



COMSOFT AFTN/AMHS Products

by Uwe Kurpat, AFTN/AMHS Product Manager

COMSOFT's Advanced Message Handling Product Line

ICAO MEVA-TMG30

Oranjestad

May 29, 2015

COMSOFT
dedicated to ATM

AIDA-NG – AFTN/CIDIN/AMHS Product

COMOSFT provides two products for AFTN/AMHS

- **AIDA-NG**
Integrated AFTN/AMHS Switch
- **CADAS**
**Client-Server-based AMHS UA terminal system
for the ATS end user**

**Both Products are native COMSOFT key-products,
which have proven their high flexibility by being
deployed in most different ATC environments**

AIDA-NG – AFTN/CIDIN/AMHS Product

AIDA-NG

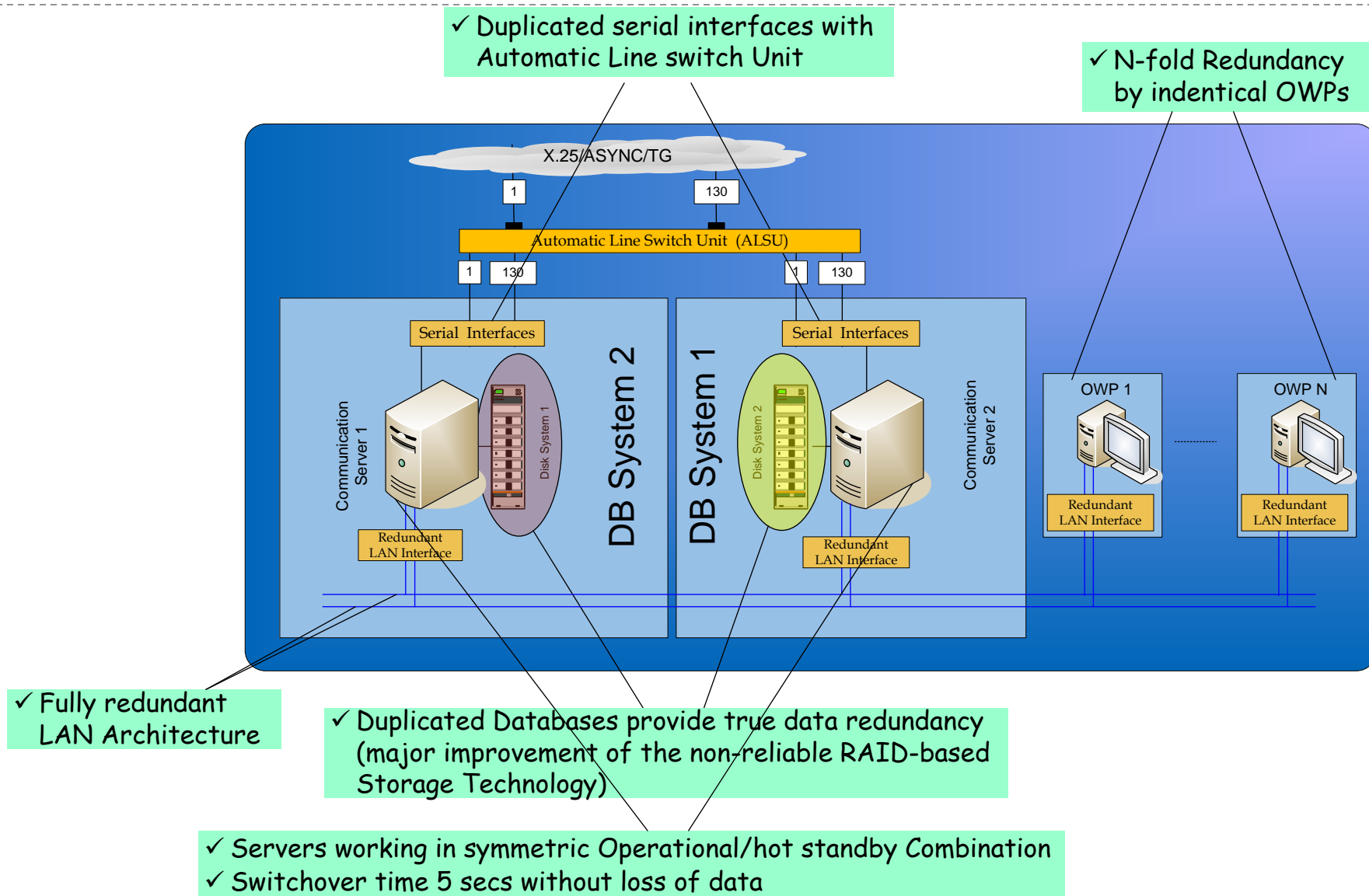
Aeronautical **I**ntegrated **D**ata Exchange **A**gent - **N**ext **G**eneration

COMSOFT key product since more than 20 years

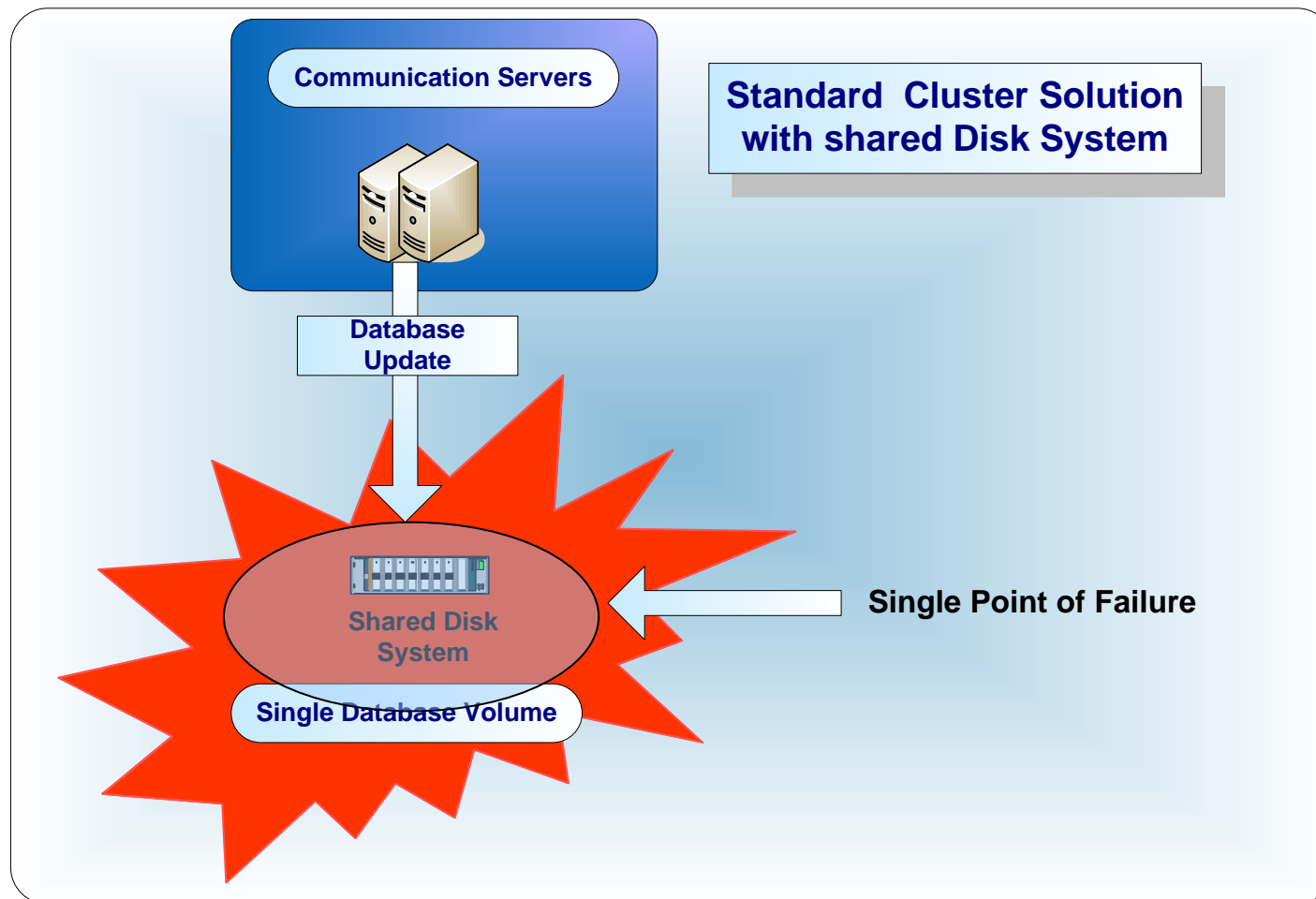
**Only MHS on the market providing a common
messaging framework for all types of
aeronautical data**

(AFTN, CIDIN, AMHS, SITA, WMO, AIDC, OLDI....)

AIDA-NG – Redundant in all Components



AIDA-NG - What we avoid – Shared Storage Devices



- Conventional Cluster Solutions typically use "shared" components, e.g. **Application Software**, **Data Volumes**, and **Storage Devices**.

AIDA-NG – Integrated ATSMHS

AIDA-NG is powered by **ECG Core Software**

(**ECG** = **E**uropean **C**ommunications **G**ateway)



Provision of
ECG Core Software

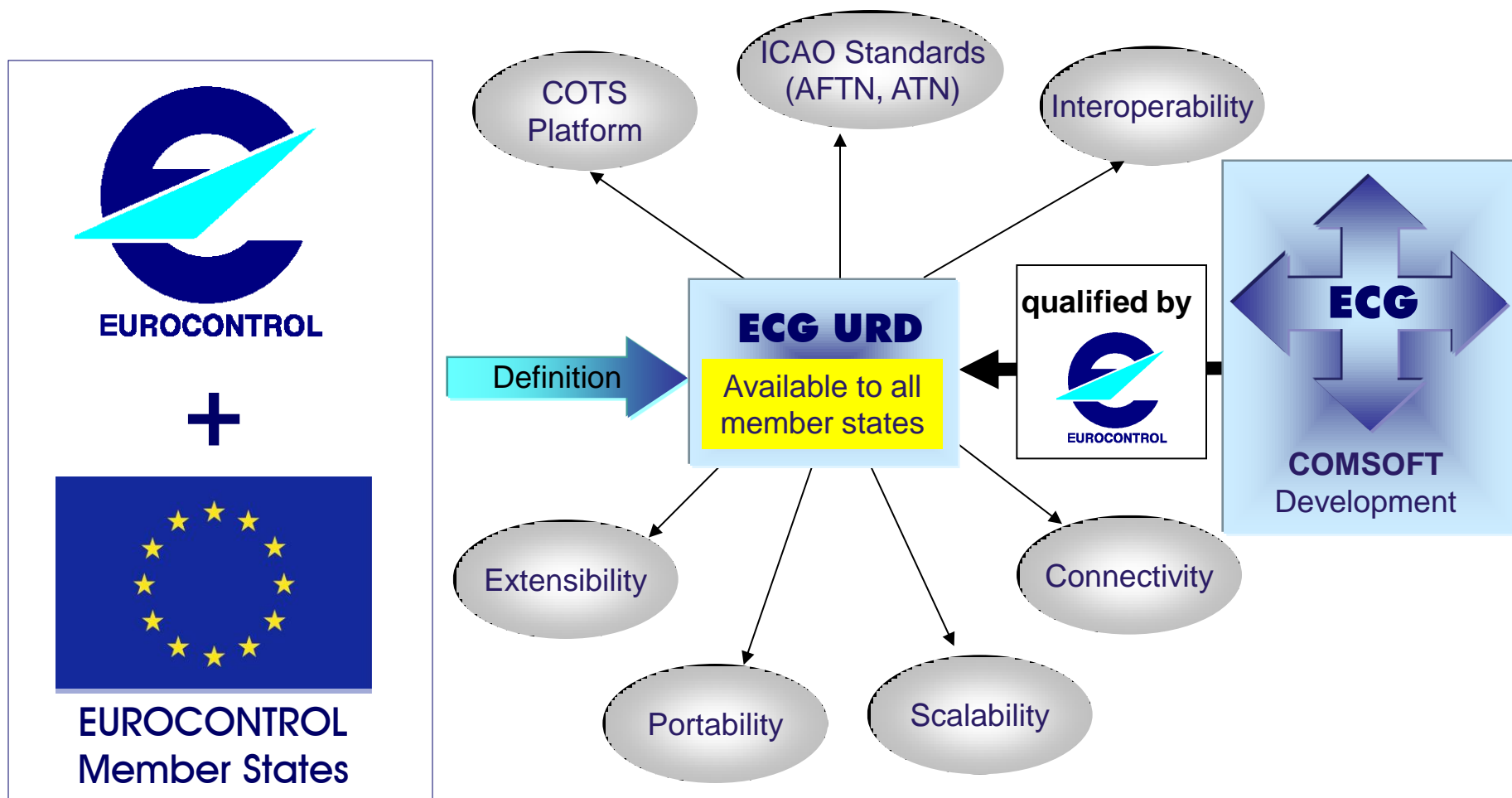


EUROCONTROL
Member States

The **ECG Core SW** is the basis for the universal ground-ground communication service of the European ANSPs

