

Air/Ground ATN Implementation ATN Seminar Singapore, 26-27 March 2001

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No one questions the need for the Aeronautical Telecommunication Network. The investment must be made. But who will go first?

> Brian Evans, Avionics Magazine February 2001

Presentation Overview

Who will go first?

 ATNSI Consortium Model/Cooperative Agreement with the Federal Aviation Administration (FAA)

Air/Ground ATN Implementation Status

EUROCONTROL PETAL IIE Project

FAA CPDLC Programs

Airline/Avionics Programs

Next Steps/Future Initiatives

Who will go first? *Chicken vs. the Egg*



<u>The Problems</u> Technology First - or -Applications First



Program Commitments

(Technology and Applications)

Users Equip First - or -Providers Equip First



Cooperative Development (Users and Providers)

ATNSI Consortium

- Air Canada
- Alaska Airlines
- American Airlines
- American Trans Air
- Continental Airlines
- Delta Air Lines
- El Al Israel Airlines

- Federal Express
- Hawaiian Airlines
- Northwest Airlines
- Trans World Airlines
- United Airlines
- United Parcel Service
- US Airways
- International Airlines Encouraged to become Members -

ATNSI/FAA Cooperative Agreement

Objective

 Provide Capacity and Efficiency Benefits to World-Wide Flight Operations



Develop the critical components of the Aeronautical Telecommunication Network (ATN) and encourage wide-spread deployment in the air and ground segments of the aviation community.

ATNSI Products

ATN Infrastructure Components



Benefits of the Consortium Model

- Pooled Resources among Government and Industry Participants
- Reduced Development Risk through Establishment of Common Baseline
- Single Development Effort creating Products for Installation in several types of Avionics and Ground Systems
- Enhanced Government Acquisition Process through Industry Collaboration

Air/Ground ATN Implementation Status



ATN Air/Ground Application Services

Air Traffic Control (ATC) Services

- Controller Pilot Data Link Communications (CPDLC)
- Automatic Dependant Surveillance (ADS)
- Flight Information Services (FIS)
- Context Management (CMA)
- Other Potential Services
 - Aeronautical Operational Control (AOC)
 - Aeronautical Administrative Communication (AAC)
 - Aeronautical Passenger Communications (APC)

ATC Service Benefits

Reduced Holding and Delays Enables Timely and Effective Clearances Reduced Communication Errors Enables Utilization of pre-prepared Messages and facilitates Error Checking Increased Margin of Safety Enables a more orderly Operation during Traffic **Rushes**

Problem: Congested Voice Radio Sector



Solution: Data Comm. + Voice Radio



Example: FAA Study



Problem

Solution

Air/Ground ATN Implementation Programs



PETAL IIE Project Overview

- PETAL = <u>Preliminary Eurocontrol Test of Air/Ground Data Link</u>
 PETAL IIE = Extension of PETAL Project to include ATN Operations
- Single Site: Maastricht Upper Area Control Centre
- Operational Services
 - ◆ Transfer of Voice Communication, Initial Contact, Altimeter Setting
 - Clearances and Requests: Flight Level, Route and Heading, Speed
 - "Passive" Requests (e.g. Preferred Level, Top of Descent)
- Uses VDL Mode 2 as Air/Ground Subnetwork
- American Airlines is the Launch Airline

www.eurocontrol.be/projects/eatchip/petal2/

PETAL IIE Overview

Status:

- End-to-End Testing in Progress
- Flights Start in June 2001

FAA CPDLC Build 1 Overview

- Single Site: Miami Air Route Traffic Control Center
- Provides 4 Operational Services
 - Transfer of Voice Communication
 - Initial Contact
 - Altimeter Setting
 - Informational Free Text (menu capability built by supervisor inputs)
- Uses VDL Mode 2 as Air/Ground Subnetwork
- American Airlines is the Launch Airline

www.adl.tc.faa.gov

FAA CPDLC Build 1A Overview

- National Deployment: All Air Route Traffic Control Centers
- Provides Additional Operational Services
 - Larger Message Set accommodating assignment of Speeds, Headings, and Altitudes
 - Includes Route Clearance Function
 - Capability to accommodate Pilot-Initiated Altitude Requests
- Uses VDL Mode 2 as Air/Ground Subnetwork
- American Airlines is the Launch Airline
- Widespread Industry Participation is Anticipated

