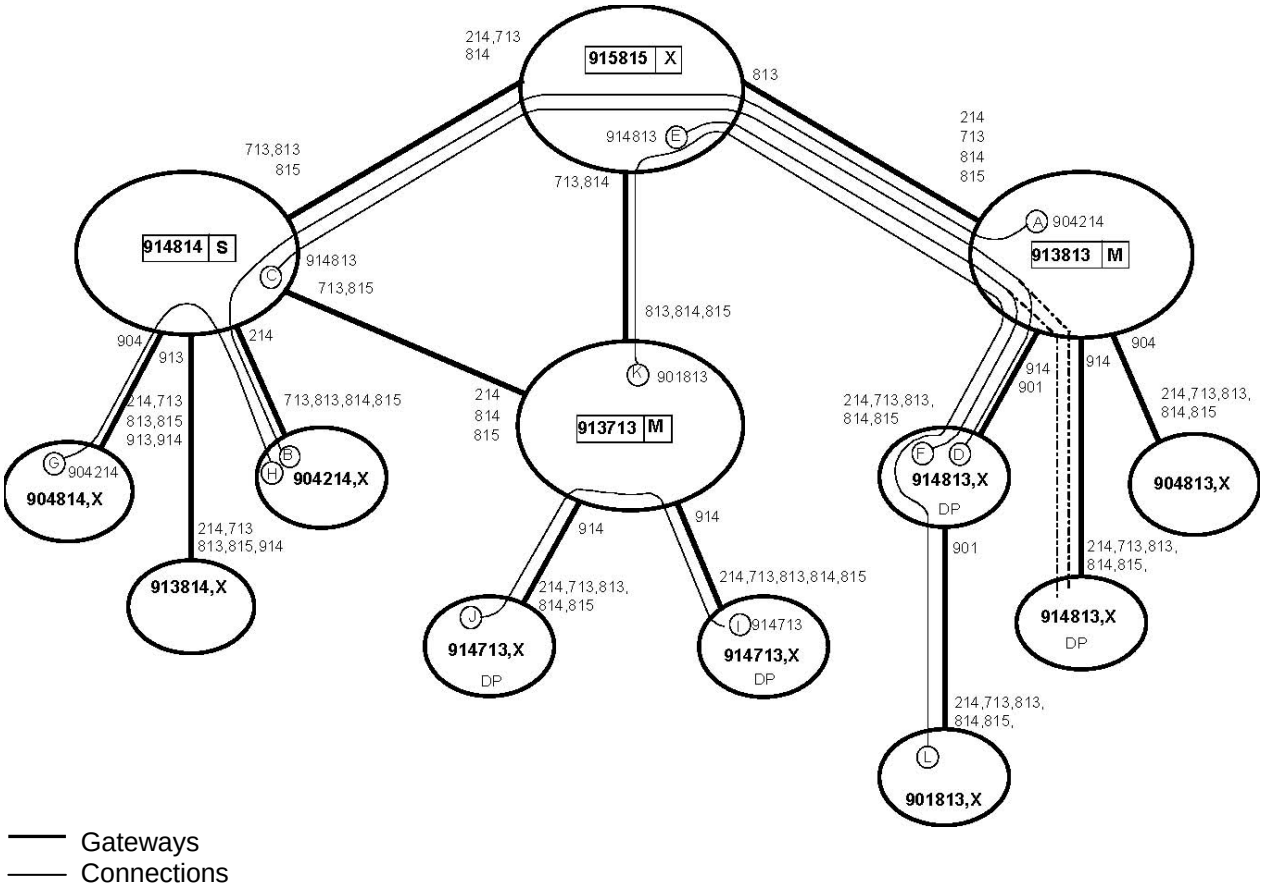


Figure F2.- Routing to and between Formations under Command

Comments to Fiqure F. 2 : Routing to and between Formations under Command

1. Allocation of area codes

There are four major formations of three different nations. Both formations of UK (NI=913) have been allocated different master ACs (813 and 713) according to Appendix 1 of Annex C.

According to Annex B, formations under command of the major US formation (916814) must have unique NIACs, i.e. formations under command from the same nation must have different ACs. One formation under command from each nation is allocated the master AC of the major formation (904814 and 913814), the other(s) are allocated subsidiary ACs (904214).

