AERONAUTICAL TELECOMMUNICATION NETWORK PANEL

Working Group 2

Alexandria Virginia

Achieving a Cost Effective ATN

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SUMMARY

The United States FAA recognizes that the ICAO standardization process and the interoperability of global systems is critical to the success of the ATN. The FAA has concerns on realizing a cost effective implementation on the ATN as currently specified in the draft SARPs. This paper proposes modest changes to the ATN draft SARPs to alleviate these concerns.

REVISION HISTORY

Section	Date	Issue	Reason for Change
	September 30, 1996	Issue 1.0	Document Creation

Achieving a Cost Effective ATN

1. Scope and Purpose of this Paper

This paper discusses the FAA concerns on providing a cost effective realization of the ATN as currently defined in draft SARPs. It also provides modest changes to the draft standards that would preserve interoperability and allow the U.S. ATN components to take greater advantage of COTS products for at least initial implementations of the ATN.

2. References

None

3. Acronyms

4. Background

The aeronautical community has been involved in efforts to introduce Air Traffic Service data communication to aircraft for more than 10 years. While commercial data communications services and projects have evolved partly over this time, the unique requirements of the aeronautical community have prevented the introduction of significant use of air-ground communications. The most notable aviation-specific requirements are: 1) maintaining communications with mobile aircraft that can have multiple computers on board, 2) making use of air-ground data links that have low-bandwidth relative to common ground networks, 3) having an internationally standardized communication infrastructure that allows aircraft equipment to work anywhere with the international Air Traffic Management system. The ICAO ATN Panel has been working towards the definition of a common internetwork communication design that will meet the needs of the aeronautical community. The approval of the ATN standards is expected to occur at the November 1996 meeting of the ATN Panel. The U.S. is interested in seeing that the benefits of a world-wide ATN system are achievable in the near-term and sustainable for the future. The FAA recognizes that the ICAO standardization process and the interoperability of global systems is critical to this success.

5. Discussion

The U.S. FAA is concerned that the draft ATN standards as they currently exist unnecessarily limit our implementation in two ways. First, the standards as written constrain our use of common COTS products throughout the ground network (for both ATN routers and end systems). This will have significant impact on the affordability of ATN implementation in the U.S. Specifically, the draft standards include optional use of certain parameters in standards ISO OSI protocols that are not supported in widely available COTS products. The U.S. would like to explore modest changes to the draft standards that would provide functional equivalence, preserve interoperability and allow U.S. ATN components systems to take greater advantage of COTS products for at least initial implementation of the ATN.

Second, while the ATN standards must necessarily address the interactions between participating organizations, restrictions should not be placed on the internal operations of organizations. This is an important issue to the FAA due to the potential cost savings and operational efficiencies that can be gained from maintaining administrative flexibility. While the current draft ATN standards do not compromise this administrative flexibility, the language of the draft standards might cause confusion for implementors.

The U.S. views the issues described above as consistent with the philosophy of the ATN. Any changes to the draft SARPs to address these issues could provide a cost effective way for providing a phased implementation strategy and administrative flexibility while preserving interoperability.

6. U.S. Proposal

The U.S. FAA makes the following proposed changes to the draft ATN standards (see Appendix A for specific text changes) :

That an optional protocol change be added to explicitly signal that the ground system can specify:

1) that the Inter-Domain Routing Protocol (IDRP) **not be** used over an air-ground subnetwork

2) that the ATN Security Option **not be** used.

Appendix A

ATN Draft SARPs Changes

N.B: All APRLs must be updated according to these proposals, where ambiguity exists.

Table 5.2-1 ATN Router Classes

The Class 5 router should have the ISO/IEC 10747 protocol as optional. This protocol is required only between ATN Backbone RDC routers that peer with other such routers in other ATN Backbone RDCs. It should not be required that all Air/Ground Ground-based routers be part of the ATN Backbone.

Add to Section 5.2.7.1.1

Some states may desire not to use the Security Parameter, relying instead on the address of the ATSC application to imply the service quality required by the ATSC application. The service quality will be *provided* by local (ground) means, as is the case when the Security Parameter is explicitly used. The ground ATSC domain will signal this desire implicitly, the preferred method, or explicitly. The implicit signaling is contained in the address of the application itself, i.e., the host wishing to peer with this application must know, a priori, that the Security Parameter cannot be used. This a priori knowledge is obtained through means outside of this standard, e.g., through bi-lateral agreements between states. The explicit signaling is effected through negotiation, as described in Section 5.3.5. Note that the procedures described here need not affect AOC traffic flows and operations: these are matters for the AINSC parties and their ATN service providers.

Insert after Section 5.3.5.2.6.4

5.3.5.2.6.4 In the case of an air/ground router, if it does not support the use of IDRP over the air/ground link, i.e., it only supports the optional non-use of IDRP, the SEL field of the NET inserted into the ISH PDU shall always be set to FDh (i.e. a binary pattern of 111 1100).

The SEL value of FDh also indicates that the security options shall not be invoked by any applications transferring data over that subnetwork connection.

Resequence sections 5.3.5.2.6.5 through 5.3.5.2.6.8 accordingly

To section 5.3.5.2.9.1 Add a second paragraph as follows.

If an airborne router receives an ISH PDU with an SEL field value of FDh (binary bit pattern of 1111 1100), then the airborne router shall assume that the use of IDRP information between the air/ground router and the airborne router is prohibited and shall apply the following procedures; regardless of the SEL value that the airborne router transferred to the air/ground router.

a) The FIB shall be updated with the NET of the air/ground router
b) The NET of the air/ground router shall be truncated to the first eleven octets and the resulting NSAP Address Prefix shall be included in any Routing Information Base maintained by the airborne router.
c) No security path attributes shall be used when updating the FIB or RIB.

Note 1.-The airborne RIB can be updated using other routes known locally as a result of the reception of the air/ground NET.

Note 2.-There is no recommendation to suppress the periodic transmissions of ISH PDUs.

Modify Section 5.3.5.2.13.6 by inserting Item 4 at the end of the list.

4. In the case of an Airborne router implementing the procedures when IDRP is not used over the Air/ground subnetwork system (SEL = FDh), all routes shall be removed from the RIB and FIB associated with the reception of the NET in the ISH PDU received from the Air/Ground router for which the Leave Event reports a loss of connectivity.

Modify Section 5.3.5.2.14, APRL for Air/ground Route Initiation, accordingly.

5.8.3.1.1

Replace "Airborne Routers" with "Airborne Routers and Ground Routers".