COMSOFT is official **ECG** supplier to EUROCONTROL

ECG Core Software – Realisation



URD = User Requirements Document

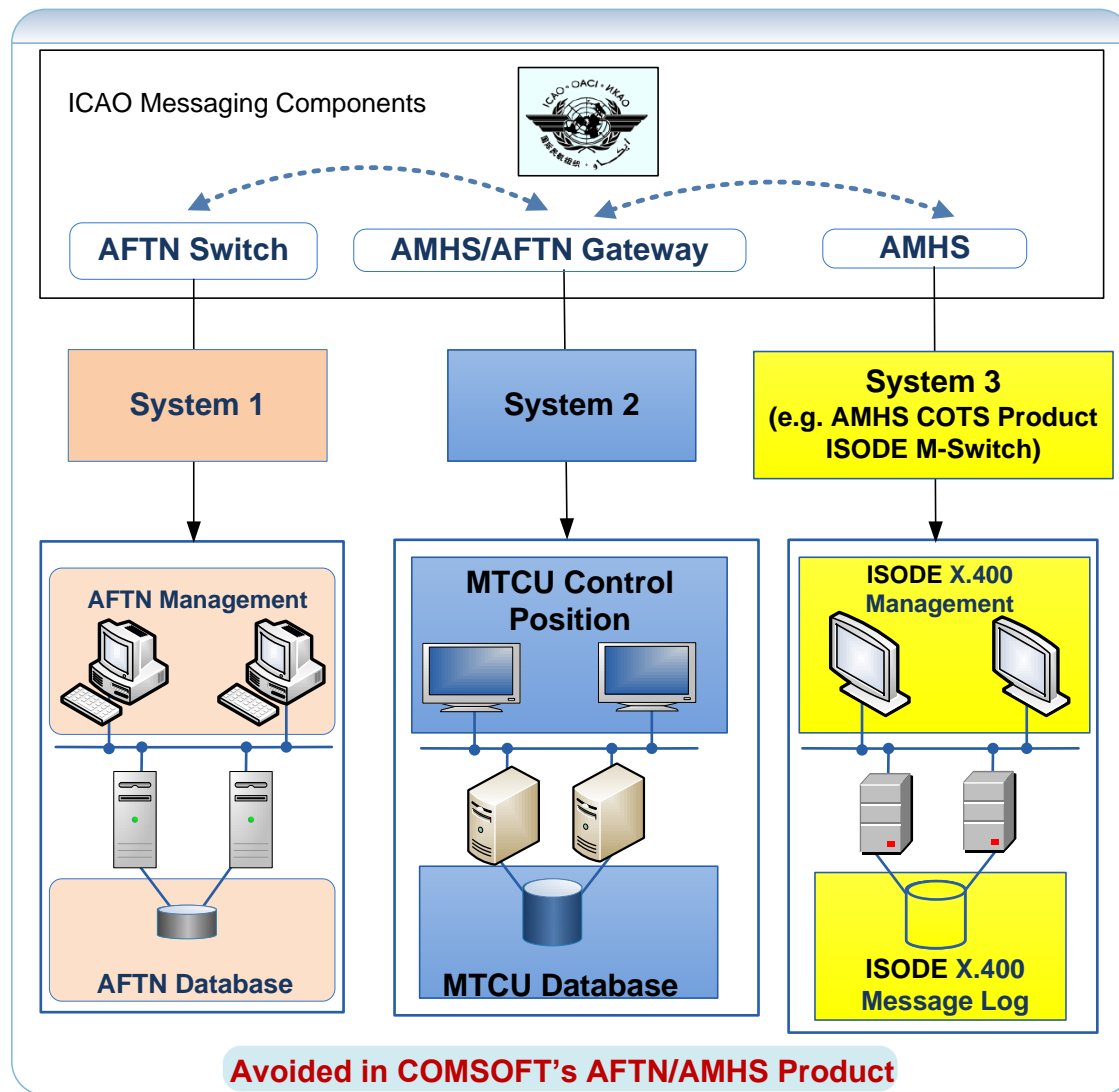
ECG Core Software - Key Requirements

- Integrated on COTS Platform
(standard server-based architecture)
- Universal Connectivity
(AFTN, AMHS, SITA, WMO, OLDI, AIDC, etc.)
- Deployable in every ATS Environment
(small(est), medium, big, obsolete, or advanced infrastructure...)
- Maximum Support of the AMHS Migration
("online", without stopping the service)

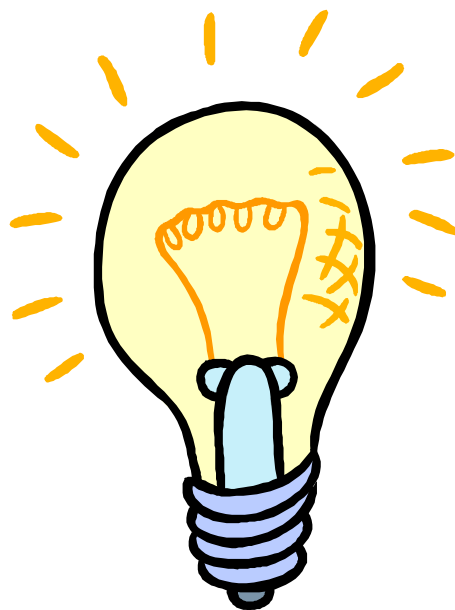
Long-Term Mixed Operation of AFTN and AMHS



Standard (Fragmented) Solution – Suitable ?

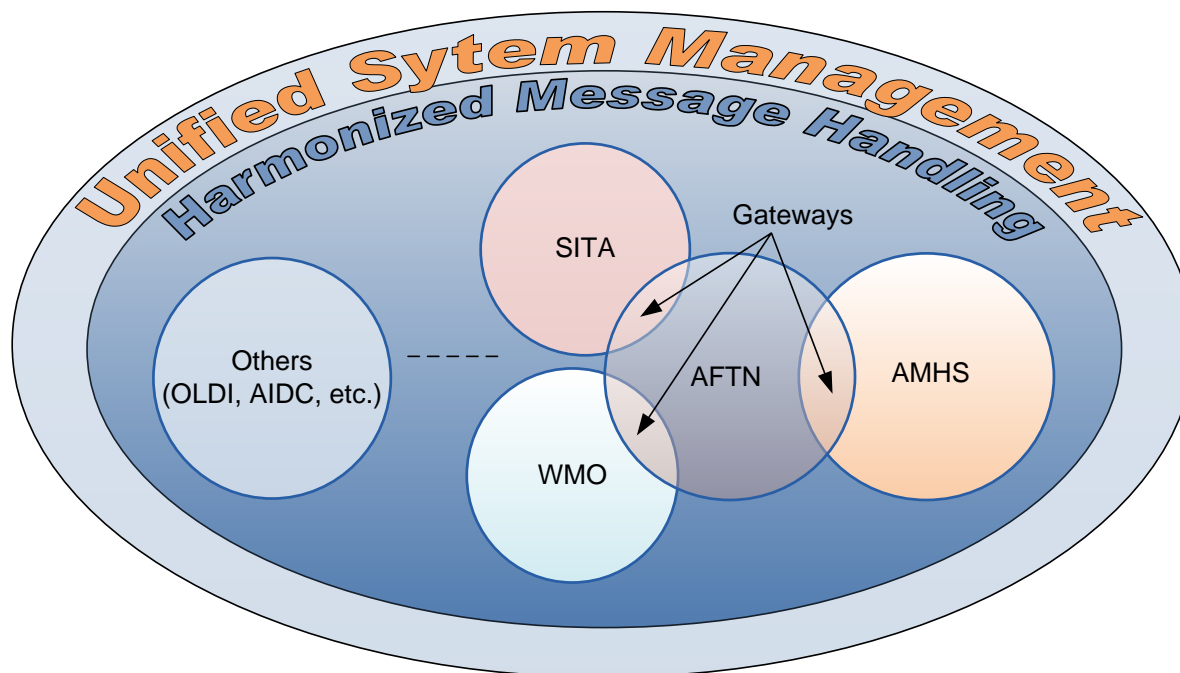


The Solution



Integrated System

AIDA-NG – Integrated Messaging Services



100% Compliance to Standards

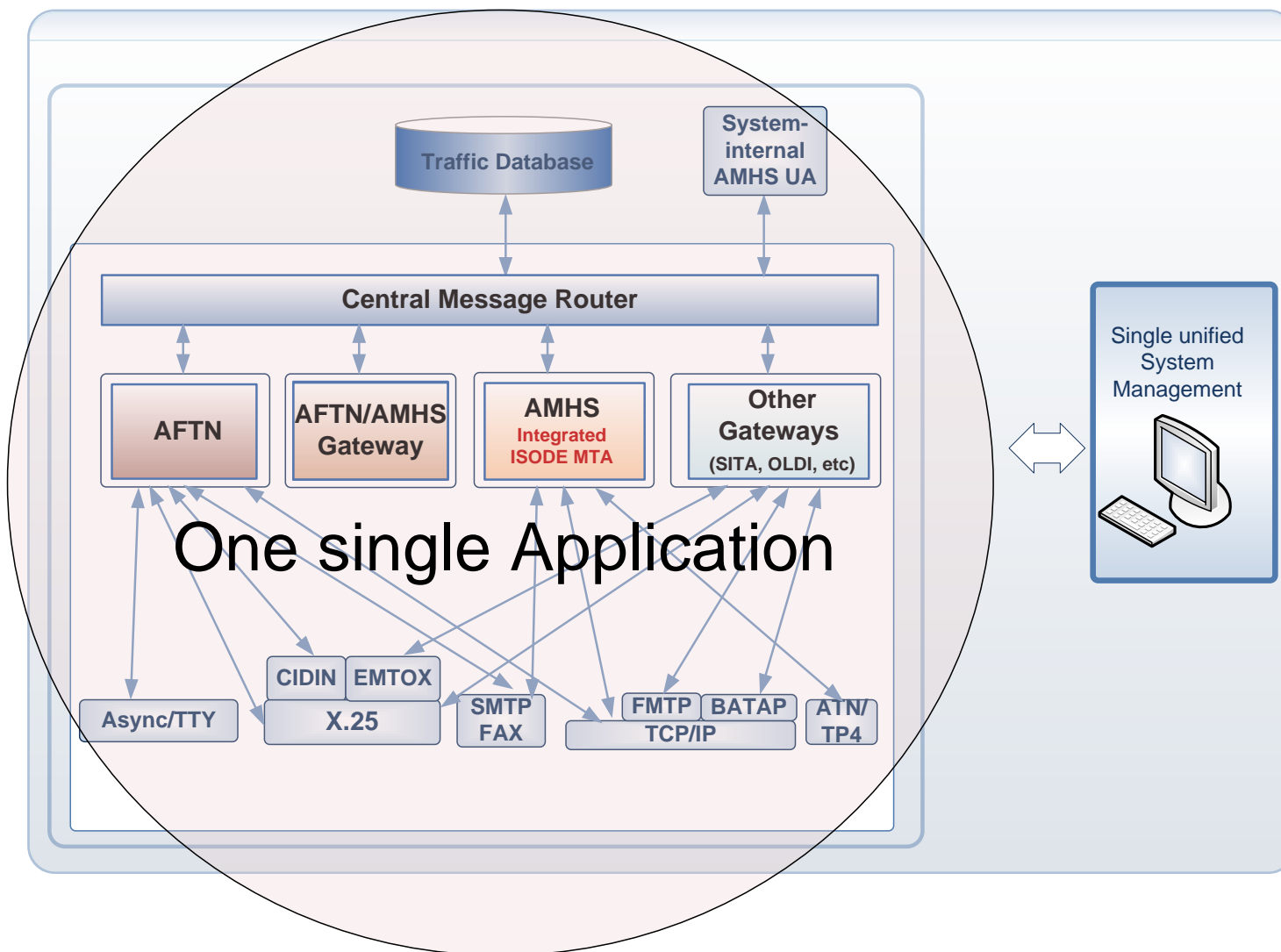


World Meteorological Organization
Working together in weather, climate and water

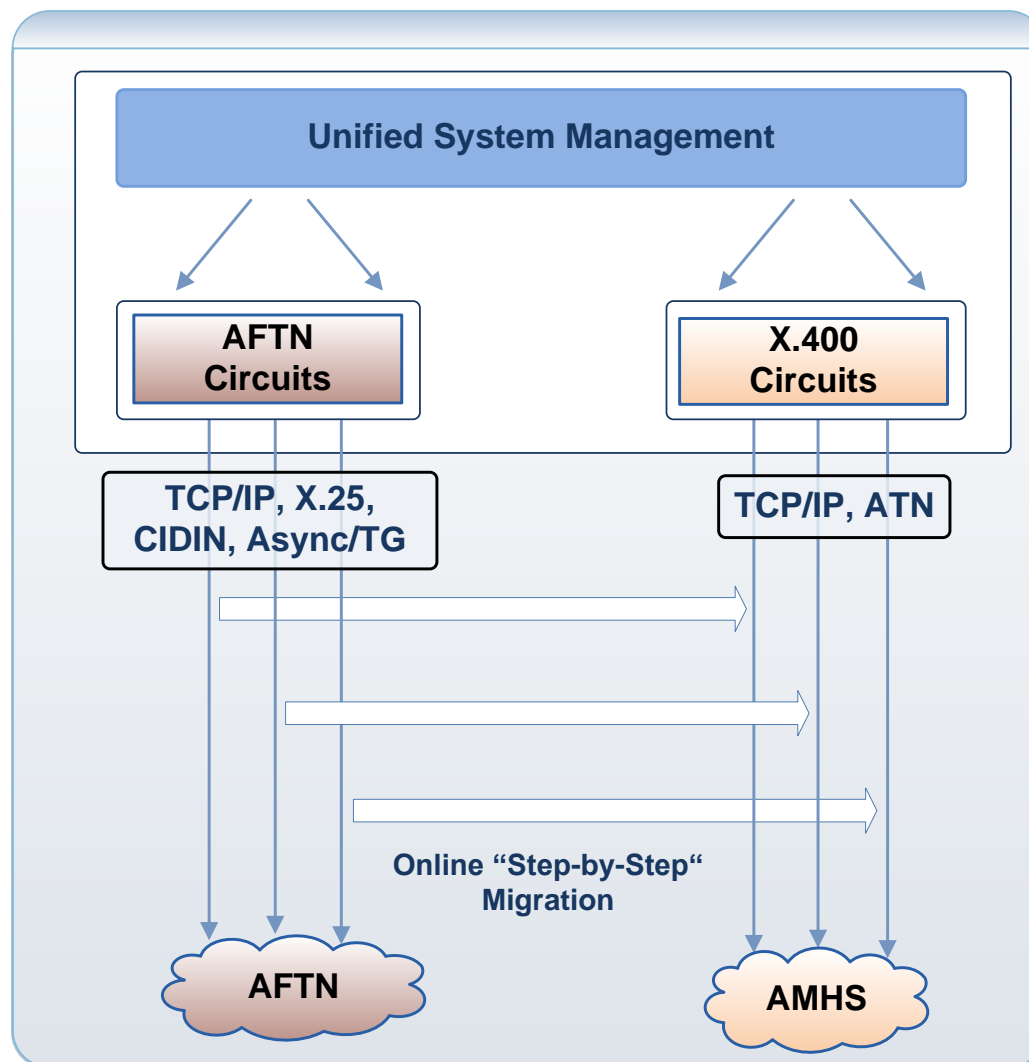


- ✓ **100% Integration of all messaging entities (AFTN, AMHS, SITA, WMO, OLDI, others)**
- ✓ **Harmonised Message Handling (AFTN, AMHS, SITA, WMO, OLDI, others)**
- ✓ **Unified System Management**

