AIR TRAFFIC MANAGEMENT
A growing partnership
Air Ground Communication

ICAO Seminar/workshop on the Implementation of Ground-ground and Air-ground data links in the SAM Region - Lima, Peru
12/Sep/2012

By: Adriana Mattos
SITA VHF AIRCOM

VHF & VDL AIRCOM

• Provides data communications to aircraft equipped with ACARS avionics using SITA’s VHF / VDL ground station network

SITA has over 1000+ VHF radios operating in 160+ countries

• 6,500+ aircraft are equipped ACARS and use a VHF datalink services

• 200+ aircraft are equipped to use VDL mode 2 services

• VHF Ground Stations are connected via SITA Network Services to SITA’s VHF AIRCOM Datalink Traffic processor

• SITA Network Services uses the OBS network which extends to 225 countries
SITA AIRCOM ATM portfolio

Data link Air Traffic Services

• PreFANS services: D-ATIS, D-VOLMET, DCL and OCL
• FANS service: ADS and CPDLC
• ATN VDL2 service: Full Operational service, ATN backbone, Test / Trial ATN service
• Hosted ATS services (CFRS / CADS)
• Regional ADS-B service trial

Data link Air Traffic Systems

• Airport Tower Systems: D-ATIS (EVATIS), D-VOLMET (EVAMET), DCL (CLEVER) and Centralized ATS server
• En Route Systems: ADS/CPDLC Gateway, ADS/CPDLC Workstation, Data-Link Front End Processor.
Air/Ground Data Link Services

- SITA has almost 30 years experience in the delivery of air/ground data link services
  - To support AOC since 1980
  - To support ATS since 1990
    - Digital-ATIS
    - Departure Clearance
    - FANS 1/A (CPDLC, ADS-C)
  - Services delivered through
    - VHF data link
    - Satellite data link
  - Based on the ACARS protocols
## Data Link Applications

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VHF AIRCOM Coverage - worldwide
AIRCOM Infrastructure

Global SITA Network Service

PRIMARY

ACARS Processor (Singapore)

BACK-UP

ACARS Processor (Montréal)

Airline Application System

ATS Application System

DCL, ATIS, OCL, ARINC 623

FANS1/A, ARINC 622

INMARSAT

GES

RGS

Airline Application System

ATS Application System

Brazilian VHF data link

AVICOM

ARINC

SITA Managed Service

Airline Application System

ATS Application System

DCL, ATIS, OCL, ARINC 623

FANS1/A, ARINC 622

INMARSAT

GES

RGS

Airline Application System

ATS Application System

Brazilian VHF data link

AVICOM

ARINC

SITA Managed Service
High Level Functional Architecture

SITA Network Services

ANSPs hosts

Airlines Hosts

GES

RGS/VGS

ACARS PROCESSORS

24/7 Helpdesk
Why Continental CPDLC using ATN/VDL2?

END TO END DELAY < 3.5 SECONDS
The EUROCONTROL Link 2000+ programme

- Implementing En-route CPDLC over ATN/VDL2
  - Superior performance compared to FANS 1/A
  - FANS 1/A and ATN will need to co-exist in transition period
- Baseline ICAO standards

**Key Objective:**
11% Capacity Gain in the so called Link Airspace

**Key Figures:**
29% controller workload decrease
37 ACCs in the SES airspace
About 10000 aircraft will be using the airspace under consideration
The Link2000+ Programme Plan

- **Pioneer Phase:**
  - 400 aircraft Equipped
  - 200+ Flying
  - 250 flights/day at MUAC
- **Link+ 2000 Airlines**
  - Aeroflot
  - Air Berlin
  - Air Europa
  - Alitalia
  - CNO
  - FedEx
  - TuiFLY
  - LTU
  - Lufthansa
  - Malev
  - SAS

Source: Eurocontrol
European Union SES legislation will require **ANSPs** and **airspace users** to comply

- **1st Jan 2011**: All new Aircraft operating above FL 285 must have compliant system
- **7th Feb 2013**: All Link Region ANSP must have implemented an operational complaint system*
- **1st Jan 2014**: Aircraft with individual airworthiness certificate before this date that are equipped with FANS are exempt for the life time of the aircraft entering into service after 1st Jan 2014 shall comply with the rule
- **1st Jan 2015**: State aircraft shall comply with the rule if equipped with non-military data link
- **7th May 2015**: All EU region operating above FL 285 must retrofit with compliant system
- **31st Dec 2017**: Aircraft which are at least 20 years old & which will cease operation within EU airspace before 31st Dec 2017 are exempt
- **Nov 2018**: All EU region ANSPs must have implemented an operational compliant system

