International Civil Aviation Organization

ATN Seminar and Third ATN Transition Task Force Meeting

Singapore, 26-30 March 2001

Agenda Item 6: Planning and Implementation Considerations

**ICAO ATN SEMINAR FROM AFTN TO ATN
IN THE ASIA/PACIFIC REGION**

(Presented by IATA)

The AFTN In Its Infancy:

The AFTN was conceived in a period when modern day data communications technologies were not developed and available.

It was developed on the basis of messaging technology which was available at the time (eg.Telex). Further development of the AFTN has always had to be made within the limitations of the original "telex technology", to preserve backwards compatibility with the existing AFTN network.

The character-based AFTN is **no longer able to provide what digital communications could give to Aviation**.

AFTN: The World's First Major Message Handling System

Raison D'etre: the need to distribute Flight Safety Messges among an increasing number of locations

Users: allows many users to co-operate on a world-wide basis (ATSOs, airports, AOCs,)

Operations: on a co-operative basis by States

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The world's first major message handling system - initially a great innovation

*but now technically **far behind***

The Confusion about ATN

Regrettably there is considerable confusion as to what the ATN is and why it is needed.

It must be made clear that the ATN is not a direct replacement for the AFTN.

$$ATN \neq AFTN - F \ !$$

To demonstrate this it is important to understand the **weaknesses of the existing AFTN** and its bit oriented replacement CIDIN which is in limited use in the EUR Region.

The ATN-The Digital Data Super-highway

The ATN is designed to be the communications 'superhighway' for the exchange of digital data between computers for aeronautical purposes. It will provide data exchange between :-

☞ **Aircraft systems and Air Traffic Control(ATC) systems (air/ground communications)**

☞ **Air traffic systems (ground/ground communications)**

☞ **Air traffic providers and airspace users, and**

☞**Permitting ATC and Airline Operational Communications (AOC) to share the same data links.**

The ATN- The Aviation Intranet

The ATN is based on internetworking techniques - it can be considered to be an **aviation intranet**.

It is not just a ground based data communications network but includes sub-networks which include the various form of data-link transmission (over VHF, SATCOM and other technologies such as Mode S Extended Squitter & UAT
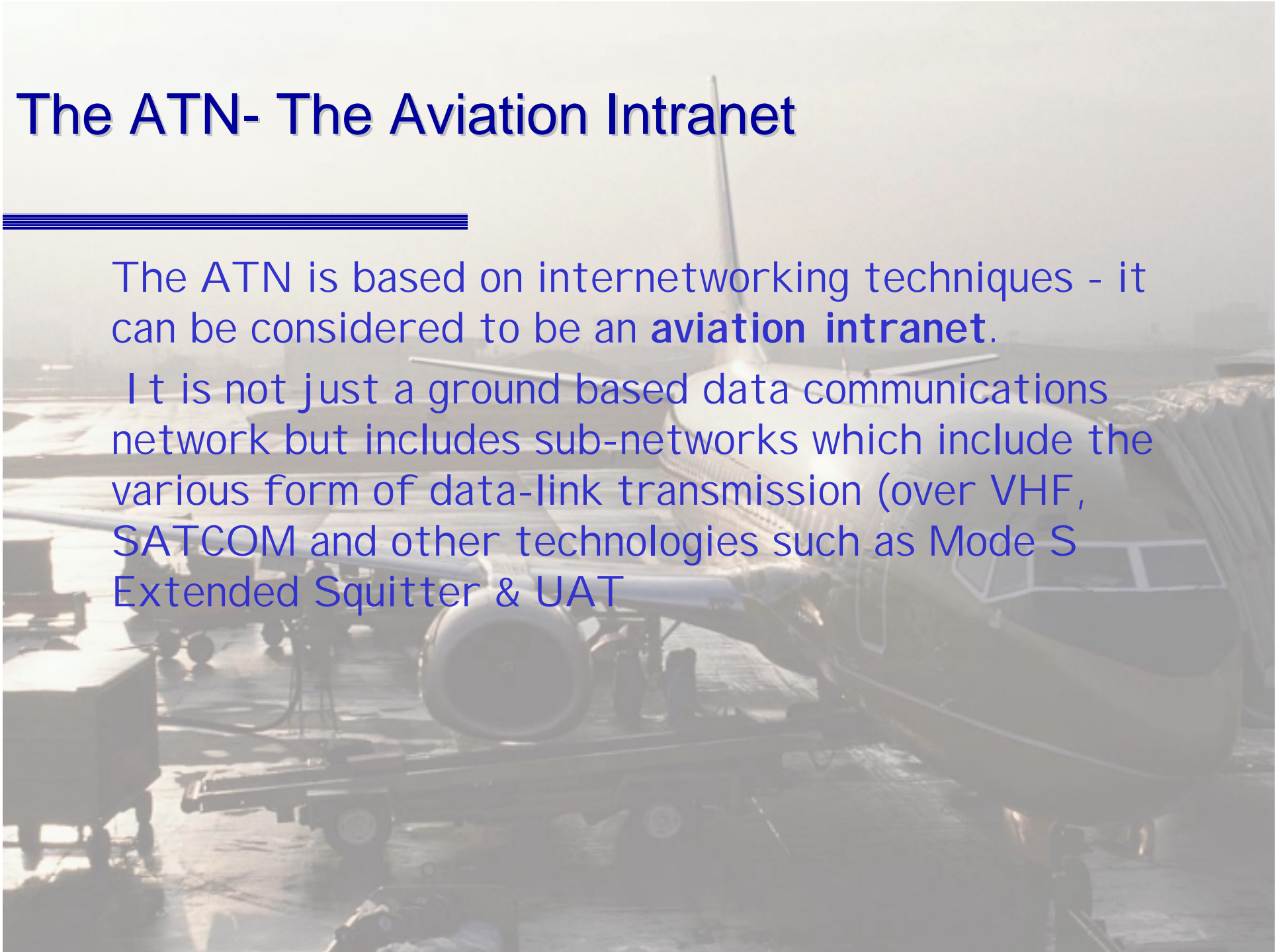
The Operational Functionality of the ATN