AIDA-NG Strong Point – Horizontal/Vertical Integration

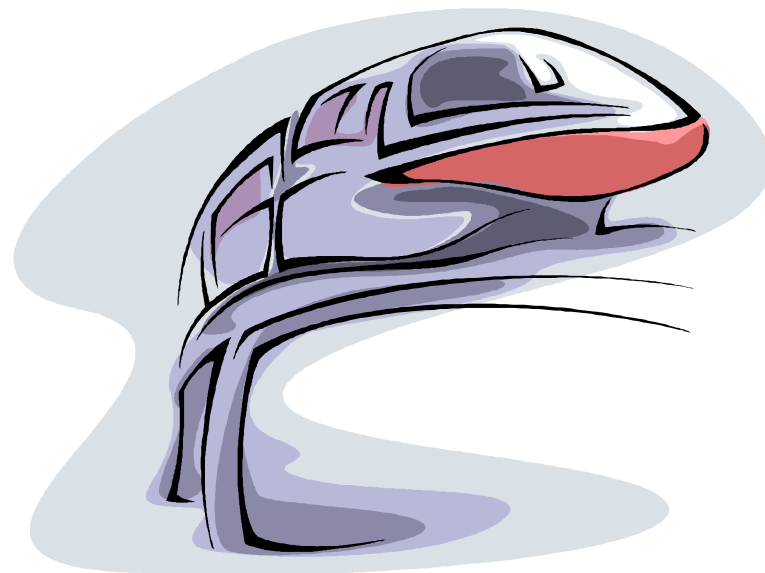


AIDA-NG Strong Point - AFTN to AMHS Transition Support



AIDA-NG Performance Values

- Platform
- Protocols/Messaging
- Throughput
- Reliability
- Maintainability
- Robustness
- Extended Supervision



Server-Based Platform

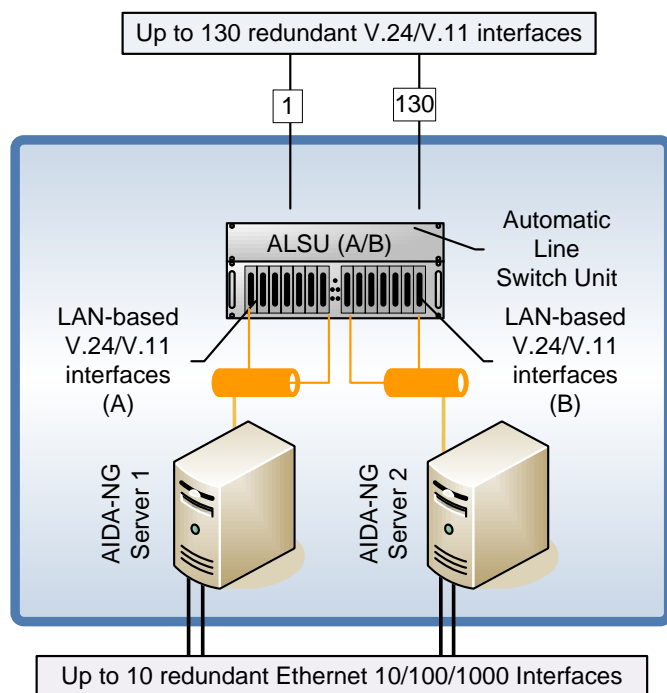
- Integrated on Intel® processor-based servers and workstations of various vendors (IBM, HP, DELL, etc.)
- RED HAT Linux Enterprise Distribution (Scientific Linux)
- Fast real-time database of any capacity
- X-Windows and Java-based GUIs



AIDA-NG Strong Point - Interfaces and Protocol Stacks

Messaging Interfaces supported in “one system”:

- Up to 130 serial redundant V.24/V.11 interfaces:
 - AFTN/ASync (direct, leased lines)
 - AFTN/Telegraphic Interface
 - AFTN/X.25 (PVC/SVC)
 - CIDIN/X.25 (PVC/SVC)
 - WMO/X.25 (PVC/SVC)
 - OLDI FDE ICD (X.25 SVC)
 - SITA/BATAP/EMTOX (X.25 PVC/SVC)
- Up to ten Ethernet LAN 10/100/1000 Interfaces
 - AFTN/TCP/IPv4,6 (bilateral agreement)
 - AFTN/SOAP
 - AMHS P1/ATN (via ATN Router)
 - AMHS P1,P3/TCP/IPv4,6
 - AMHS SOAP (**Service for SWIM**)
 - FMTP (TCP/IP)
 - SITA/BATAP/MATIP (TCP/IP)



AIDA-NG Strong Point – Additional Gateways

- **AFTN/SITA Gateway**

Conversion of AFTN messages \leftrightarrow SITA messages

- **AMHS/SITA Type-X Gateway**

Conversion of AMHS Messages \leftrightarrow SITA Type-X messages (XML)

- **AFTN/E-mail Gateway**

Connection to E-mail Server via SMTP/POP3

Conversion of AFTN messages \leftrightarrow E-mail

- **AMHS/E-mail Gateway**

Conversion of AMHS Messages \leftrightarrow e-mail

Full support of extended services (attachments)

- **E-mail/FAX Gateway**

Conversion of E-mail \leftrightarrow FAX (G3)

Fully applicable for the AFTN/AMHS \leftrightarrow E-mail GW

- **OLDI/FMTP Gateway**

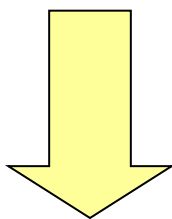
Conversion of FDE ICD \leftrightarrow FMTP

Throughput Figures Example

Msg Length 300 Bytes	Message In/Out AMHS \leftrightarrow AMHS: 375 msg/sec in, 375 msg/sec out AMHS \leftrightarrow AFTN: 350 msg/sec in, 350 msg/sec out
Msg Length 10.000 Bytes	Message In/Out AMHS \leftrightarrow AMHS: 325 msg/sec in, 325 msg/sec out AMHS \leftrightarrow AFTN: 225 msg/sec in, 225 msg/sec out
Average Transit Time	AFTN \rightarrow AMHS: 60 ms AMHS \rightarrow AFTN: 60 ms AMHS \rightarrow AMHS: 40 ms Average: 55 ms
Command Response Time	< 2 sec

Strong Point - Message Congestion Handling

- ✓ System can hold more than 250,000 pending messages (AFTN/AMHS) in transmission queues
- ✓ Switching Performance and System Access is not degraded under this load
- ✓ System is fully protected against overload by flow control mechanisms



Manual Contingency Procedures on message level (e.g. a message drain function) are not required

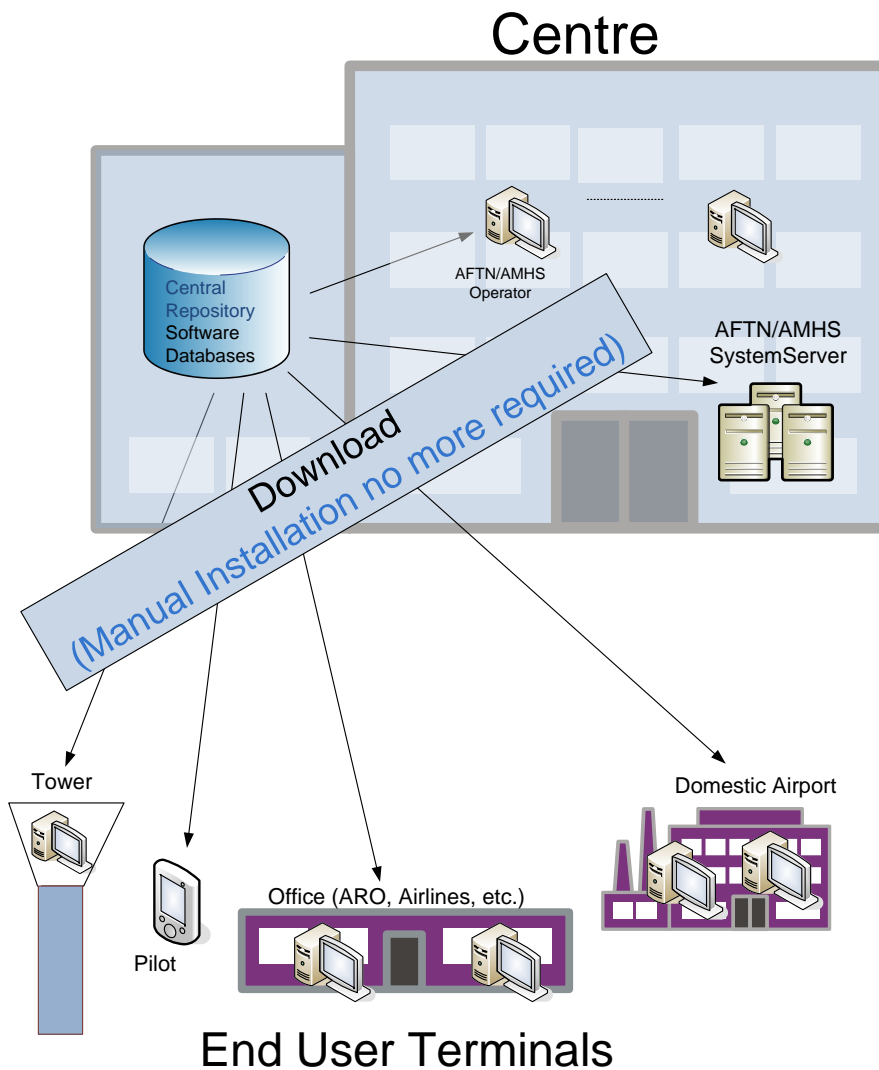
AIDA-NG/CADAS – System Availability (April, 2015)

Excerpt of Customer Installations	Number of Operational Systems	Operational since ...	Number of operational hours/total
Germany	1	Mar-02	116016
Bosnia and Herzegowina	2	Dec-02	218832
Libya	1	May-04	97008
Eurocontrol CFMU	2	Nov-04	185184
Philippines	1	Dec-05	83112
United Kingdom	1	Jun-06	78744
Macedonia	1	Jul-06	78024
Serbia and Montenegro	1	Nov-06	75072
United Arabian Emirates	1	May-07	70728
Singapore	1	Jun-07	69984
Australia	1	Jul-07	69264
Oman	1	Nov-07	66312
Morocco	1	Dec-07	65592
Slovak Republic	1	Apr-08	62664
Egypt	1	Nov-08	57528

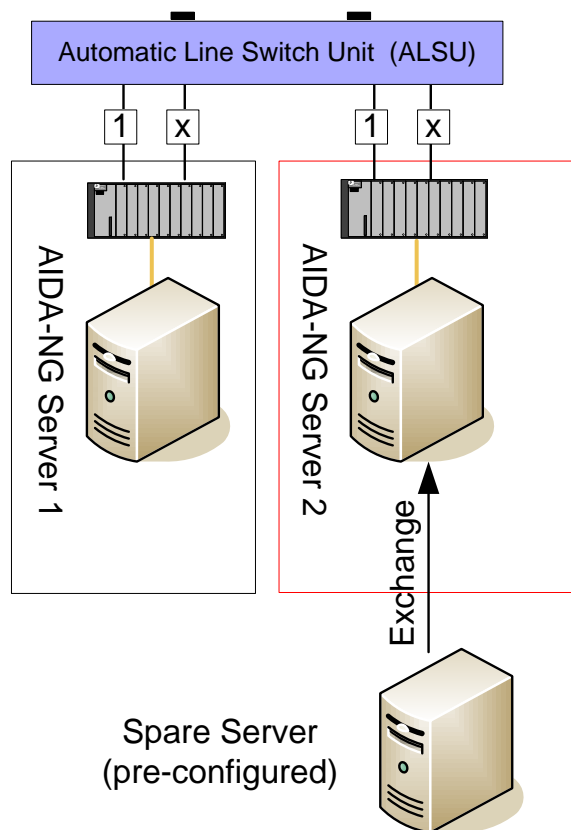
Field-proven system availability: > **99,999956%**

