



➔ **AIDC status**

SIP on AIDC – 12-13 October 2010

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OVERVIEW 

- ▶ INTRODUCTION:THALES and Air Operations
- ▶ EUROCAT and AIDC implementation
  - ▶ Geographical view
  - ▶ Technical view (Messages list, technology: X-25 / AFTN / AMHS / IP)
- ▶ Lessons learned in the implementation of AIDC
  - ▶ General Feed-back
  - ▶ TAHITI: Operational and Technical overview
  - ▶ TAIWAN: Operational and Technical overview
  - ▶ AUSTRALIA: Operational and Technical overview
- ▶ CONCLUSION

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## INTRODUCTION - THALES

- ▶ World leader in mission critical systems and solutions
- ▶ Four core businesses
  - ▶ Aerospace & Space
  - ▶ Defence
  - ▶ Security
  - ▶ Transport
- ▶ A worldwide group
  - ▶ 68,000 employees
  - ▶ Presence in 50 countries

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2 Communications

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## INTRODUCTION – Air Operations

- ▶ Air Operations provides leading edge airspace control and security solutions for the commercial and defense sectors.
  - ▶ Business Model: Complete ATM systems provider
    - System design, development, delivery and support
    - Software Production - Eurocat, Flowcat, SimCat
  - ▶ Use of leading edge technologies – developed in Melbourne
    - Human Machine Interface (HMI)
    - Voice Recognition
- ▶ EUROCAT:
  - ▶ Surveillance
  - ▶ Communication
  - ▶ Automation center

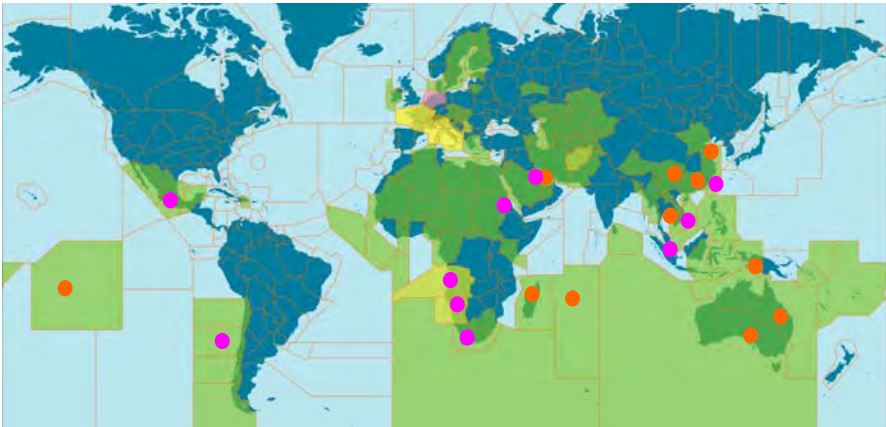
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3 Communications

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- Thales en-route centres market share (#1 worldwide)**
- 82 FIRs out of 300 approx., + 60 countries or 27% worldwide market share
  - More than 20 countries over AIDC (v1, v2, v3)

 AIDC installed    AIDC installed and operational

## AIDC implementation – Messages list

Implemented operational	Transmission	Reception
ABI	Automatic or Manual	Automatic
CPL	Automatic or Manual	Manual
EST	Automatic or Manual	Automatic
PAC	Automatic or Manual	Automatic
MAC	Automatic or Manual	Manual
CDN	Manual	Manual
ACP	Automatic or Manual	Automatic (EST) or manual (CDN)
REJ	Manual	Manual
TOC	Automatic or Manual	Automatic
AOC	Manual	Automatic
EMG	Manual	Automatic
MIS	Manual	Manual
LAM	Automatic	Automatic
LRM	Automatic	Automatic
TDM		Automatic

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6 Communications

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## AIDC implementation – Messages list

Implemented in deployment	Transmission	Reception
ADS	Manual	Manual
TRU	Manual	Manual
Under implementation	Transmission	Reception
FAN	N/A	N/A
FCN	N/A	N/A
ASM	N/A	N/A

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## AIDC implementation – Technology

- ▶ Implemented operational
  - ▶ AIDC over X25, AFTN, IP
  
- ▶ Implemented, in deployment
  - ▶ AIDC over AMHS

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## AIDC implementation – Technology

- ▶ Follow ATN ground-ground (AMHS) specifications.
- ▶ "AFTN like" header information is used to fill the ATS-Message header
- ▶ For AIDC: Optional Data Field is entered in the ATS-Message-Optional-Heading-Info
  - allows AMHS-AMHS data exchange
  - allows a gateway to build the AFTN message.

1	ATS-Message-Header	M	M	see 3.3.3.3	
1.1	start-of-heading	M	M	(SOH)	(0/1)
1.2	ATS-Message-Priority	M	M		
1.2.1	priority-prompt	M	M	PRI:(single space)	(5/0)(5/2)(4/9)(3/10)(2/0)
1.2.2	priority-indicator	M	M	see 3.3.3.3.2	see 3.3.3.3.2
1.2.3	priority-separator	M	M	(CR,YL,F)	(0/13)(0/10)
1.3	ATS-Message-Filing-Time	M	M		
1.3.1	filing-time-prompt	M	M	FT:(single space)	(4/6)(5/4)(3/10)(2/0)
1.3.2	filing-time	M	M	see 3.3.3.3.3	see 3.3.3.3.3
1.3.3	filing-time-separator	M	M	(CR,YL,F)	(0/13)(0/10)
1.4	ATS-Message-Optional-Heading-Info	O	M		
1.4.1	OHI-prompt	M	M	OHI:(single space)	(4/15)(4/8)(4/9)(3/10)(2/0)
1.4.2	optional-heading-information	M	M	see 3.3.3.3.4	see 3.3.3.3.4
1.4.3	OHI-separator	M	M	(CR,YL,F)	(0/13)(0/10)
1.5	start-of-text	M	M	(STX)	(0/2)
2	ATS-Message-Text	M	M	see 3.3.3.4	see 3.3.3.4