2. Gateway prefixes

Between the major formations, gateways are marked with ACs of all other major formations that can be reached, except where looping might occur (see Annex D, para 5). In the example of figure F.2 no looping can happen. Note that optional routes may exist where possible; e.g. calls from 916814 to 913713 may go direct or via 915815. Of course, a nation may choose not to include the latter, and always route direct.

6-digit-routing systems will store the 6-digit NIAC of all possible destinations (major formation and formations under command).

3. Examples for calls

Explanations are given for 3-digit systems only. All 6-digit systems will route on NIACs according to Annex E, para 3.(a) and (b).

A - B (904214)
Call(multi-transit) from a major formation through 2 other major formations to a formation under command: Route on AC, i.e. rule 2.(e) in Annex E. Multi-transit calls may not always be possible due to national implementations (see Annex D, para 5.(b)).

C - D (916813)
Call (multi-transit) from a major formation via another major formation to formations under command (916813) In 916814 and 9l5815 route on AC, i.e. rule 2.(e) in Annex E; in 913813 route on NI, i.e. rule 2.(c)..

G - H (904214)
Call between two formations that are formations under command of same major formation. In 904814 and 914814 route on AC, i.e. rule 2.(e).

K - L (901813)
Call between direct formations under command and secondary formations under command of two different major formations. In 913713 and 915815 route on AC, i.e. rule 2.(e); in 913813 and 916813 route on NI, i.e. 2.(c).