AIDA-NG – System Maintainability

Central Boot/Configuration/Software Server



AIDA-NG Strong Point – Example Server Exchange

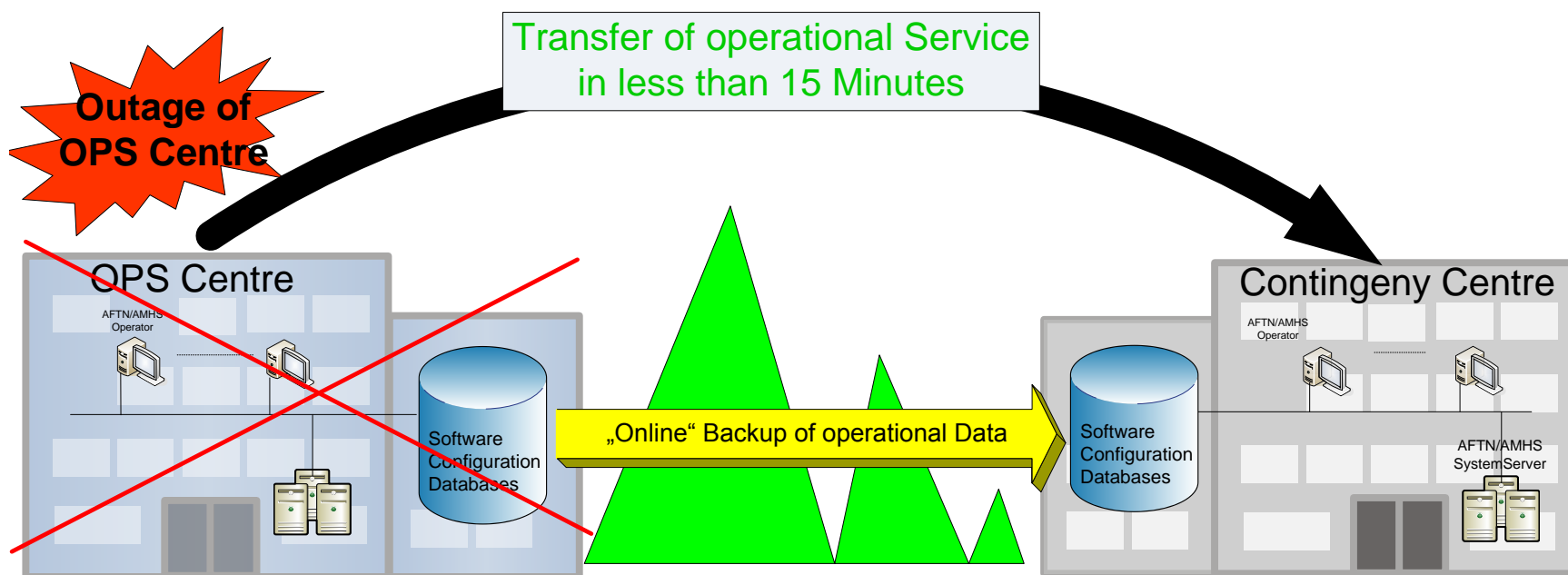


Exchange of a spare server can be done in two steps:

1. Configure spare server via basic installation CD (5 minutes)
2. Reboot spare server

- ✓ Exchange can be done in approximately 10 minutes
- ✓ Installation of software, configuration, databases, etc. is not required
- ✓ No interruption of service during exchange of the server

AIDA-NG Strong Point - Dual Site Handling

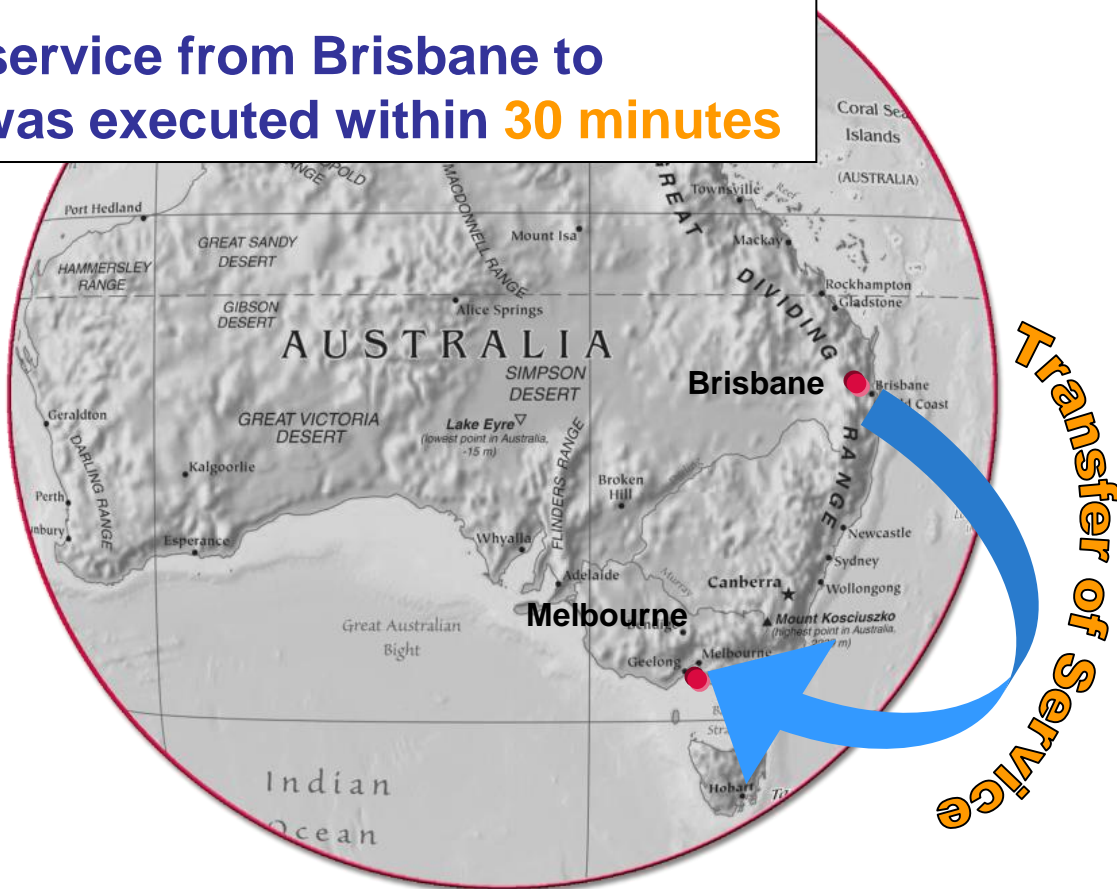


In Operation – AIDA-NG Dual Site Configuration Australia

Operational System: Brisbane

Contingency System: Melbourne

Transfer of service from Brisbane to Melbourne was executed within 30 minutes



Strong Point - Unrivalled Benefits for Users

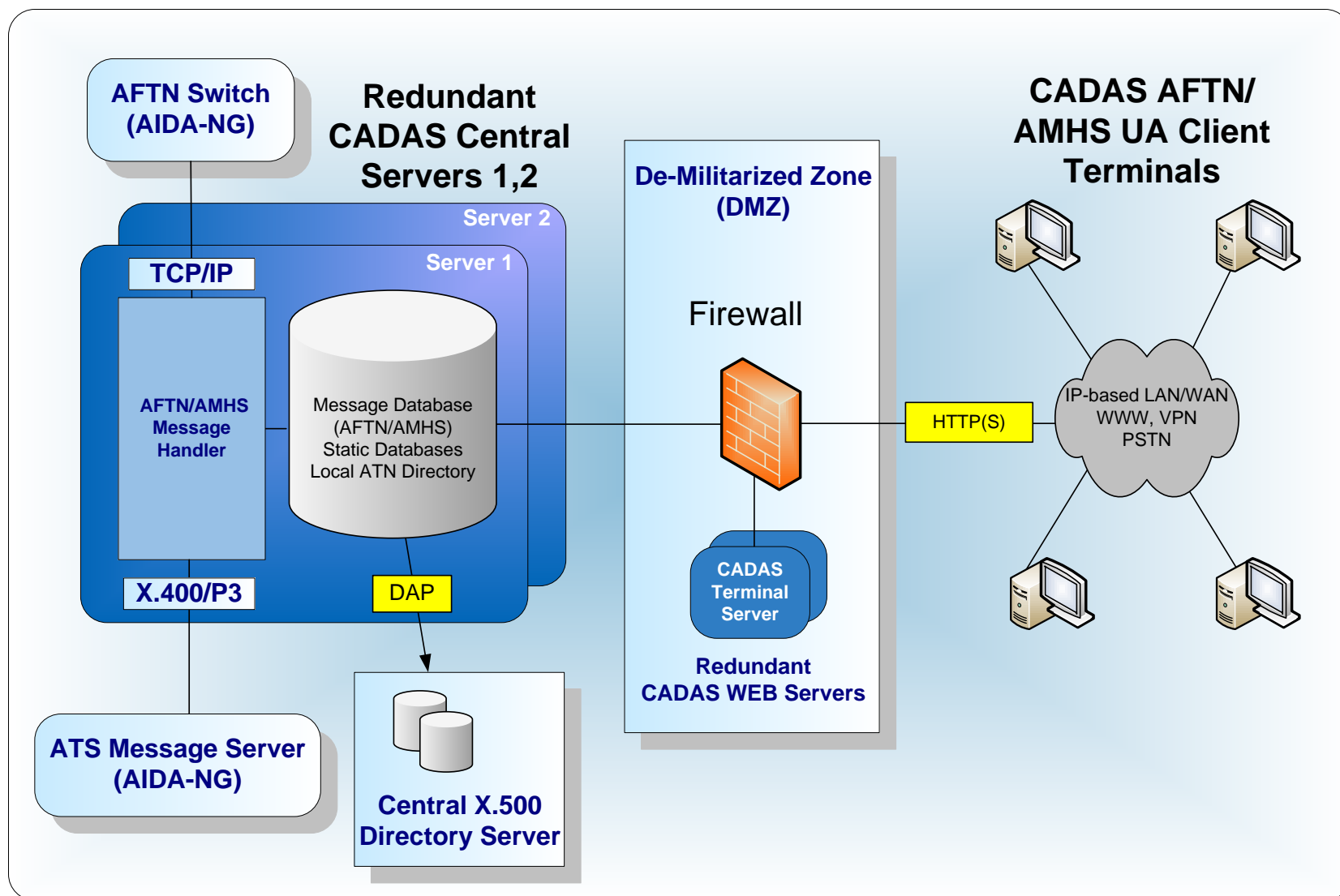
- ✓ Redundancy without any single point of failure
- ✓ Complete System Switchover in < 5 sec
- ✓ Fully integrated and tuned X.400 COTS product (redundancy, stability, throughput, extended queue handling, diagnostics, etc.)
- ✓ Unified System Management (AMHS, AFTN, legacy part, X.400, etc.)
- ✓ 100% protection against overflow situations
- ✓ Unmatched high message throughput
- ✓ Dual Site Operation/Contingency Management

CADAS

COMSOFT Aeronautical Data Access System

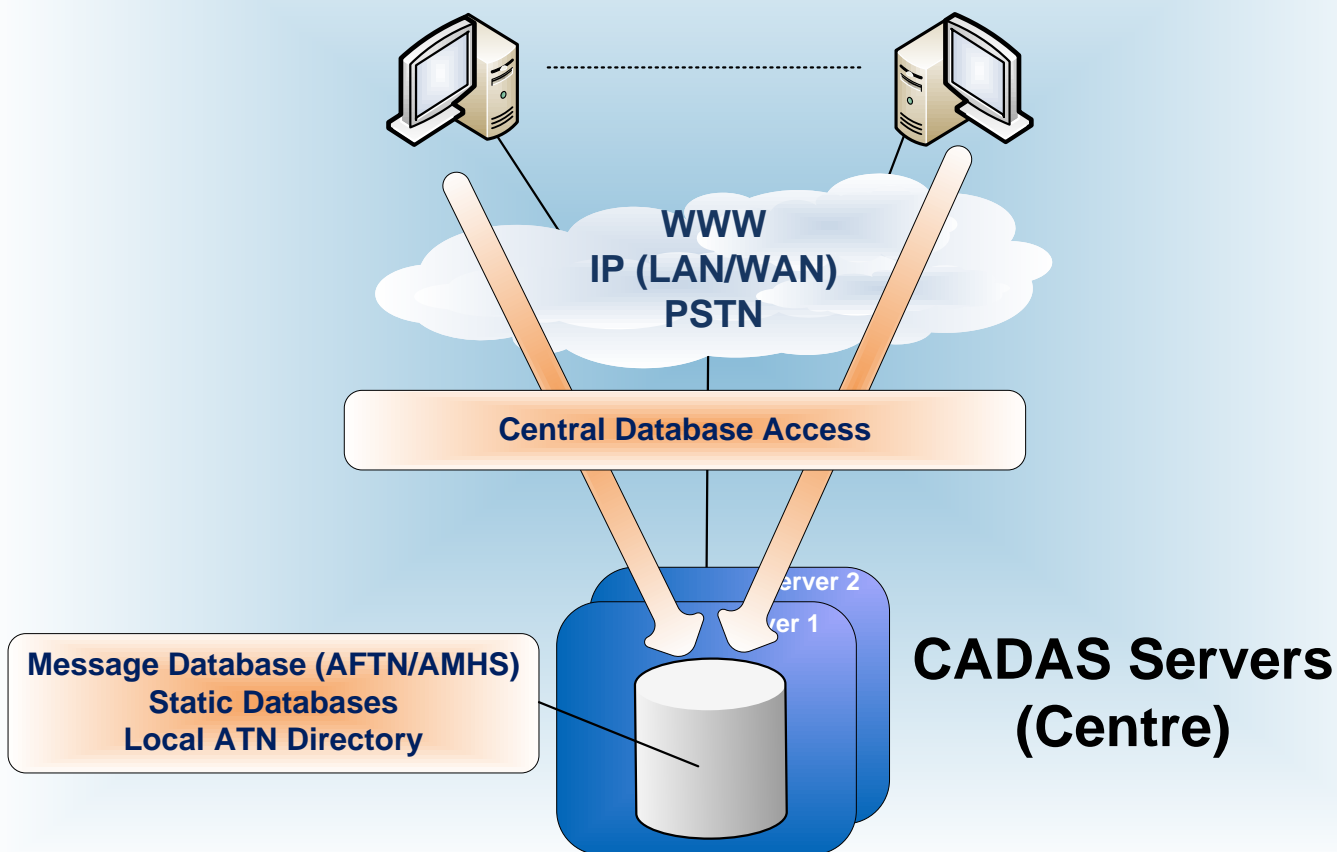
COMSOFT's advanced client/server-based ATS
Terminal System

