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ATN AIR/GROUND SUBNETWORK USE

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Summary
This paper provides an airline perspective to the rationale of multiple ATN subnetwork availability and their usage.

1. Introduction

The aviation industry has spent an enormous amount of time and effort developing ATN. Why? Principally for a more cost effective way to communicate, not forgetting that data has a higher degree of integrity, and can automate functions which could not be automated by voice.

We must not lose track of the fact that ATN is being developed principally for ATC. Airlines have their own datalink, ACARS. Yes, it is desirable to upgrade from character to a bit oriented system, however a new airline only system would be much simpler than ATN. Still, the primary driver for upgrading would be improved ATS services based on greater automation and secondarily, cost effectiveness.

2. Subnetwork Issue

The one factor which makes ATN most unique from all other data networking systems is the wide diversity of data subnetworks available over the air/ground environment. The four currently approved or being considered by ICAO are SATCOM, VHF, Mode-S, and HF. In the future even more may be added to the arsenal.

Each of the air/ground subnetworks have their own unique qualities. SATCOM has universal coverage with the exception of the poles. HF Datalink has universal coverage, however it needs to overcome propagation anomalies. It has also been found that SATCOM has its own propagation problems, however they are different from HF. There is consideration within the industry that a SATCOM/HFDL installation can meet perceived communications requirements better than a dual SATCOM system.

VHF and Mode-S are both line of sight air/ground subnetworks dependent on numerous ground stations. These however have their unique characteristics ownership and performance.

As stated previously, cost and efficiency are the primary attributes considered when determining usage. This of course is dependent on availability, i.e. VHF and Mode-S cannot provide coverage in oceanic regions not close to land masses. In areas with dual coverage of air/ground subnetworks, a primary concern will be cost of usage. In the instance of both VHF and SATCOM coverage, VHF may be about a tenth of the cost of SATCOM.

ATN is defined and being developed to provide the choice of subnetwork usage. Proposals have been made to limit air/ground subnetwork usage to one in the CNS/ATM-1 Package. This could only be counter productive. Not only would

this restrict usage and raise costs, it would curtail the development of a flexible ATN system.

Airlines will use the air/ground subnetworks for their proprietary communications which they feel best meet their needs and are most cost effective for them. This does not mean they are not concerned about the cost effectiveness of ATC data communications. ATC costs are ultimately charged back to the airlines in one form or another; therefore, airlines are just as concerned that cost be a primary factor in air/ground subnetwork usage by ATC, assuming of course the subnetworks meet performance requirements.

3. Recommendation

As already noted, performance and cost will be the primary factors in the selection of the air/ground subnetwork to be used based upon the requirements of the applications. As also already noted, multiple air/ground subnetworks may be available at any one time. It will also be a fact that during flight, subnetworks may come and go. It is the intent to use the most optimum air/ground subnetwork based upon performance, costs and application requirements.

In order to achieve the intentions stated, it is imperative that applications must be supported by all available air/ground subnetworks and furthermore, that the transition between the subnetworks be transparent to the end applications. Therefore, for optimum use of ATN, the CNS/ATM-1 Package must not restrict the use of or selection of air/ground subnetworks for ATSC applications as long as the requirements are met.