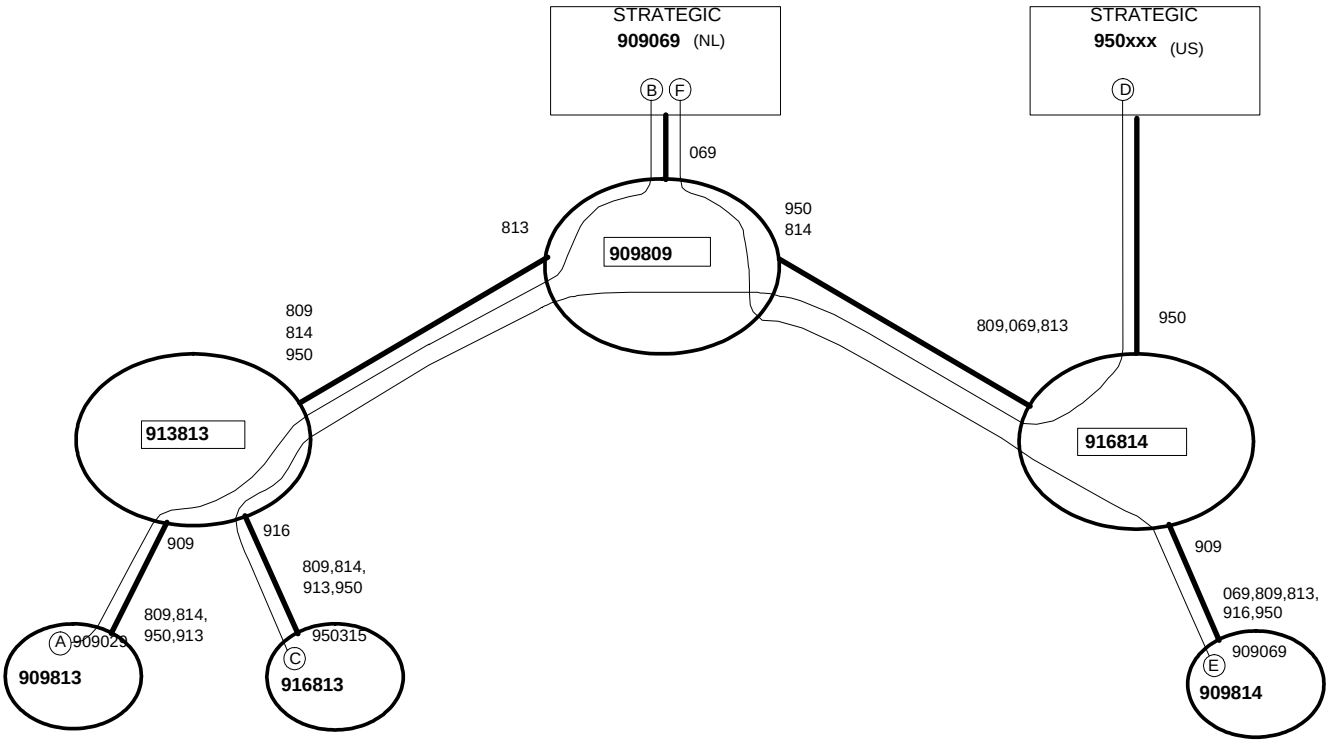


Figure F.3. - Routing to Strategic Networks

Comments to Figure F.3 - Routing to strategic networks

1. Allocation of area codes

   There are two strategic networks each directly connected to a major formation of the same nationality. NIACs (909069 and 950XXX) to both strategic systems have been assigned according to Annex C, para 6. Formations under command from both nations with strategic networks have been allocated prefixes (909813, 909814 and 916813) with ACs corresponding to their host major formations in accordance with Annex C.

2. Gateway prefixes

Between major formations all gateways are marked with ACs of all other major formations that can be reached. According to Annex C, para 11., gateways towards the US strategic system (950XXX) have stored the special prefix NI (950) as required. For the NL strategic system (909069) the AC (069) has been stored at gateways of system 909814, 916814 and 909809 based on assumed arrangements between system managers, which is the preferred solution to ensure operationally required communications.

3. Example of calls

Explanations are only given for 3-digit systems. All 6-digit systems will route on 6-digit NIACs according to Annex E, para 3.(a) and (b).

A - B (909069)
Call between formations under command and strategic network of NL transiting the host formation. In 913813 route on AC (809) to major formation as formations under command, i.e. rule 2.(d) in Annex E. Preferred method is to route on strategic AC after agreement between system managers).

C - D (950315)
Call between formations under command of US to US strategic network : Route on special NI (950), i.e. rule 2.(b) in Annex E.

E - F (909069)
Call between formations under command to strategic network of NL : Route on strategic AC (069), i.e. rule 2.(d) in Annex E

ANNEX G

NATO PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (NPICS) PROFORMA

1 Introduction

For a protocol implementation which is claimed to conform to STANAG 4214 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.

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:
G.1. All material in the base standard, i.e. STANAG 4214, 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 General abbreviations

NIAC	Nationality Identifier and Area Code
NI	Nationality Identifier
AC	Area Code
N/A	Not Applicable

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.

NIAC	Nationality Identifier and Area Code
AL	Access List
Rs	Single Routing
R	Routing
PG	Parallel Gateways
D3	3 Digit routing
D6	6 Digit routing
NI	Nationality Identifier
AC	Area Code
Ag1	Reserved Address for G1
Ag2	Reserved Address for G2
Ag3	Reserved Address for G3
Ag4	Reserved Address for G4
Ag5	Reserved Address for G5
Ag6	Reserved Address for G6
Acdr	Reserved Address for CDR
Apers	Reserved Address for Pers
Ag1ops	Reserved Address for G1 Ops
Ag2ops	Reserved Address for G2 Ops
Ag3ops	Reserved Address for G3 Ops
Ag4ops	Reserved Address for G4 Ops

As5	Reserved Address for S5
As6	Reserved Address for S6
Ar	Reserved Address
Asa	Reserved Address for Subscriber Assistance
Asm	Reserved Address for System Management
Aps	Reserved Address for Packet Gateway
Apf	Address Prefix
Ri	Routing Information
Rdx	Routing on x digits
Rpg	Routing parallel gateways

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 CCITT or ISO base standards in addition to STANAG references, the STANAG references shall be prefixed by "STxxxx", while the CCITT or ISO references are direct to chapters, paragraphs etc. Such CCITT 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 CCITT 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 relevant 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 STANAG 4214 according to 2.4 above. 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, categorised 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 unambiguous 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:
G.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 STANAG 4214.

Note:
G.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 nation/supplier's terminology (e.g. Type, Series, Model).