Air/ground

i. Data Link Initiation Capability (DLIC)

ii. Automatic Dependent Surveillance (ADS)

iii. Controller Pilot Data Link Communications (CPDLC)
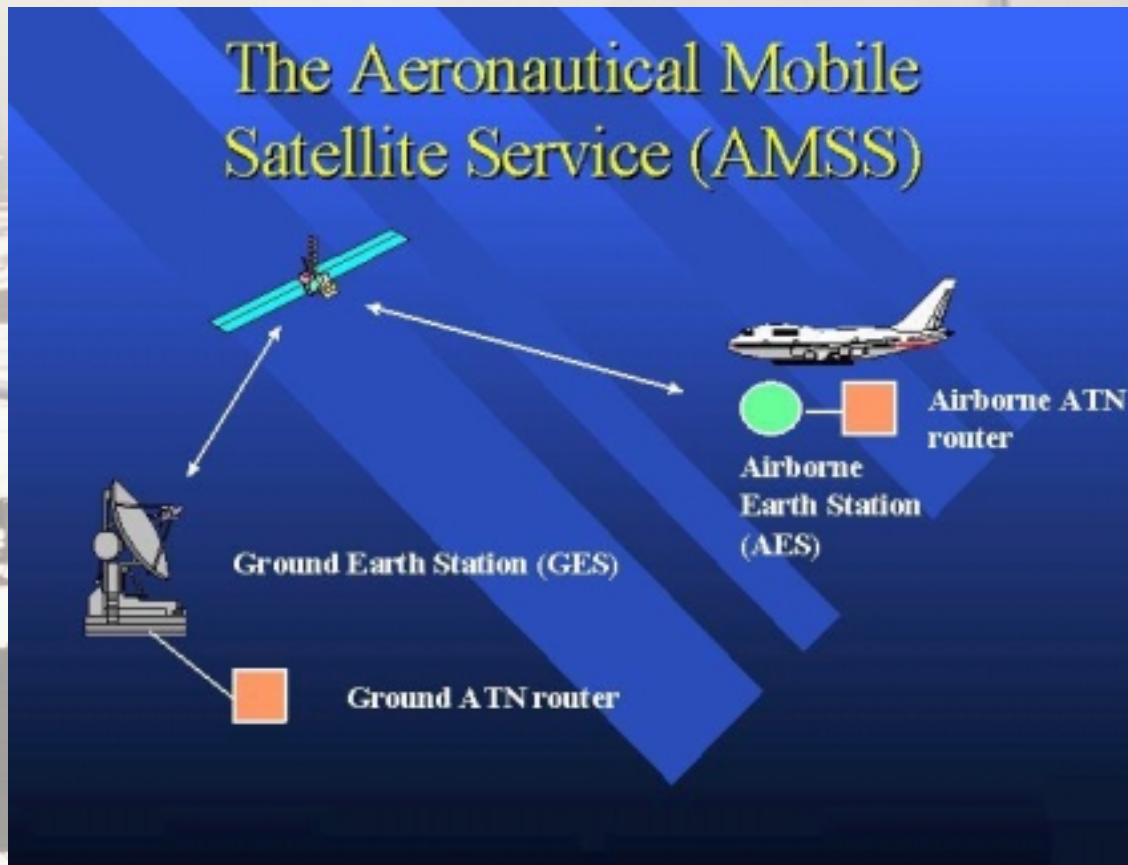
iv. Digital Flight Information Service (DFIS)