CADAS – Client/Server Terminal System with ATS/AFTN or ATS/AMHS UA Client Terminals



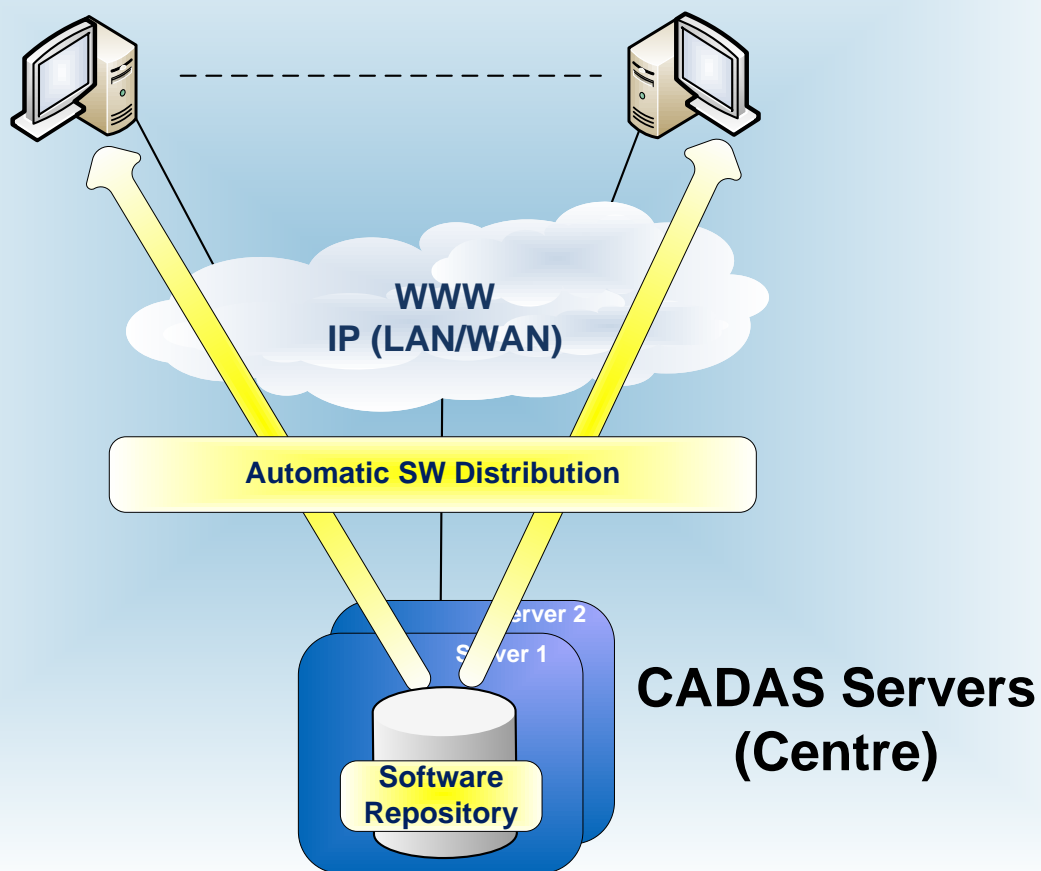
Strong Point - Client/Server System Database Access

CADAS AFTN/AMHS UA Client Terminals (Remote Locations, Domestic Airports, etc)



Strong Point - Client/Server System Software Maintenance

CADAS AFTN/AMHS UA Client Terminals (Remote Locations, Domestic Airports, etc)



CADAS – Terminal Applications

- Centre Terminal
Full Scope of ATS Functions for ATC Controllers, Tower, ARO, Airlines
- ATS Terminal
Management of ATS Messages (FLP+ associated, NOTAM, METEO, free text)
- Pilot Terminal
Proposal filing (FPL, DLA, CHG, CNL), Active flight monitoring
- Flight Strip Printing Terminal
Automatic generation, update and printing of flight strips
- Administration Terminal
Supervision, control and configuration of the entire system

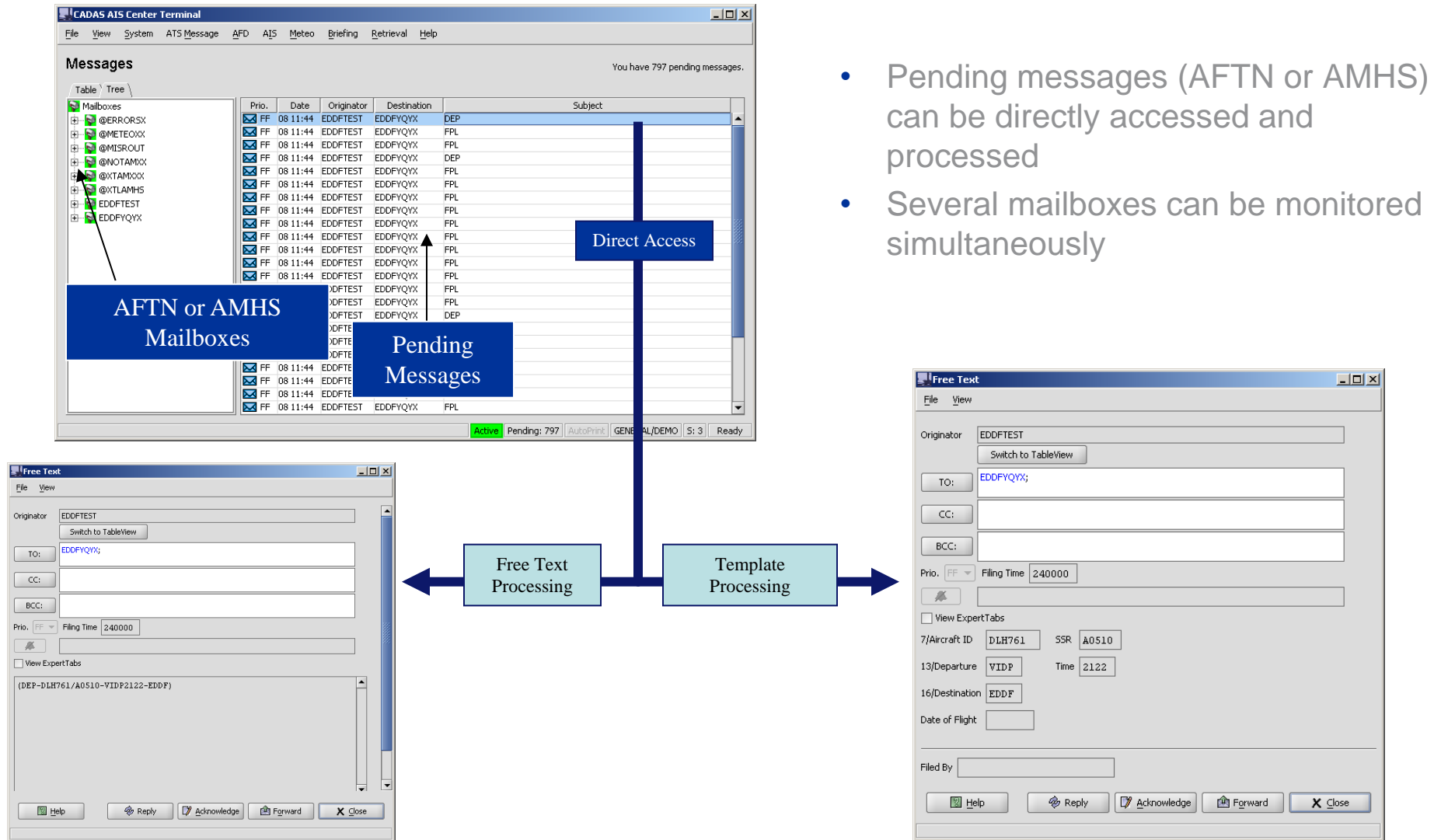
CADAS – ATS Client Terminals (AFTN or AMHS)

The screenshot displays three overlapping windows from the CADAS ATS Client Terminal:

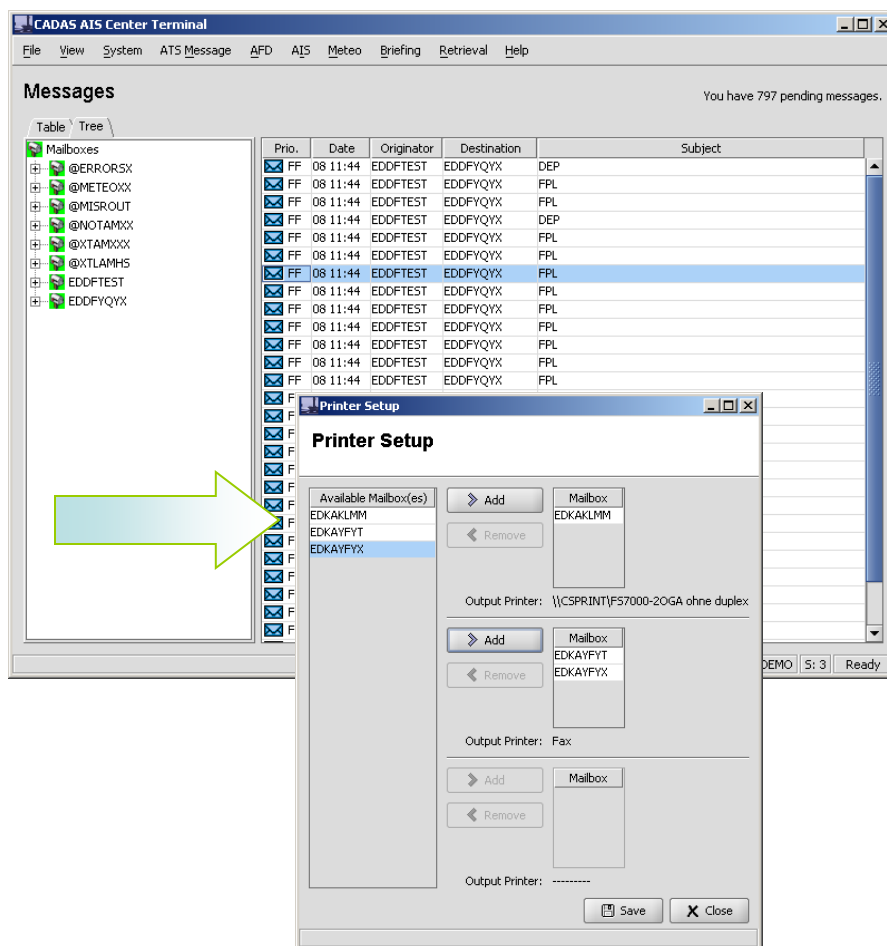
- NOTAM - Notice To Airmen:** A window for managing NOTAMs. It includes fields for Originator (YBBUSRA), TO (YBBUSRB), CC, BCC, and Priority (GG). It also has a 'Switch to TableView' button and a 'View ExpertTabs' checkbox.
- FPL - ICAO Flight Plan:** A window for managing ICAO Flight Plans. It includes fields for Originator (YBBUSRA), TO (YBBUSRB), CC, and BCC. It also has a 'Switch to TableView' button and a 'View ExpertTabs' checkbox.
- METAR (SA):** A window for managing METAR data. It includes fields for Originator (YBBUSRA), TO (YBBUSRB), CC, BCC, and Priority (GG). It also has a 'Switch to TableView' button and a 'View ExpertTabs' checkbox. Below these fields is a table with columns for Message ID, Orig., Issued, and Corr. The table contains one row with the message ID 'SA NP 01 YBAF 220655'.

- Platform-independent Java Application
- "Online" monitoring of incoming messages (AMHS or AFTN)
- Syntactic/semantic checking of received messages with type detection (FPL, NOTAM...)
- Template-specific view of received messages
- Automatic printout of incoming/transmitted messages
- Templates for all kinds of ATS messages (FPL+ associated, etc.) with online checking mechanisms
- Highly sophisticated message retrieval function with a multitude of filter criteria
- Support by central static databases (aircraft types, flight routes, FIRs, aerodromes, etc.)

CADAS ATS Client Terminal – Mailbox Monitoring



CADAS ATS Client Terminal – Message Printing



EDKAYFYT ⇒ System Printer 1:



EDKAYFYX ⇒ System Printer 2:



EDKAKLMM ⇒ System Printer 3:



- Automatic printing of messages according to Printer Setup
- Up to three printers can be assigned for auto printing on each Terminal

CADAS ATS Client Terminal - FPL Management

The screenshot shows the 'Send - FPL - ICAO Flight Plan' window. The interface includes a menu bar (File, View, Edit, Help) and a toolbar with icons for Send+Close, Load, Store, Create PIB..., Search Route, Store Route, and Search Area. Below the toolbar, there are several input fields and checkboxes for flight plan details. A 'Search Aircraft Type' dialog box is open, showing a search result table.

Callouts and Features:

- Restricted Areas:** Points to the 'Search Area' button in the toolbar.
- Preferential Routes:** Points to the 'Search Route' button in the toolbar.
- Templates:** Points to the 'Store' button in the toolbar.
- Online Help:** Points to the 'Help' menu item.
- Syntax/Semantic Check:** Points to the 'Invalid SRR [A + 4 numeric characters]' error message.
- Static Data Support:** Points to the 'Search Aircraft Type' dialog box.