* Includes NATS
SITA support to the ATN/VDLm2 European Mandate

NATS/IAA FAB: ATN/VDLm2 Service

Maastricht UAC: ATN/VDLm2 Service

FABEC (France, Benelux, Switzerland): Selected SITA

NAV Portugal: VGS Partnership

DFS (Germany): VGS Partnership

AENA (Spain): VGS Partnership
CPDLC Message Set defined for Link 2000+

- Implementation of subset of CPDLC messages
  - DLIC: Data Link Initiation Capability
    - Makes data link communications possible between an ATSU and aircraft
  - ACM: ATC Communications Management
    - Provides automated assistance for the transfer of communications (voice and CPDLC)
  - ACL: ATC Clearances
    - Allows flight crew and controllers to conduct operational exchanges
  - AMC: ATC Microphone Check
    - Allows controllers to send an instruction to all CPDLC equipped aircraft to verify that their voice communication equipment is not blocking a given voice channel
ATN/CPDLC - Feedback from MAAS UAC Controllers

- Use is Voluntary but Controllers use it – even in busy sectors
- LINK is a useful package to start Datalink with (Controllers drive the use of CPDLC)
- Use is Increasing
  - No. of messages sent by controllers
  - No. of messages per flight
  - No. of aircraft that Logon and have CPDLC dialogue
- “Less Misunderstandings .. It’s saving us a lot of time” – Nick Miller
- Push for more automation/functionality (SSR code)
  - and next auto-ACM, Monitor, Top of Descent etc.
ATN/CPDLC - Feedback from MAAS UAC Controllers

- Increased Safety:
  - CPDLC is offering an independent second unambiguous communication channel,
    - e.g. in case of blocked or deteriorated VHF frequency!

- Reduced VHF frequency load.
  - More that 50% of the messages used are “contact” messages which do not require a read back. CPDLC aircraft are providing a relieve on Com’s in busy ATC sectors.
Which are the options for an ANSP?

BUY

• ANSPs could buy the service from existing vendors e.g. SITA
• Standard Tender Doc template issued by EUROCONTROL could be used

Make

• VHF Partnership with SITA
Managed ATN Service

- Comprises operation of VDLM2 stations providing required coverage compliant with Link2000+ ACSP generic req’ts
- Comprises ATN routing:
  - Aircraft not in ANSP airspace
  - Interworking with 3rd party ATN infrastructure (EEC, Airbus...)
  - Access to SITA’s ATN and VDLm2 test facilities
Current SITA/ANSP VHF Data link Partnerships

Fundamental partnership principles
• ANSP takes over complete ownership and control of end to end chain for message delivery through its National ATN/VDL Network
• SITA has exclusive use of network for delivery of AOC
• SITA pays ANSP share of airline AOC revenues

As a result of the EU Legislation Partnerships were established with the following:
• AENA, Spain (2003)
• DFS, Germany (2005)
• GACA, Saudi Arabia (2007)
• FABEC
Proposed architecture

FANS via SATCOM

VHF

D-ATIS/DCL

ATN/CPDLC

ANSP NETWORK

FANS

SATCOM

AIRLINE OPERATIONS

SITA NETWORK

ATN ROUTER

ANSP SITA

SITA DATALINK PROCESSORS
Proposed architecture

- VHF
- D-ATIS /DCL
- ATN/CPDLC
- ANSP NETWORK
- FANS
- SATCOM
- AIRLINE OPERATIONS
- ATN ROUTER
- SITA NETWORK
- SITA DATALINK PROCESSORS

FANS via VHF
Proposed architecture

D-ATIS/DCL via VHF

VHF

D-ATIS /DCL

ATN/CPDLC

FANS

SATCOM

ANSP NETWORK

AIRLINE OPERATIONS

SITA NETWORK

ATN ROUTER

SITA DATALINK PROCESSORS

ANSP

SITA
What is included in the partnership 1

Sharing of Revenue
Software monitoring tool
• Remote VGS, ATN control and monitoring tool
• Runs on a standalone workstation
• Or to be located at ANSP’s central operations centre