Ground/ground

v. ATS Interfacility Data Communications (AIDC)

vi. ATS Message Handling Service (ATSMHS)

Broadcast

vii. Automatic Dependent Surveillance Broadcast (ADS-B_).

Our End System to Your End System

- Airborne Router seeking connectivity to a ground based Router via AMSS when VDL connection is not possible

# AMSS: The Costly Solution available to Airlines

AMSS Issues

- **High cost**
  - to equip ($50,000 - $350,000)
  - to use ($0.46 per kilobit)
- **Wide Coverage**
  - 85% Global Coverage
  - only realistic option in oceanic areas and remote continental areas
- **Vulnerable to satellite failure**

AMSS will provide enhanced coverage where VDL can not reach.

Where AMSS is not possible eg. Polar Regions, HF Data Link may offer technically feasible solutions. However,

it is of concern to Airlines that this may be a prohibitive cost.

HF Data Link: Airlines Concerns

HF datalink

- Frequency band: 3-30 MHz
- Signals reflected by ionosphere
  - Very long propagation distances
  - Propagation characteristics influenced by time of day and sunspot activity
  - Requires careful tuning of frequencies
- ACARS protocol and ARINC 622/623
- ATN compliant protocol under study
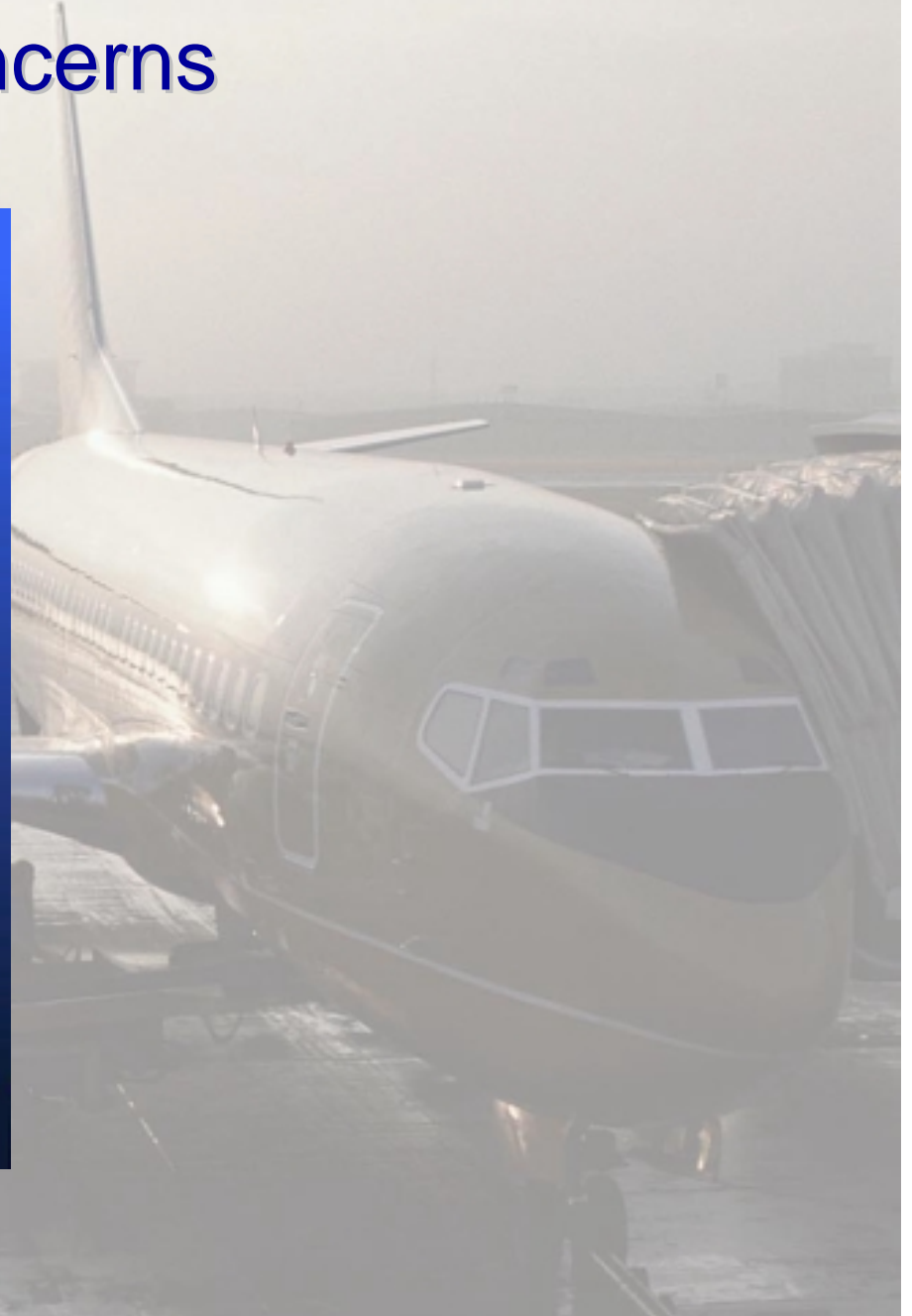
AMHS A Replacement for AFTN ?