Search Aircraft Type Dialog Box:

Search Aircraft Type
☒ No entry is selected

Aircraft Type Name
 GLF

Search result

Type	Name	Wake Turbulence
GLF2	C-20J, G-115...	M
GLF3	G-1159A Gulf...	M
GLF4	C-20F/G/H, G...	M
GLF5	G-1159D Gulf...	M

Main Form Fields:


Invalid SRR [A + 4 numeric characters]

Prio. Addressees: FF EDDKYFYX
 Filing Time: KAAGEMBX
 7/Aircraft ID: N498QS SSB: 123
 8/Flight Rules: I Type of Flight: G
 9/Number: Type of Aircraft: GLF4 Wake Turbulence: M
 10/Equipment: SGHIJRWXY / S
 13/Departure: KHPN Time: 2300
 15/Speed: N0461 Altitude/Level: F410
 Route: DCT MERIT DCT HFD J42 PUT DCT EBONY N135B REDBY DCT CARPE/M080F410 DCT 54N050W 56N040W 57N030W 56N020W/N0459F410 DCT N180G/N0463F410 UN551 NURSI UN551 BESOP UP6 REMSI UL603 EVELI UL19 TULIP UG9 ARNEM UL620 SONEB T841 DOM DCT GMH GMH2C
 16/Destination: EDDK Total EET: 0627 Alternate: EDDL 2nd:
 18/Other: EET/CZQM0047 CZUL0115 CZQX0147 CZQX0202 54N050W0219 56E030W0340 56N020W0418 EGPX0457 EISN0502 EGPX0506 EGTT05 EDVW0611 REG/N498QS SEL/HJEQ DAT/SV RMK/TCAS EQUIPPED ORGN/KCMHEJAA
☐ Activate supplementary information
 19/Endurance: Person on Board: Emergency Radio:
 Survival Equipment: [S] [P] [D] [M] [J] Jackets: [J] [L]
 Dinghies: [D] Number: Capacity: Cover: [C] Colour:
 Colour and Markings:
 Remark: [R]
 Pilot:
 Filed By: DEMO.DEMO Group: DEMO User: K

Strong Point CADAS ATS Client Terminal – Integrated AMHS Functionality

FPL - ICAO Flight Plan

File Edit View


Originator: YBBBUSRA  Switch to TableView

TO: YBBBUSB

CC:

BCC:

Prio: FF



☐ View ExpertTabs

7/Aircraft ID: QTR552 SSR

8/Flight Rules: I Type of Flight: S

9/Number: Type of Aircraft: A306 Wake Turbulence: H

10/Equipment: SDEHIPRMW / S

13/Departure: OTBD Time: 0915




15/Speed: N0465 Altitude/Level: F240

Route: DCT DOH R659 ELOSA B457 BAH A791 HIL G662
EGVOP/N0471F260 G662 NIMAR UL550 KITOT/N0476F280 UL550 MWB A791
MENLI A411 CV0 A727 OTIKO/N0462F290 W725 NANVO/N0463F300 W725 BRN
A411 LOSUL/N0461F310 A411 KHOMS V400 TPI DCT

16/Destination: HLLT Total EET: 0513 Alternate: DTTJ 2nd:

18/Other: EET/0BBB0007 OEJD0102 HECC0235 HLL0354 REG/A7ABN SEL/MSEP OPR/QTR
DOF/050318 RMK/P/TBN R/UYE J/LF D/06 372 C GREY A/WHITE AND GREY
NAV/TCAS C/

Filed By: GENERAL.YB

 Help  Send  Close

Attachment

Access to central address book

Display/hide AMHS Attributes

- Fully integrated AMHS User Agent
- Practically invisible to the end user

ATS Terminal – Creation of NOTAMs

- Auto NOTAM Series number allocation,
- Message Templates:
 - NOTAM N/R/C
 - SNOWTAM
 - ASHTAM

NOTAM - Notice To Airmen

File Edit View

☒ Type in a series letter

Originator: **EDKAAMHS**

☒ TO:

☐ CC:

☐ BCC:

Prio: **GG**

Bell

☐ View ExpertTabs

NOTAM Id: (☒ 0001 / 05) Type: NOTAM **N** Reference NOTAM Id: /

FIR: ☒ Q) / Q ☒ / Tfc: ☒ / Purpose: ☒ / Scope: ☒ / Lower: / Upper: / Coordinates: / Radius:

Affected Aerodromes or FIRs

A) ☒ B) C) ☒

D)

E) ☒

Lower Limit: F) Upper Limit: G)

Filed By: **GENERAL. JENS**

ATS Terminal – OPMET Templates

METAR (SA)
Type in a meteo report region

Originator: **EDKAAMHS** Switch to TableView

TO:

CC:

BCC:

Prio. **GG**

Bell ☐ Optional Header

☐ View ExpertTabs

Message ID	Orig.	Issued	Corr.
SA <input type="text"/>	EDDF	070948	<input type="text"/>

METAR	Location	Observed	
EDDF	070948	Z	

Filed By: **GENERAL.JENS**

- Sophisticated retrieval mechanism with a multitude of selection attributes available
- METEO Message Templates with formatted Inputs and online field checking mechanisms
- Various message templates including:
 - METAR
 - SPECI
 - SIGMET
 - AIRMET
 - TAF

CADAS – Extensions

Active Flight Database

Active Flight Database

- Online monitoring of Inbound, Outbound, and Over-Flights
- Configurable time window
- Callsign filter and sorting criteria
- List of ATS message history of each flight

AFD Monitor Setup

Type

☒ Inbound flights

☐ Outbound flights

☐ Over flights

Aerodrome

FIR

Timeframe

☐ Next 1 hour

☐ Next 2 hours

☐ Next 12 hours

☒ Next 24 hours

☐ Next 6 days

Aircraft ID



CADAS ATS Terminal

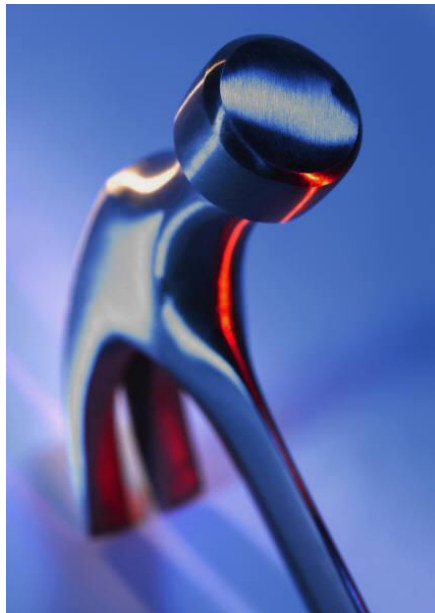
File View System ATS Message ATFM Message AIS Briefing Retrieve Help

Active Flights

Aircraft ID	Departure	Est. Off-Block	Destination	Route
AXL3923	EDDF	2004.05.22-05:05:00	EGLL	N0250F180 REFSO R1 LAM
AXL3923	EDDF	2004.05.23-05:05:00	EGLL	N0250F180 REFSO R1 LAM
AXL3923	EDDF	2004.05.24-05:05:00	EGLL	N0250F180 REFSO R1 LAM
KLM144	EDDF	2004.05.20-03:05:00	EHAM	N0460F320 AKBUK VG80 EK1 W102 VADEN ...
OHY965	EDDF	2004.05.24-03:05:00	EHAM	N0460F320 AKBUK VG80 EK1 W102 VADEN ...
LH400	EDDF	2004.05.22-08:00:00	KJFK	N0460F320 AKBUK VG80 EK1 W102 VADEN ...

Active AutoPrint AutoReadAck GENERAL/JENS S: 1 Ready

Services - How you get it



COMSOFT delivers "turnkey" solutions

Services – "Turnkey" Solution – Example



Valuable Add-On: COMSOFT Network Management System

CNMS
Central
Supervision of the
entire Location



CNMS – Central Supervision of Components – Logical View

CNMS AMADEUS - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://cnmssrv/

CNMS AMADEUS History

AMADEUS Logical View

19-11-2008 09:49:24

CNMS Status: ✔

OWP99 not in use

- Top Level View
- AMADEUS Logical View**
- Cabinet View
- Network Load
- Tactical Overview
- Open Nagios View
- Event History Search
- SNMP Traps
- Downtime Tool
- Mars Web Interface

AIDA-NG Application

- AIDA-NG LAs ✔
- AIDA-NG Interfaces ✔
- Pending Message List (PML) ✔
- Automatic Line Switch ✔
- SNMP Traps ✔

AIDA-NG Hardware

- RCS A ✔ RCS C ✔ RCS B ✔
- Fan Unit A ✔ Fan Unit C ✔ Fan Unit B ✔

COS

- A:OP+ ✔ B:STANDBY ✔

RSS

- 1:OP+ ✔ 2:OP+ ✔

Aida-NG Server 1 **Aida-NG Server 2**

Network Diagram:

- LVNL Domestic Network
- WWW SMS/Email Provider Remote Access
- PSTN
- Switch 1
- Switch 2
- LVNL LAN
- AAA LAN
- ELAN
- ILAN
- Monitoring LAN

Services and Components:

- AMADEUS Routers (1, 2)
- CADAS Health ✔ Message Handler ✔ Terminal Server ✔
- VPN: LVNL: 0 Comsoft: 0 ✔
- ASA Firewall ✔ Email-Fax-Gateway (CADAS) ✔
- CADAS Health ✔ Message Handler ✔ Terminal Server ✔
- Fax Queues ✔ Fax Lines ✔ Hytifax Port ✔ SMTP Port ✔ Mail Queue ✔
- NTP Server
- OPS ✔ Backup (Test) ✔ MARS ✔ CNMS Client ✔ CNMS Server ✔
- Operator Consoles ✘ Laser Printers ✘ Chain Printers ✘

Event History:

Time	Type	Logentry
19-11-2008 09:37:25	External Command	EXTERNAL COMMAND: ACKNOWLEDGE_SVC_PROBLEM:CNMS Server:hw_interface-status eth0:2:1:1:regos:No LSMC available in Karlsruhe
19-11-2008 09:37:25	Service Notification	SERVICE NOTIFICATION: regos-admin:CNMS Server:hw_interface-status eth0:ACKNOWLEDGEMENT (WARNING:trap_servicestate.eth0:DOWN: 1 int NOK : WARNING:regos:No LSMC available in Karlsruhe
19-11-2008 09:35:35	Info Message	HOST DOWNTIME ALERT: ASA Firewall:STARTED: Host has entered a period of scheduled downtime
19-11-2008 09:35:35	Info Message	SERVICE DOWNTIME ALERT: ASA Firewall:disco_asa_load:STARTED: Service has entered a period of scheduled downtime
19-11-2008 09:35:35	Info Message	SERVICE DOWNTIME ALERT: ASA Firewall:disco_vpn_sessions:STARTED: Service has entered a period of scheduled downtime
19-11-2008 09:35:35	Info Message	SERVICE DOWNTIME ALERT: ASA Firewall:internal-interface:STARTED: Service has entered a period of scheduled downtime

Scheduled downtimes:

Host	Service	Author	Comment	End
IDS_Sensor	disco_service_memory	Oliver	Test Downtime	2008-11-19 11:18:00
IDS_Sensor	disco_idb_sensor_active	Oliver	Test Downtime	2008-11-19 11:18:00
IDS_Sensor	disco_idb_packet_loss	Oliver	Test Downtime	2008-11-19 11:18:00

Disabled service checks:

Host	Disabled Service Check
Laser Printer 4	
Laser Printer 5	
OWPS	

Click here for Trap Details:

Most recent Mars traps:

Time	Message
2008-11-19 09:00:14	MARS-1-101 Wed Nov 19 09:00:15 2008 %MARS-1-101: Rule 330297 (System Rule: Inactive CS-MARS Reporting Device) fired and caused green Incident 16040429, starting from Wed Nov 19 09:00:02 2008 to Wed Nov 19 09:00:02 2008 Event details
2008-11-19 07:59:51	MARS-1-101 Wed Nov 19 08:00:19 2008 %MARS-1-101: Rule 330297 (System Rule: Inactive CS-MARS Reporting Device) fired and caused green Incident 16040428, starting from Wed Nov 19 08:00:05 2008 to Wed Nov 19 08:00:05 2008 Event details
2008-11-19 06:59:46	MARS-1-101 Wed Nov 19 07:00:13 2008 %MARS-1-101: Rule 330297 (System Rule: Inactive CS-MARS Reporting Device) fired and caused green Incident 16040427, starting from Wed Nov 19 07:00:00 2008 to Wed Nov 19 07:00:00 2008 Event details

http://cnmssrv/nagios/nagvis/nagvis/index.php?map=amadeus-logical

N 11 hosts down 19 unknown services 24 service warnings 3 critical services

Central Supervision – Cabinets

COMSOFT AMADEUS - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://cnmssrv/

CNMSS AMADEUS

History

19-11-2008 09:51:19

CNMSS Status:

OWP99 not in use

- Top Level View
- AMADEUS Logical View
- Cabinet View**
- Network Load
- Tactical Overview
- Open Nagios View
- Event History Search
- SNMP Traps
- Downtime Tool
- Mars Web Interface

Cabinet View

COMSOFT A	COMSOFT C	COMSOFT B
NTP Server		
SNL LAN Switch A		SNL LAN Switch B
RCS Rack A	RCS Rack C	RCS Rack B
Fan Unit A	Fan Unit C	Fan Unit B
AMADEUS Router 1		AMADEUS Router 2
ASA Firewall		MARS
E-Mail-Fax-Gateway		CNMSS Server
Aida-NG Server 1		Aida-NG Server 2
Keybd/TFT		Keybd/TFT
ILAN Switch 1		ILAN Switch 2
ELAN Switch 1		ELAN Switch 2
LVNL LAN Switch 1		LVNL LAN Switch 2
AAA LAN Switch 1		AAA LAN Switch 2
Monitoring LAN Switch 1		Monitoring LAN Switch 2

Application Status

AIDA-NG

- AIDA-NG LAs
- AIDA-NG Interfaces
- Pending Message List (PML)
- Automatic Line Switch
- SNMP Traps

CADAS

CADAS UA

- CADAS Health
- Message Handler
- Terminal Server

EFG

- CADAS Health
- Message Handler
- Terminal Server

Email-Fax-Gateway

- Fax Queues
- Fax Lines
- Hyfax Port
- SMTP Port
- Mail Queue

CSS

A:OP+ B:STANDBY

RCS

1: OP+ 2: OP+

OWPs **CADAS UA** **CNMSS Client** **Laser Printers** **Chain Printers**

NTP Server Backup (Test)

Event History:

Time	Type	Logentry
19-11-2008 09:49:54	External Command	EXTERNAL COMMAND: DEL_HOST_DOWNTIME:36
19-11-2008 09:49:54	Info Message	HOST DOWNTIME ALERT: ASA Firewall:CANCELLED: Scheduled downtime for host has been cancelled.
19-11-2008 09:49:54	External Command	EXTERNAL COMMAND: DEL_SVC_DOWNTIME:37
19-11-2008 09:49:54	Info Message	SERVICE DOWNTIME ALERT: ASA Firewall:cisco_asa_joad:CANCELLED: Scheduled downtime for service has been cancelled.
19-11-2008 09:49:54	External Command	EXTERNAL COMMAND: DEL_SVC_DOWNTIME:38
19-11-2008 09:49:54	Info Message	SERVICE DOWNTIME ALERT: ASA Firewall:cisco_vpn_sessions:CANCELLED: Scheduled downtime for service has been cancelled.