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9 Communications

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- ▶ General feed-back from integrators and operational people is very positive: only two significant issues
- ▶ Reasons
  - ▶ Dynamic standard
  - ▶ ICD definition with customer
    - Design Review process
    - ICD defines all OSI Layers, data transmitted and options being exercised
  - ▶ High flexibility of the E-X data preparation
    - offline data defined (messages conditions, timer, Protocol, connections, flag (CPL/LAM, EST/LAM), format)
  - ▶ Clear Letter of Agreement
  - ▶ Test strategy (simulation, operational tests)

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▶ Offline definition example

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/FIR/
-- FIR Name Definition
--FIR |ICAO/ |TOC/ |OLDI |IPFZ |E-X | Block | Unit | ICAO |ICAO |CPL | Comment
--Name |AIDC |AOC |used | |Cent| Level | |CPL |EST |RTE |
-- | |used | | | | | | |LAM |LAM |TRUNC |
-----
SPOL | AIDC | N | N | Y | N | BLOCKLVL | Imperial | N | N | Y | S Pole
VRMM | ICAO | N | N | N | N | BLOCKSUP | Imperial | Y | Y | Y | Male
WIIZ | ICAO | N | N | N | N | BLOCKSUP | Metric | Y | N | N | Jak
YMM | AIDC | Y | N | N | N | NOBLOCK | Metric | ML FIR
SPOL | AIDC | N | N | Y | N | NOBLOCK | Metric | N | N | Y | S Pole
ABCD | ADEXP | N | N | N | N | NOBLOCK | Imperial | N | N | N | Dummy 1
    
```

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- ▶ General feed-back from customers (organisations and controllers): Implementation of AIDC has been very beneficial
- ▶ Reasons
  - ▶ Reduce controller workload (reduce manual coordination)
  - ▶ Make sure the coordination is done
  - ▶ Enhance Safety
    - Less data entry and reduce common errors usually experienced for level or time manual update
    - Alert when problems occur
  - ▶ Automatic Input of information reflected on the screens

When you start using it, you can't live without it!

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- ▶ Operational, Tahiti is connected to New Zealand and the USA, using the AIDC V3.0 standard over AFTN.
- ▶ No significant issues were found.
- ▶ Messages exchanged operationally include configuration of Block Level (V2 or V3), Mach Speed and OTD/WTD.
- ▶ TRU and ASD/FAN are not implemented.
- ▶ TOC/AOC not in operation
- ▶ EST message are received for inbound flights and CPL messages for Area Of Interest only flights.

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- ▶ Expected to become operational March-2010
- ▶ The AIDC over AMHS with Hong-Kong has been tested. Japan will use X.25.
- ▶ TRU and ASD are implemented
- ▶ Only one significant issue
  
- ▶ Procedures / letters of agreement are to be defined
- ▶ Expect additional connections with Philippines and other FIRs over AMHS

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- ▶ Cyclic Redundancy Check (CRC) in AIDC header for message integrity
- ▶ AIDC messages use CRC-CCITT
- ▶ The CRC-CCITT implemented in Eurocat is using CRC-CCITT(XMODEM).
- ▶ But there are four different kinds of CRC-CCITT which are
  - ▶ CRC-CCITT(XMODEM)
  - ▶ CRC-CCITT(0XFFFF)
  - ▶ CRC-CCITT(0X1D0F)
  - ▶ CRC-CCITT(kermit)
- ▶ Adjacent FIRs are using different scheme, HK is using CRC-CCITT(00X1D0F). So we are unable to communicate.
- ▶ Guang Zhou ATMS(XMODEM) also run into this problem when they test with Cheung Sha(0XFFFF).

CRC scheme should be taken into account during the ICD definition

CRC scheme of AIDC header should be configurable

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- ▶ Messages exchanged operationally include Block Level, Mach Speed and OTD/WTD.
- ▶ One significant issue for CDN messages management
- ▶ Previous implementation:
  - ▶ CDN Tx: message display contained all possible fields which made manual processing difficult
  - ▶ CDM Rx: display issue when multiple change were done, multiple windows, windows with blank fields were prone to typographical errors
- ▶ Current implementation: HMI improvement
  - ▶ implementation of a new window dedicated to the negotiation phase: CDN/ACP/REJ messages.
  - ▶ CDN Tx: improved access to window, alert management, layout
  - ▶ CDN Rx: improved window layout, visually distinguish which fields are updated/proposed, streamlined negotiation process

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MOVE	AIDC CDN Window										CLOSE	
<b>7a</b>	SSR	7b	7c	ADEP	13a	ADES	16a					
Send All Fields	<input checked="" type="checkbox"/>					SCD	14d	XCON				
EST	BP	14a	ETO	14b	CL	14e	14e					
RTE	15											
OTHER	18											
Show/Hide F15, F18	ESCAPE	CURRENT	ROUTE	RER								
Address	ACP	SEND	REJ	UPDATE/ CLEAR								
LOWER	Error field											

HMI and human factor aspects  
to be considered during implementation of AIDC

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- ▶ Positive Feed back
- ▶ Future development
  - ▶ Native Product should gather most AIDC developments
  - ▶ Next Generation product will implement full AIDC V3 based on previous programs
    - Block levels, Mach number, OTD/WTD
    - ADS/TRU messages
    - FAN/FCN and ASM messages

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 Thank you

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