MHS - Who communicates and What?

- In a global context - anyone!
- In the Specific ATM context, MHS is seen as a replacment for the AFTN in the form of the Aeronautical MHS (AMHS)
- AMHS will support:
  - Flight Plan distribution
  - NOTAM (AIS) Information distribution
  - OPMET Data distribution
  - + Others

- Aeronautical applications have been defined to use MHS, including Flight Plan distribution, NOTAM Distribution and OPMET distribution. These applications all have a global context within the ATM community and it is foreseen that AMHS will eventually replace the ageing and now expensive AFTN.

Association Of AMHS With Other MHSs
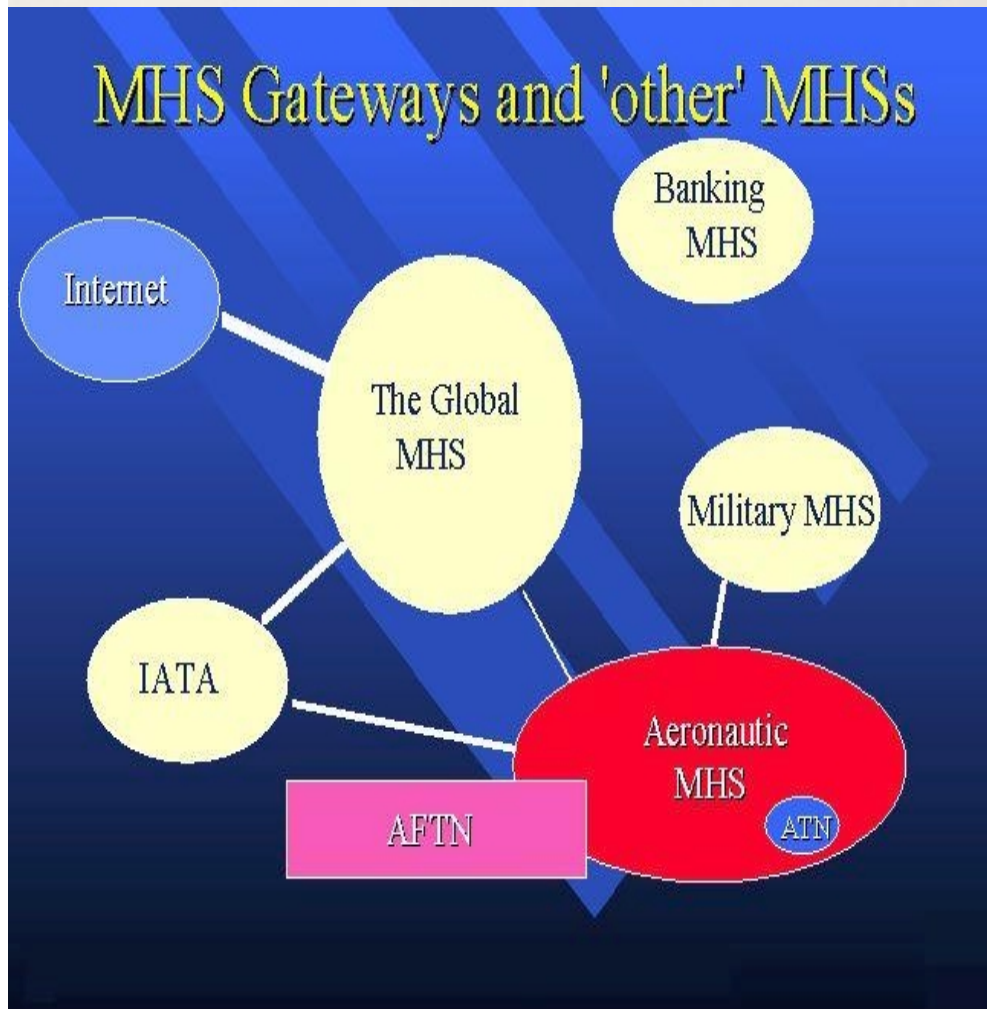
- The AMHS has proposed links with AFTN, the Global MHS, IATA,Military Messaging, TCP/IP Internet,and even financial MHS.