Scheduled downtimes:

There are currently no scheduled downtimes.

Disabled service checks:

Host	Disabled Service Check
Laser Printer 4	
Laser Printer 5	
OWP5	

Click here for [Trap Details](#).

Most recent Mars traps:

Time	Message
2008-11-19 09:00:14	MARS-1-101 Wed Nov 19 09:00:15 2008 %MARS-1-101: Rule 339207 (System Rule: Inactive CS-MARS Reporting Device) fired and caused green Incident 16040429, starting from Wed Nov 19 09:00:02 2008 to Wed Nov 19 09:00:02 2008 Event details
2008-11-19 07:59:51	MARS-1-101 Wed Nov 19 08:00:19 2008 %MARS-1-101: Rule 339207 (System Rule: Inactive CS-MARS Reporting Device) fired and caused green Incident 16040428, starting from Wed Nov 19 08:00:05 2008 to Wed Nov 19 08:00:05 2008 Event details
2008-11-19 06:59:46	MARS-1-101 Wed Nov 19 07:00:13 2008 %MARS-1-101: Rule 339207 (System Rule: Inactive CS-MARS Reporting Device) fired and caused green Incident 16040427, starting from Wed Nov 19 07:00:00 2008 to Wed Nov 19 07:00:00 2008 Event details

http://cnmssrv/nagios/nagvis/nagvis/index.php?map=cabinet

11 hosts down **19 unknown services** **24 service warnings** **3 critical services**

CNMS – Central Supervision of Components - Switches

19-11-2008 12:28:01

CNMS Status: ✔

OWP99 not in use

- Top Level View
- AMADEUS Logical View
- Cabinet View
- Network Load
- Tactical Overview
- Open Nagios View
- Event History Search
- SNMP Traps
- Downtime Tool
- Mars Web Interface

ELAN Switch 1

Aida-NG Server 1
Pass Port 1

Aida-NG Server 2

Monitoring LAN Switch 1
ELAN Switch 2 (FE 23)

ELAN Switch 2 (FE 24)

Catalyst 3560 series PoE-24

CPU: 45.5 OK ✔

Event History:

Time	Type	Logentry
19-11-2008 12:15:35	Process Info	Auto-save of retention data completed successfully.
19-11-2008 12:08:57	External Command	EXTERNAL COMMAND: DEL_HOST_DOWNTIME:48
19-11-2008 12:08:57	Info Message	HOST DOWNTIME ALERT: NTP Server OPS:CANCELLED: Scheduled downtime for host has been cancelled.
19-11-2008 12:08:57	External Command	EXTERNAL COMMAND: DEL_SVC_DOWNTIME:49
19-11-2008 12:08:57	Info Message	SERVICE DOWNTIME ALERT: NTP Server OPS:hopl_sync_state:CANCELLED: Scheduled downtime for service has been cancelled.
19-11-2008 12:08:57	External Command	EXTERNAL COMMAND: DEL_SVC_DOWNTIME:50

Scheduled downtimes:
There are currently no scheduled downtimes.
Disabled service checks: There are currently no disabled service checks.

Click here for [Trap Details](#).
Most recent Mars traps:

Time	Message
2008-11-19 12:00:13	MARS-1-101 Wed Nov 19 12:00:17 2008 %MARS-1-101: Rule 339297 (System Rule: Inactive CS-MARS Reporting Device) fired and caused green Incident 16040433, starting from Wed Nov 19 12:00:03 2008 to Wed Nov 19 12:00:03 2008 Event details
2008-11-19 11:00:12	MARS-1-101 Wed Nov 19 11:00:15 2008 %MARS-1-101: Rule 339297 (System Rule: Inactive CS-MARS Reporting Device) fired and caused green Incident 16040432, starting from Wed Nov 19 11:00:03 2008 to Wed Nov 19 11:00:03 2008 Event details
2008-11-19 10:15:23	MARS-1-101 Wed Nov 19 10:15:25 2008 %MARS-1-101: Rule 339172 (System Rule: CS-MARS IPS Signature Update Failure) fired and caused green Incident 16040431, starting from Wed Nov 19 10:15:16 2008 to Wed Nov 19 10:15:16 2008 Event details
2008-11-19 10:00:13	MARS-1-101 Wed Nov 19 10:00:15 2008 %MARS-1-101: Rule 339297 (System Rule: Inactive CS-MARS Reporting Device) fired and caused green Incident 16040430, starting from Wed Nov 19 10:00:02 2008 to Wed Nov 19 10:00:02 2008 Event details

Done

11 hosts down 19 unknown services 24 service warnings 3 critical services

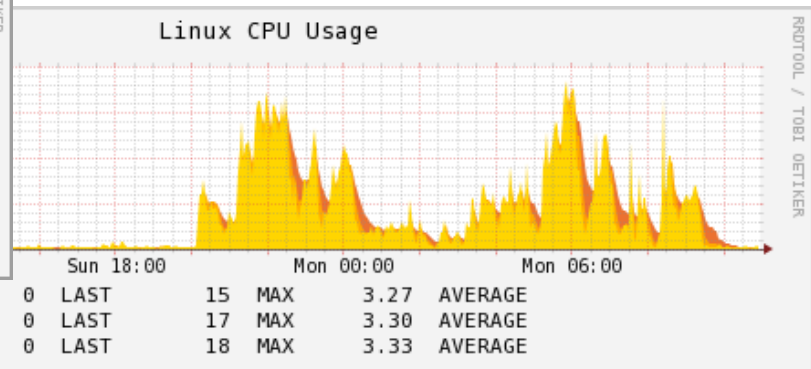
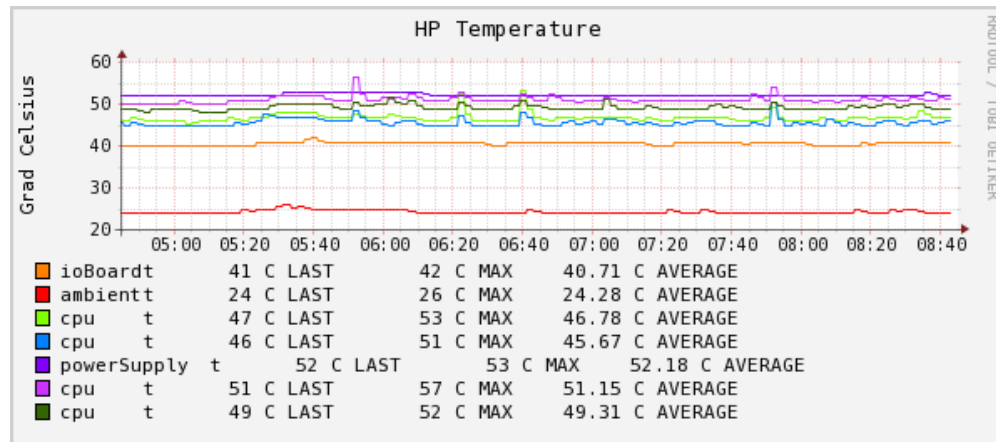
CNMS – Central Supervision of Remote Terminals



Visualisation of Performance Data

- CPU Load
- Memory Usage
- Temperature
- Availability Figures
- Number of pending messages
-

Performance graphics are generated automatically



Product Maturity

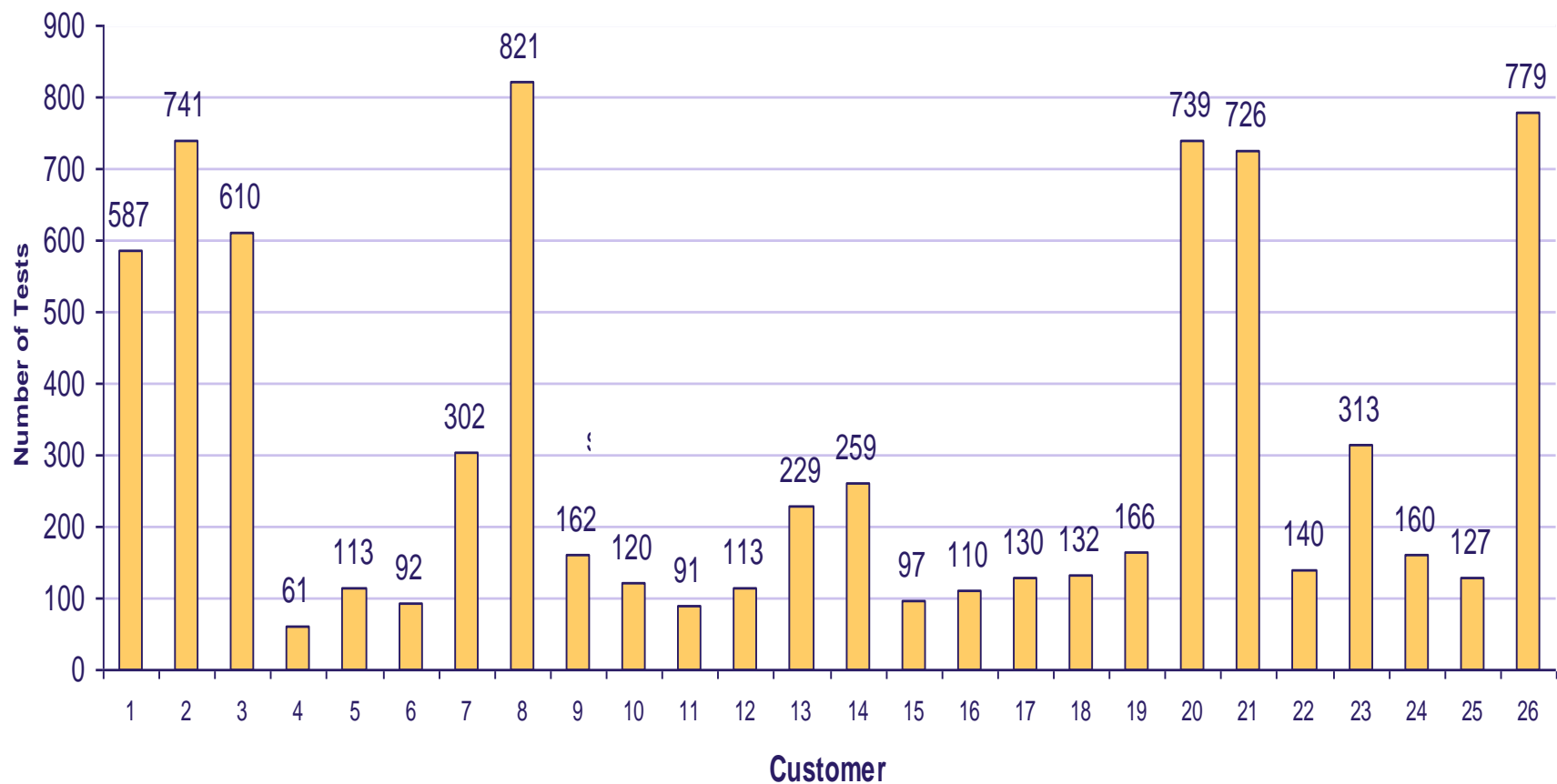
AIDA-NG has evolved to the most mature AFTN/CIDIN/AMHS system on the market



AIDA-NG Product Line – Outstanding Maturity Level

- ✓ More than **700,000** (!) automated module and integration tests for each customer baseline.
- ✓ The AIDA-NG product line has been excessively tested in a multitude of implementation projects:
- ✓ More than **15000** test cases witnessed by numerous FAT inspection teams since 2005

System Testing – Acceptance Tests



Added Value – Compliance with European Safety Regulations

- ✓ Full compliance with **European Safety Regulations (ESARR1-6)**.
- ✓ Proven **Software Assurance Level (SWAL) 3** according to EUROCONTROL Safety Assessment Methodology (SAM) (SIL-2/IEC 61508 and AL 4/ED-109).

