AERONAUTICAL TELECOMMUNICATION NETWORK PANEL

WORKING GROUP 2

Phuket, 10-14 March 1997

Proposed Draft SARPs Corrections Concerning Subnetwork Priority Mapping

Working Paper

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SUMMARY

During the tenth meeting of ATNP WG2, discussions arose about a potential inconsistency between section 5.2.8.5. of the current Draft ICS SARPs and the referenced subnetwork Draft SARPs. This paper illustrates the defects found and proposes some corrections.

References:

/1/   ATN Manual, Version 2.0

/2/   Priority Definitions within ICAO Annex 10 and the Relationship to the ATN SARPs, ATNP WG2, July 1995 (Rome meeting)

/3/   ATNP/2-WP/67, APPENDIX B to the report of Agenda item 3 (Draft ATN SARPs)

/4/   Annex 10, Vol. III, Chapter 5, Amendment 71 (Mode S Subnetwork SARPs), ICAO, November 1996

/5/   WP1/496, Mode S Subnetwork Guidance Material, SICASP, February 1996

/6/   AMSS Draft SARPs, Appendix to the Report on Agenda Item 2 of AMCP/3, Montreal, 7-22 April 1994

/7/   AMSS Draft Guidance Material, Appendix to the Report on Agenda Item 3 of AMCP/3, Montreal, 7-22 April 1994

1   Background

During the last working group meeting in Alexandria, some lengthy discussion arose about the subnetwork priority mapping in general. In particular, it was questioned whether priority mapping is specified in the Mode S and AMSS subnetwork material or not, and whether the existing text is still appropriate in spite of several changes to the priority mapping table (which is now in the core part of the SARPs).

2   Discussion

2.1   Analysis of Draft ATN SARPs

The existing Draft ATN SARPs (sub-volume 5) are reproduced in the following:

5.2.8.5.1.1 When an ATN connection mode subnetwork does not support prioritisation of subnetwork connections, then the ATN Internet Entity shall not attempt to specify a subnetwork connection priority, and NPDUs of any priority may be sent over the same subnetwork connection.

Note 4. — The following does not apply to AMSS and Mode S Subnetworks, which have specified their own priority mapping schemes.

5.2.8.5.1.2 When an ATN connection mode subnetwork does support prioritisation of subnetwork connections, then unless the relationship between ATN Internet Priority and subnetwork priority is explicitly specified by the subnetwork specification, the following shall apply:

a)   Subnetwork connections shall be established as either "High" or "Low" priority connections.

b)   For the "Low" priority connection type, the priority to gain a connection, keep a connection and for data on the connection shall be the defaults for routine use of the subnetwork.

c)   For the "High" priority connection type, the priority to gain a connection, keep a connection and for data on the connection shall be appropriate for urgent and network management data in the context of the subnetwork. In the absence of guidance from the subnetwork provider, the value decimal 8 shall be used for each of the three priorities.

d)   "High" priority connections shall be used to convey NPDUs of priority six and above. "Low" priority connections shall be used to convey all other NPDUs.

2.2   Analysis of Subnetwork (Draft) SARPs

2.2.1   Mode S

Neither in the Mode S Subnetwork SARPs (Ref. /4/), nor in the corresponding Draft Mode S Subnetwork Guidance Material (Ref. /5/), a specification of the mapping of CLNP priority to Mode S subnetwork priority could be identified. Consequently, the Note in chapter 5.2.8.1.1 has to be amended with respect to the Mode S subnetwork.

2.2.2   AMSS

The AMSS Draft SARPs (Ref /6/) define priority levels concerning the establishment and maintenance of switched virtual circuits and the relative precedence of data using these connections for the message categories listed in the communication priority table of the Draft Core ATN SARPs and of Sub-Volume ! of Appendix A to the Draft ATN SARPs. This means that for these message the AMSS Draft SARPs establish an implicit but unambiguous mapping between the ATN network priority scheme and the AMSS subnetwork priority scheme. Consequently, the existing communication priority table in the Draft ATN SARPs in conjunction with the existing

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priority mapping specification in the AMSS Draft SARPs provides a complete and explicit mapping between the ATN Network Layer Priority and the AMSS Subnetwork Priority.

2.3   Potential Defects

The following problems (and thus potential defects) were identified:

1.   Note 4 (referring to subnetworks with priority) is misplaced because it is located in the paragraph dealing with subnetworks without priority;

2.   The correctness of the note itself was questioned because it was unclear whether AMSS or Mode S really have specified their own priority mapping schemes;

3.   in section 5.2.8.5.1.2, section d), there is a discrepancy with respect to the threshold for declaring "low" and "high" priority. Ref /1/ and /2/ state that CLNP priorities 9 and under should be mapped to "low" subnetwork priority, whereas the current Draft ICS SARPs (Ref. /3/, subvol. 5) require CLNP priorities below 5 to be mapped to "low" S/N priority. The reason for this change remained unclear;

4.   the rationale for the default value "8" in subsection c) of 5.2.8.5.1.2 remained unclear, and the meaning of the term "each of the three priorities" in this section is not understood.