The key characteristics of the ATN that will enable benefits to be achieved

A high availability network is provided by ensuring there is no single point of failure. By permitting the availability of multiple routes to the same destination with dynamic switching between alternatives, a feature **NOT** available with the AFTN, availability is enhanced. The same techniques apply to both fixed and mobile communications giving mobile communications **an availability that was unattainable with older technologies.**

It ensures that low priority data does not impede the flow of high priority data.

It also incorporates advanced congestion management techniques to ensure that **high priority data** continues to receive **low transit delays** even at times of high traffic load.
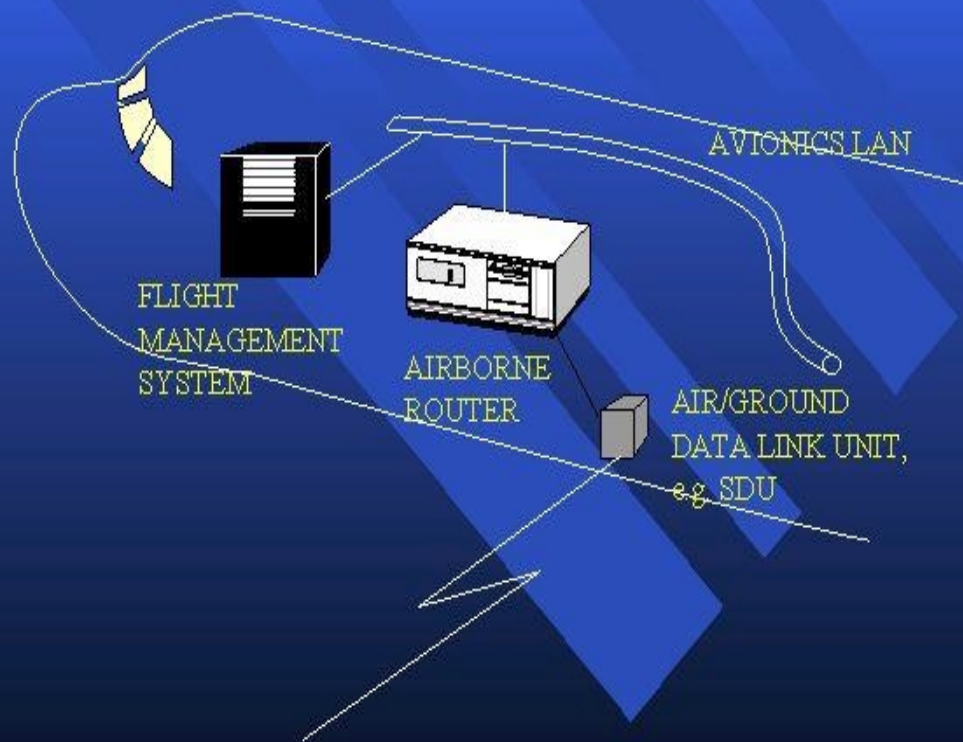
ATN Is No longer a mere Concept. It is Ready.
Is This Region Getting Ready?

- The ATN Internet is a validated specification, and is ICAO Approved.

- It is now ready to support the future CNS/ATM Applications.

Enable 'Router Talk': Move to ATN!

Possible Airborne Architecture

- Our Routers are getting ready to 'Talk' to other Routers. Our fears are that some States may be slow in getting theirs ready in this Region.

- In that event, ATN implementation will delay the **C** of **CNS**, and thereby effect **CNS/ATM in this Region.**

Do we have to accommodate the present in the future means of communications?

1.3.3 The ATN shall enable the transition of existing AFTN users and systems into the ATN architecture.

Is the above requirement constricting ATN development and implementation?

Can not the AFTN remain undisturbed till its final days by which time ATN will have matured unrestricted?