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Review of Recent Changes to the draft ATN Internet SARPs

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SUMMARY

Several significant changes have taken place during the passed year that have made significant changes to the nature of the draft ATN Internet SARPs. This paper attempts to catalogue the main changes, and, in particular, their impact on the use of COTS Software.

DOCUMENT CONTROL LOG

SECTION	DATE	REV. NO.	REASON FOR CHANGE OR REFERENCE TO CHANGE
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1. Introduction

During this past year, a considerable number of changes have been made to the draft ATN Internet SARPs. Each of these changes has been justified by user requirements. However, the net effect has been to require more special to type behaviour from ATN equipment and hence a further move away from the original intention of using Commercial Off-The-Shelf (COTS) systems wherever possible.

The objective of this short paper is to record the significant changes that have taken place, their effect on systems development, and why the change took place. This may then be reviewed and the validity of these changes accepted.

2. Review of Changes to the Draft SARPs

1.	**Optional non-use of IDRP**
Reason for Change	
Concern over implementing IDRP in avionics within the timescales of CNS/ATM-1 Package.	
Changes Required	
a) Modified Route Initiation procedures to negotiate non-use of IDRP b) Route Inference procedures to determined implied route availability without IDRP.	
Impact on use of COTS Software and Systems	
Both Air/Ground and Airborne Routers are affected.	

2.	**Air/Ground IDRP Profile**
Reason for Change	
This profile makes optional, features that are mandatory in the ISO standard. It was proposed in order to minimise the IDRP implementation effort for Airborne Routers by removing any features not required in an ICAO Air/Ground Context.	
Changes Required	
a) Air/Ground Routers must be tolerant of non-implementation of mandatory ISO requirements. b) Airborne Routers may omit certain mandatory features, but are not required to do so.	
Impact on use of COTS Software and Systems	
In simplifying the Airborne Router, which is always expected to be a specially developed system, Air/Ground Routers have to deviate from ISO mandatory requirements, and hence must be modified from standard COTS offerings.	

3.	**User Routing Policy Requirements**

Reason for Change

Airline representatives demanded that the ATN provide them with at least equivalent functionality to the existing ACARS system in respect of controlling the air-ground communications links used. Further, such requirements were endorsed by ATC Community representatives when considering the need to control the routes traversed by ATC messages.

Changes Required

a) Use of the CLNP Security Parameter by ATN End Systems and Routers, to convey user Routing Policy Requirements. Addressing conventions were investigated but found to be impractical due to the consequential increase in routing overhead.

b) Additional path information to be conveyed by IDRP along with each route, in order to identify the air-ground subnetwork(s) that a route passes over and any restrictions on traffic types that may be carried.

c) The implementation in ATN Routers of special procedures for the generation of the Forwarding Information Base from the additional path information and reference by the User Routing Policy Requirements contained in the CLNP header.

d) Modified Route Inference procedures (during Route Initiation with the optional non-use of IDRP)

Impact on use of COTS Software and Systems

i) COTS End Systems are only useable for General Communications traffic. ATN versions are required for all other uses.

ii) All ATN Boundary Routers (i.e. BISs) must support these mechanisms and hence must always be ATN specific versions.

3. Discussion

In addition to these new requirements, the ATN Manual also included requirements which were essentially non-COTS. These were:

a) The Mobile SNDCF

b) The Address Compression Algorithm (ACA)

c) Route Initiation Procedures.

d) The Use of Priority in both CLNP and ATN Subnetworks

e) The earlier use of the CLNP Security Parameter to convey Traffic Type Information.

f) Extended use of TP4.

g) QoS based Routing.

In addition, some very specific routing policy requirements on IDRP may not be realisable in “normal” implementations and may require ATN Specific implementations. However, it is

still early days in the area of IDRP implementations, and ATN requirements may influence what suppliers regard as normal.

In the above list, (a) to (c) are all due to need to support air-ground subnetworks and are essentially isolated in impact to Air/Ground and Airborne Routers. These are unlikely to be normal commercial systems and so the need for special features has been viewed as acceptable. The optional non-use of IDRP and the special IDRP profile introduced this year are also in this area.

However, some of the other non-COTS features affect End Systems and other ATN Routers, and here there could be gain if COTS systems could be used in such areas. Work was therefore undertaken in late 1994 was aimed at trying to remove some of the “non-COTS” requirements in order to reduce the validation risk and procurement cost, especially for End Systems. This was successful in terms of the “QoS based Routing” foreseen by the ATN Manual, and some of the additional TP4 options.

However, this work only succeeded in re-affirming the need for the use of priority in the ATN. Further, attempts the simply the use of the Traffic Type from the need for the CLNP Security Parameter to an addressing convention (and hence to use COTS End System implementations), only succeeded in flushing out more clearly stated requirements in this area from Airlines and ATC users.

4. Conclusion

Outside of the specific are of Air/Ground communications, there could be gain from trying to ensure that only COTS features are required for ATN End Systems and ATN Routers not directly involved in Air/Ground communications. The two significant ATN features requiring the use of ATN versions of COTS systems in both of these areas are the “Use of Priority” and the “User Routing Policy Requirements”.

The Use of Priority in the ATN is believed essential for ensuring that availability criteria are met for Safety Related Applications, whilst sharing the network with other applications. This will be validated during the validation and verification process that is currently underway.

The User Routing Policy Requirements are believed essential for the acceptability of the ATN by its principal users, who are also responsible for the additional cost (if any) of ATN versions of COTS systems.

It is this believed that the continued existence of these ATN specific features is essential for the acceptability and use of the ATN and are hence fully justified.