ATN Platform - Optional
• Hardware platform
• ProATN G/G – A/G router
• ATN RRI Ground End System
• ATN RRI Air End System
• ADS-CPDLC Gateway system
• COCPIT software (CPDLC HMI)
• AFAME : ATN Air Test Tool and Gateway to ATN Air ES.
What is included in the partnership 2

Services

• SW installation, configuration (assume hardware installation ensured by NATS)
• Training
• Remote testing support
• Test scenario definition support
• Test coordination with airline

AFAME – ATN Test Tool

• Test Configuration against...
• YUL bench, EEC, ATN Aircraft, AFAME + AES, Local Avionic bench and Lab Aircraft.
A solid partnership in Europe

Supporting the implementation of Controller Pilot Data Link Communications (CPDLC)

- SITA has been the **ATN/VDL mode-2** service provider to EUROCONTROL since 2008
- SITA operates with ANSPs more than **50 VDL mode-2 stations** in Europe
- **85%** of the **airlines** that exchange CPDLC messages with EUROCONTROL Maastricht do so through **SITA**

CPDLC will improve safety and increase overall capacity by **11%**
SITA & ANSP: A growing partnership in the CAR/SAM region

- ADS CPDLC developments
- VHF data link partnership in Brazil
- Pre FANS program in Brazil
  - D-ATIS/DCL/D-VOLMET
DGCA Chile wished to acquire some initial experience with FANS 1/A for their South Pacific airspace, besides provide better safety monitoring in the Pacific FIR under their responsibility. Selected SITA to provide FANS trials in the Oceanic airspace in 2006.
Trials started in 2003 with own ADS CPDLC prototype system but it was taking too long to become an operational service.

A SITA FANS workstation was commissioned at Atlantico Area Control Center (ACC AO) by Ago2008:
Proven software / robust platform and dual architecture

A new integrated ATM system supplied by Atech was commissioned by Oct09, in replacement to SITA ACW.
Statistics for ADS-C/CPDLC in ACC AO

- Traffic msgs:
  - JAN2007: 226
  - MAY2009: 30,716
  - JUN 1st: Air France
  - JUL 2009: 73,172
  - JUL2012: 118,428

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<th># of outages</th>
<th>Shortest Duration</th>
<th>Average Duration</th>
<th>Longest Duration</th>
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DGTA Argentina

A new integrated ATM system supplied by INDRA was commissioned in both Area Control Centers of Ezeiza and Comodoro Rivadavia. ACC Ezeiza was connected to SITA AIRCOM network since May 2010. DGTA to advise trial and operational phases planning.
A new integrated ATM system supplied by ADACEL was commissioned in Cayenne ACC in 2010.
COCESNA just refreshed their integrated ATM system supplied by INDRA and plan to start trial phase within 2012 in the ACC CENAMER.
SITA FANS service performance report

- SITA FANS services performance reports are provided to ANSP
- Main sections of the Performance report:
  - Traffic data: number of messages/by airlines
  - Availability of the service (processor, VHF network, Satellite network)
  - Reliability of the service (uplink success rate)
  - Performance data (uplink and downlink delivery times)
VHF data link partnership in Brazil

- In 2010, after a public RFP process, SITA has been selected by DECEA to deploy a new VHF data link network in Brazil
- The contract model is a public concession where SITA operates and maintain the VHF network on behalf of DECEA
- Exclusive service provider in Brazil for AOC
- ATS Intwk with other DSP
**PHASE 1**

- Contract signature
- Concession operation initiated

**Lot 01**
- the existing infrastructure is replaced (ACARS processor, VHF stations (24) and Network) + 5 key sites are duplicated (GRU, CGH, GIG, RIO and BSB) = 29 Stations

**PHASE 2**

- CPDLC/ATN trial

**Lot 02**
- complete POA (ACARS) Data Link coverage over Brazil;
- 22 additional SITA stations.

**PHASE 3**

- complete VDL coverage over Brazil;
- implement ATN routing
Brazilian VHF ground stations sites for Phase 1 (until Dec 2012)
PRE FANS program in Brazil

DCL & D-ATIS in Sao Paulo
D-ATIS in Rio
CATS in Rio
D-VOLMET
Centralized ATS server (CATS)
DECEA and SITA implemented Datalink broadcast of VOLMET relevant content for all Brazilian FIRs:
- FIR Amazonica
- FIR Brasilia
- FIR Recife
- FIR Curitiba
Air ground communication: partnering for safer and more efficient Air Traffic Management

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