4.2 Protocol identification

Identification of protocol specification	STANAG 4214
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 4214 edition 2)	No[] Yes[]

Date of Statement	

5 Implementation

5.1 Routing

5.1.1 Format of the Routing Prefix

ITEM	PROTOCOL FEATURE	REFERENCES	STATUS	SUPPORT
NIAC	Does the system support the 6 digit routing prefix comprising a Nationality Identifiers and an Area Code with the format defined in the references?	7, 8, 9, 10, 11 and 12	M	Y[]

5.1.2 Knowledge of Routing Prefixes (Gateway Access List)

ITEM	PROTOCOL FEATURE	REFERENCES	STATUS	SUPPORT
AL	Does the system maintain knowledge of NI, AC and NIAC for the networks through which access can be gained via the Digital Gateway ?	A/2	M	Y[]

5.1.3 Routing Capabilities

Item	Protocol Feature	References	Status	Support
PG	Does the system support Parallel Gateways	A/3, A5	O	Y[] N[]
R2	Does the system prevent a call from being routed to a formation it has come from?	A/2c	PG:M	N/A[] Y[] N[]
*D3	Does the system support 3-digit routing?	A/4	O.1	Y[] N[]
*D6	Does the system support 6-digit routing?	A/4	O.1	Y[] N[]

* Predicate usage:
D3 is used in item Rd3
D6 is used in item Rd6

5.2 Address

5.2.1 Allocation of Nationality Identifiers

Item	Protocol Feature	References	Status	Support
NI	Is the system capable of conforming to the allocation of Nationality Identifiers as specified in the reference?	B	M	Y[]

5.2.2 Allocation of Area Codes

Item	Protocol Feature	References	Status	Support
	Is the system capable of conforming to the allocation of Area Codes for the following types of Tactical formation:]			
AC2	Major formations capable of single routing?	C/5	M	Y[]
AC4	Formations under direct command of host major formations capable of single routing?	C/7	M	Y[]
AC5	Is the system capable of conforming to the allocation of Area Codes for Strategic Systems?	C/8	M	Y[]
AC6	Is the system capable of conforming to the allocation of Area Codes for Secondary formations under command of Formations under command?	C/11	M	Y[]
AC7	Is the system capable of conforming to the allocation of Subsidiary Area Codes as identified in the reference?	C1/1, C1/2, C1/3, C1/4	M	Y[]
AC8	Is the system capable of conforming to the Area Codes allocated to Nations as specified in the reference?	C1/Table 1	M	Y[]

5.2.3 Reserved Addresses for Special Facilities

ITEM	PROTOCOL FEATURE	REFERENCES	STATUS	SUPPORT
Ar	Does the system reserve addresses 79999xx to be used for special facilities? Does the system support the following addresses to be used to set-up the specified facilities?	C2/1	M	Y[]
Ag1	7999971 G1	C2/2	M	Y[]
Ag2	7999972 G2	C2/2	M	Y[]
Ag3	7999973 G3	C2/2	M	Y[]
Ag4	7999974 G4	C2/2	M	Y[]
Ag5	7999975 G5	C2/2	M	Y[]
Ag6	7999976 G6	C2/2	M	Y[]
Acdr	7999979 CDR	C2/2	M	Y[]
Apers	7999980 Pers	C2/2	M	Y[]
Ag1ops	7999981 G1 Ops	C2/2	M	Y[]
Ag2ops	7999982 G2 Ops	C2/2	M	Y[]
Ag3ops	7999983 G3 Ops	C2/2	M	Y[]
Ag4ops	7999984 G4 Ops	C2/2	M	Y[]
As5	7999985 S5	C2/2	M	Y[]
As6	7999986 S6	C2/2	M	Y[]
Asa	7999990 Subscriber Assistance	C2/2	M	Y[]
Asm	7999991 System Management	C2/2	M	Y[]
Aps (Note 1)	7999961 Packet Gateway	C2/2	X	--
APf	Are the above addresses preceded by the NIAC when crossing the gateway?	C2/3	M	Y[]

Note:

1. Item Aps is for further study and is prohibited from use until further notice.

5.3 Routing Information to be Exchanged between System Managers

Item	Protocol Feature	References	Status	Support
Ri3	Can the information necessary for systems which are capable of routing on the NI and AC separately, be provided to System Managers?	D/3	O	Y[] N[]
Ri6	Can the information necessary for systems which are capable of routing on the full 6-digit prefix only, be provided to System Managers?	D/4	M	Y[]

5.4 Suggested Routing Rules

Item	Protocol Feature	References	Status	Support
	Does the system comply with the suggested routing rules:			
Rd3	For systems which can route on 3 digit AC or NI ?	E/2	D3:O.2	N/A[] Y[] N[]
Rd6	For systems which route on the full 6-digit prefix only?	E/3	D6:O.2	N/A[] Y[] N[]