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FAA CPDLC Build 1/1A Architecture



Airline ATN Program Status

American Airlines

- ◆ 767-300: 4 Aircraft to be equipped
- ◆ 737-800: 24 Aircraft to be equipped
- Potential: 104-295 Aircraft could be equipped pending decision on participation in FAA CPDLC Build 1A program

Continental Airlines

- ◆ 757 (international): All equipped or to be equipped (hardware only)
- ◆ 737-700/800: All equipped or to be equipped (hardware only)
- ♦ 737-800/900: All equipped or to be equipped (hardware only)
- ◆ 767-200/400: All equipped or to be equipped (hardware only)
- Total Aircraft to be equipped (hardware only): approximately 160
- Avionics software upgrade (CPDLC/ATN-Capable) pending decision on participation in FAA CPDLC Build 1A program

Airline ATN Program Status (cont)

United Airlines (with US Airways, Northwest)

- Currently, business case assessment underway for Airbus Aircraft equipment upgrade (for over 400 aircraft)
 - (Informal) Request for Cost Proposal to Airbus for CPDLC/ATN-Capable equipment upgrade
 - Airbus (informally) indicated schedule for CPDLC/ATN-Capable equipment upgrade to be = Project Start + 3.5 Years
 - "Formal" decision expected soon (United Airlines)
- Northwest Airlines
 - Considering equipment upgrade for 757-200 and 747-400

Airline ATN Equipage Status

Туре	Retro-Fit	Forward-Fit
737-700		
	Continental: Hardware	
737-800	American: Hardware	American: Hardware/Software
	Continental: Hardware	Continental: Hardware
		Delta: Hardware
737-900		
		Continental: Hardware

Airline ATN Equipage Status (cont)

Туре	Retro-Fit	Forward-Fit
757-200	Continental: Hardware UPS: Hardware	Continental: Hardware UPS: Hardware
767-200	Continental: Hardware	Continental: Hardware
767-300	American: Hardware UPS: Hardware	American: Hardware/Software UPS: Hardware
767-400		Continental: Hardware

Avionics ATN Program Status

Rockwell Collins

- CPDLC/ATN-Capable CMU: In Test, CMU will be equipped on aircraft in PETAL IIE and CPDLC Build 1
- Honeywell
 - CPDLC/ATN-Capable CMU: Under Development
- Thales Avionics (Sextant):
 - Software for CPDLC/ATN-Capable Airbus ATSU: Under Development

ATSU = Air Traffic Services Unit CMU = Communication Management Unit

Next Steps/Future Initiatives

Formal, Strategic, Public/Private Partnerships



- **Common Objectives**
 - Airspace Capacity/Efficiency/Safety Improvements



- **Risk Sharing**
 - The Need to develop Air and Ground Systems based on a **Common Architecture**
 - The Opportunity to reduce program technical risk and development cost of Common Technologies



- **Improved Government Acquisition Processes**
 - Mechanism to Collaborate on Cost/Benefit Analyses and to enable Commitment to meet Cost/Benefit Milestones

Future Initiatives for Global Air Traffic Service Improvements

Projects of this scope are tending to evolve into constructive Collaborations among:

- ATC Providers
- Communication/Network Providers
- Airspace Users
 - F Air Transport
 - Business/General Aviation
 - Military

System Integrators/Developers
 Certification/Regulatory Authorities
 ATNSI, 01.3.1

Future Initiatives for Global Air Traffic Service Improvements

Areas for Partnership
 Airspace Architecture Definition
 System Development and Procurement
 Communication Network Service Provision
 Provision of Air Traffic Services
 Regional Airspace Management

Collaboration is the Key



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