2.4   Analysis of Potential Defects and Proposed Resolution

2.4.1   Defect #1

The minor editorial defect is obvious and can be resolved by moving the note to section 5.2.8.5.1.2.

2.4.2   Defect #2

The Mode S subnetwork SARPs do not specify how the priority mapping from the ATN internetwork to the subnetwork shall be performed. The AMSS Draft SARPs provide a partial mapping specification for a subset of CLNP priorities (or message categories respectively). No guidance is given on this subject in the corresponding guidance material for both subnetworks.

There is a defect which needs resolution. It is proposed to amend the note by deleting the reference to Mode S.

2.4.3   Defect #3

The threshold dividing "low" and "high" priority SN connections was originally selected according to the bold black line in the priority table, dividing "safety critical" and "non safety critical" messages. This leads to the following problem: The current SARPs define 6 applications (CPDLC, ADS, AIDC, CM, ATSMHS and ATIS) which are all defined as "safety critical"; Thus, mapping them all to "high" subnetwork priority would take the possibility to distinguish them in the subnetwork (where priority may be especially important in bandwidth-limited air-ground subnetworks). It is rather felt appropriate to distinguish between the already specified flight safety related messages (high and low) and flight regularity/aeronauticel information services messages. The text in 5.2.8.5.1.2 d) should be updated to reflect the allocation made in the CNS/ATM-1 package ATN SARPs. It is furthermore necessary to specify the threshold (rather than leaving it up to the operator/user) because otherwise harmonized operation is not guaranteed.

There is a defect which needs resolution. The CLNP priority values in the text of section 5.2.8.5.1.2 d) should be such that two classes of ATN applications can be distinguished if the subnetwork supports priority. Ref /3/, subvol. 1, distinguishes "High" and "Normal Priority Flight Safety Messages" with network layer priority 11 and 10 respectively, and "Flight Regularity Communication" as well as AIS messages with lower network layer priorities. It appears reasonable to assign High Priority Flight Safety Messages (i.e. network layer priority 10 and above) a subnetwork priority "high", all other Network Layer priorities "low".

2.4.4 Defect #4

The required decimal value 8 in certain cases (i.e. when no guidance is given by the subentwork provider) is arbitrary and unsuitable; this requirements may even lead to a connection not be established, if the subnetwork does not support this value. The first sentence of subparagraph c) is considered already sufficient to cover the requirement.

There is a defect which needs resolution. It is proposed to delete the second sentence in paragraph 5.2.8.5.1.2, section c).

3 Proposal

The above mentioned resolutions to potential defects have been incorporated in the following amended SARPs text including revision marks. The proposed changes may be easily incorporated by ICAO in the Draft ATN SARPs using cut-and-paste technique. It is proposed to amend the Draft ATN SARPs accordingly.

5.2.8.5.1.1 When an ATN connection mode subnetwork does not support prioritisation of subnetwork connections, then the ATN Internet Entity shall not attempt to specify a subnetwork connection priority, and NPDUs of any priority may be sent over the same subnetwork connection.

Note 4. — The following does not apply to AMSS and Mode S Subnetworks, which have specified their own priority mapping schemes.

5.2.8.5.1.2 When an ATN connection mode subnetwork does support prioritisation of subnetwork connections, then unless the relationship between ATN Internet Priority and subnetwork priority is explicitly specified by the subnetwork specification, the following shall apply:

a) Subnetwork connections shall be established as either "High" or "Low" priority connections.

b) For the "Low" priority connection type, the priority to gain a connection, keep a connection and for data on the connection shall be the defaults for routine use of the subnetwork.

c) For the "High" priority connection type, the priority to gain a connection, keep a connection and for data on the connection shall be appropriate for high priority flight safety related ~~urgent~~ and network management data in the context of the subnetwork. ~~In the absence of guidance from the subnetwork provider, the value decimal 8 shall be used for each of the three priorities.~~

d) "High" priority connections shall be used to convey NPDUs of priority ~~sixt~~en and above. "Low" priority connections shall be used to convey all other NPDUs.

Note 4. — The above does not apply to the AMSS Subnetwork, which has specified its own priority mapping scheme.

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4 Recommendation

It is recommended that

(a)	the working group approves the above text changes as correction of defects in the Draft ATN SARPs, internet communication service; and

(b)	forwards the approved material to ICAO, requesting its inclusion in the material presented to the ANC.