COMSOFT – AMHS Conformance Testing



AMHS Conformance
Verification

AMHS
Implementation
under Test

- ✓ Full Support of both, regional EUR + ASIA/Pacific AMHS Manuals (ATN/OSI, ATN/IPS)
 - ✓ Highest Automation Grade (>95%) of Test Execution
 - ✓ Platform-independent Test-Suites
 - ✓ Test Message Repository in XML Format
 - ✓ Evaluation of Test Results as integral part of Test Suites
 - ✓ Detailed Logs and Test Reports
- Suitable for any AMHS
 - Use of Standard AFTN/AMHS Interfaces and Configuration
 - No specific IUT Test Harness required

Customer References

Germany, EUROCONTROL, Netherlands, United Kingdom, Belgium, France, Suisse, Lithuania, Poland, Slovakia, Bosnia & Herzegovina, Serbia, Macedonia, Libya, Egypt, Saudi Arabia, Zimbabwe, Morocco, Emirates, Oman, Qatar, Pakistan, India, Macau, Singapore, Australia, Fiji, Hong Kong, Peru, Colombia, Angola, Nigeria, Kuwait, Mongolia

COMSOFT – Experience in AMHS Interoperability Tests

➤ ECG

The COMSOFT ECG is used as AMHS Reference System by EUROCONTROL to perform interoperability tests for the evaluation of other AMHS products

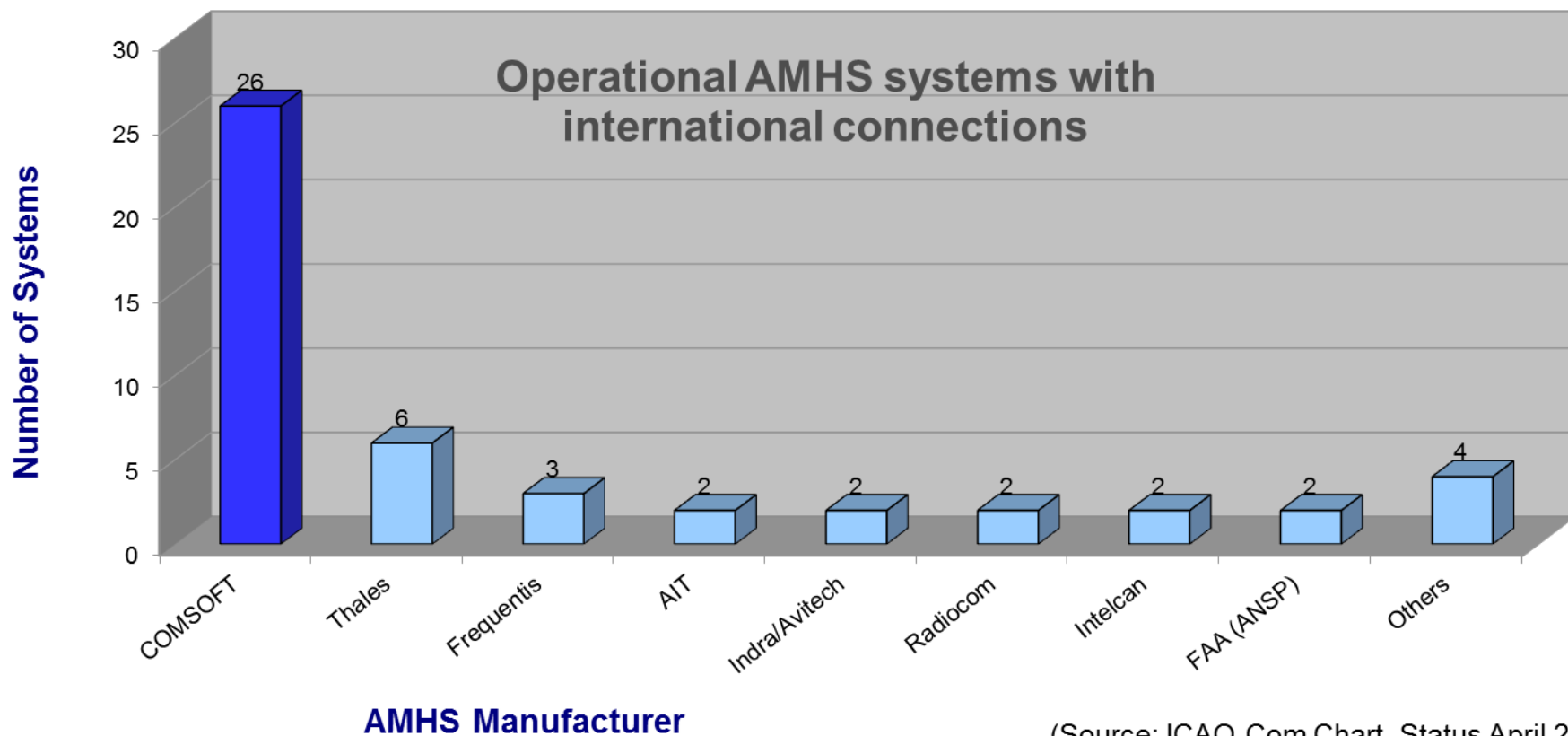


➤ Customer Support

COMSOFT is prepared to support its customers for the setup and execution of Interoperability Tests with adjacent centres:

- ✓ Test Harness (System Configuration, Test Messages, etc.) in accordance with AMHS Manual is available
- ✓ Test Documentation (Configuration, Test Suites, etc.) is available
- ✓ COMSOFT can provide
 - remote support during test phase (Option A)
 - on-site support during test phase (Option B)

Countries operating international AMHS Connections



(Source: ICAO Com Chart, Status April 2015)

COMSOFT – Customer Base

Our Success



Customer Base - References/Projects in Europe

NATS, UK

Locations: Heathrow and Gatwick

- 2 redundant **AMHS**/CDIN/AFTN systems
- 1 redundant **AMHS**/CDIN/AFTN test system

EUROCONTROL

Location: Brussels

ECG Core Software Package

EUROCONTROL AMHS Reference System

EUROCONTROL, CFMU

Locations: Brussels and Paris

- 4 redundant **AMHS**/CDIN/AFTN systems

Belgocontrol, Belgium

Location: Brussels

- 1 redundant operational **AMHS**/CDIN/AFTN system
- 1 redundant contingency **AMHS**/CDIN/AFTN system
- 1 redundant test/training **AMHS**/CDIN/AFTN system
- 45 CADAS **AMHS UA**/AFTN User Terminals

EUROCONTROL

Location: Maastricht UAC

- 1 redundant **AMHS**/AFTN/CIDIN system
- 1 redundant test/development system

LVNL, the Netherlands

Location: Amsterdam

- 1 redundant **AMHS**/AFTN/CIDIN system
- 1 redundant test/development system

DSNA (Project: MESANGE), France

Location: Bordeaux and 10 remote sites

- 1 redundant operational **AMHS**/CDIN/AFTN system
- 1 redundant contingency **AMHS**/CDIN/AFTN system
- 1 redundant test/training **AMHS**/CDIN/AFTN system
- 1 redundant **AMHS**/CDIN/AFTN development system
- 16 concentrators installed on 10 remote sites
- up to 150 CADAS **AMHS UA**/AFTN User Terminals

skyguide (Project: MESANGE), Switzerland

Location: Geneva

- 1 redundant operational **AMHS**/CDIN/AFTN system
- 1 single contingency **AMHS**/CDIN/AFTN system
- 1 redundant test/training **AMHS**/CDIN/AFTN system
- up to 40 CADAS **AMHS UA**/AFTN User Terminals



DFS, Germany

Locations: Frankfurt and Langen

- 2 redundant **AMHS**/CDIN/AFTN systems
- 1 redundant **AMHS**/CDIN/AFTN test system

LPS, Slovakia

Location: Bratislava

- 1 redundant operational **AMHS**/CDIN/AFTN systems + 1 single contingency **AMHS**/CDIN/AFTN system
- 1 redundant disaster recovery **AMHS**/CDIN/AFTN system + 1 single contingency **AMHS**/AFTN/CIDIN/ system
- 16 CADAS **AMHS UA**/AFTN Terminals

FEDCAD, Bosnia and Herzegovina

Location: Sarajevo and Mostar

- 2 redundant **AFTN/AMHS/AIM** Systems
- 17 CADAS AFTN Terminals

RSCAD, Republic of Srpska

Location: Banja Luka

- 1 redundant **AFTN/AMHS** Systems
- 5 CADAS AFTN Terminals

SMATSA, Serbia and Montenegro

Location: Belgrade

- 1 redundant **AMHS**/AFTN switch
- 1 **AMHS**/AFTN test/training system
- 34 CADAS **AMHS UA**/AFTN User Terminals

MCAA, Macedonia

Location: Skopje and Ohrid

- 1 redundant **AMHS**/AFTN system
- 23 CADAS AFTN Terminals

Aeronavigacia, Lithuania

Location: Belgrade

- 1 redundant **AMHS**/AFTN switch
- 15 CADAS **AMHS UA**/AFTN Terminals

Bulatsa, Bulgaria

Location: Sofia

- 1 redundant **AMHS**/AFTN switch
- 20 CADAS **AMHS UA**/AFTN Terminals

Croatia Control, Croatia

Location: Zagreb

- 1 redundant **AMHS**/AFTN switch
- 1 **AMHS**/AFTN test/training system
- 5 CADAS **AMHS UA**/AFTN User Terminals

Sakaeronavigatsia Ltd, Georgia

Location: Belgrade

- 1 redundant **AMHS**/AFTN switch
- 15 CADAS **AMHS UA**/AFTN Terminals

Polish Military, Poland

Location: Warsaw

- 1 redundant **AMHS**/AFTN switch
- 63 CADAS **AMHS UA**/AFTN Terminals

PANSA, Poland

Location: Warsaw

- 1 redundant **AMHS**/CDIN/AFTN switch

Russian Federation (FGUP RTC AISS)

Locations: Rostov/Don

- 1 redundant CDIN/AFTN system
- 1 AFTN concentrator at a remote site

Customer Base - References/Projects in Middle East & Africa

ONDA, Morocco

Location: Casablanca

- 1 redundant operational **AMHS**/CIDIN/AFTN system
- 1 **AMHS**/CIDIN/AFTN Test/Training System
- 5 CADAS **AMHS UA**/AFTN User Terminals

CAA, Libya

Location: Tripoli, Benina, Metiga, Sirt, Sheba

- 1 redundant **AMHS**/CIDIN/AFTN/**AIM** system and
- 5 gateway sites with 30 CADAS AFTN/**AIM** User Terminals

NAMA, Nigeria

Location: Lagos, Kano

- 1 redundant **AMHS**/AFTN/**AIM** System
- 1 redundant **AMHS**/AFTN/**AIM** Test System
- 120 CADAS **AMHS UA**/AFTN Terminals

ENANA, Angola

Location: Luanda, Limbago

- 1 redundant **AMHS**/**AIM** System
- 1 test/training **AMHS**/**AIM** System
- 50 CADAS **AMHS UA**/AFTN/**AIM** User Terminals

NANSC, Egypt

Location: Cairo

- 1 redundant **AMHS**/CIDIN/AFTN system
- Up to 200 CADAS **AMHS UA**/AFTN Terminals

GCAA, Abu Dhabi

Location: Abu Dhabi, UAE

- 2 redundant **AMHS**/CIDIN/AFTN systems
- 20 CADAS **AMHS UA**/AFTN User Terminals

DGMAN, Oman

Location: Muskat

- 2 redundant **AMHS**/AFTN/**AIM** system
- 1 contingency/test/training **AMHS**/AFTN/**AIM** System
- 1 test/training **AIM** System
- 25 CADAS **AMHS UA**/AFTN User Terminals

QCAA, Qatar

Location: Doha

- 1 redundant **AMHS**/AFTN/**AIM** System
- 1 redundant **AMHS**/AFTN/**AIM** Test System
- up to 60 CADAS **AMHS UA**/AFTN Terminals

DCA, Dubai

Location: Dubai, UAE

- 1 redundant AFTN switch

TCAA, Tanzania

Location: D'aressalam

- 1 redundant **AMHS**/AFTN System
- 21 CADAS **AMHS UA**/AFTN Terminals

CAA, Zambia

Location: Lusaka

- 1 redundant AFTN switch

CAA, Zimbabwe

Location: Harare

- 1 redundant **AMHS**/CIDIN/AFTN/**AIM** Switch
- 18 CADAS **AMHS UA**/AFTN/**AIM** User Terminals

GACA, Saudi Arabia

Location: Jeddah and Riyadh

- 1 redundant **AMHS**/CIDIN/AFTN System
- 1 single **AMHS**/CIDIN/AFTN Backup System
- Up to 60 local CADAS **AMHS UA**/AFTN Terminals

DGCA, Kuwait

Location: Kuwait City

- 1 redundant **AMHS**/AFTN/**AIM** System
- 1 contingency **AMHS**/AFTN/**AIM** System
- 1 test/training **AMHS**/AFTN/**AIM** System
- 12 CADAS **AMHS UA**/AFTN/**AIM** Terminals

Customer Base - References/Projects in the Asia Pacific Region

CAAN, Nepal

Location: Kathmandu
1 redundant
AMHS/AFTN System
25 CADAS AMHS UA
User Terminals

CAAB, Bangladesh

Location: Dhaka
1 redundant
AMHS/AFTN System
12 CADAS AMHS UA
User Terminals

CAAS, Singapore

Location: Singapore
1/1 redundant/single AMHS/AFTN+ATN Router system
12 CADAS AMHS UA/AFTN User Terminals

HKCAD, China

Location: Hong Kong
2 redundant AMHS/AFTN systems (OPS/BCK)
up to 150 CADAS AMHS UA/AFTN User
Terminals

ATO, Philippines

Location: Manila
1 redundant AMHS/AFTN incl. ATN Router
system
40 CADAS AMHS UA/AFTN Terminals

CAAM, Macau

Location: Macau
1 redundant AMHS/AFTN incl. ATN Router system
14 CADAS AMHS UA User Terminals

PCAA, Pakistan

Location: Karachi
1 redundant AMHS/AFTN/AIM System incl.
ATN Router
46 CADAS AMHS UA User Terminals

AAI, India

Location: Mumbai
1 redundant AMHS/AFTN System incl.
ATN Router system
25 CADAS AMHS UA User Terminals

APII, Indonesia

Location: Palembang
1 redundant AFTN switch
10 CADAS AFTN User Terminals

DOTC, Indonesia

Location: Djakarta
1 redundant AMHS/AFTN/AIM Test and
Reference System
10 CADAS AMHS UA/AFTN/AIM Terminals

ASA, Australia

Location: Brisbane, Melbourne
2 redundant AMHS/AFTN incl. ATN Router systems
1 redundant test/development system
up to 60 CADAS AMHS UA/AFTN User Terminals

Fiji

Location: Nadi
1 redundant AMHS/AFTN/AIM +ATN Router systems
1 single AMHS/AFTN/AIM test/training system
16 CADAS AMHS UA/AFTN/AIM User Terminals

MCAA, Mongolia

Location: Ulan Batar
1 AMHS/AFTN Gateway

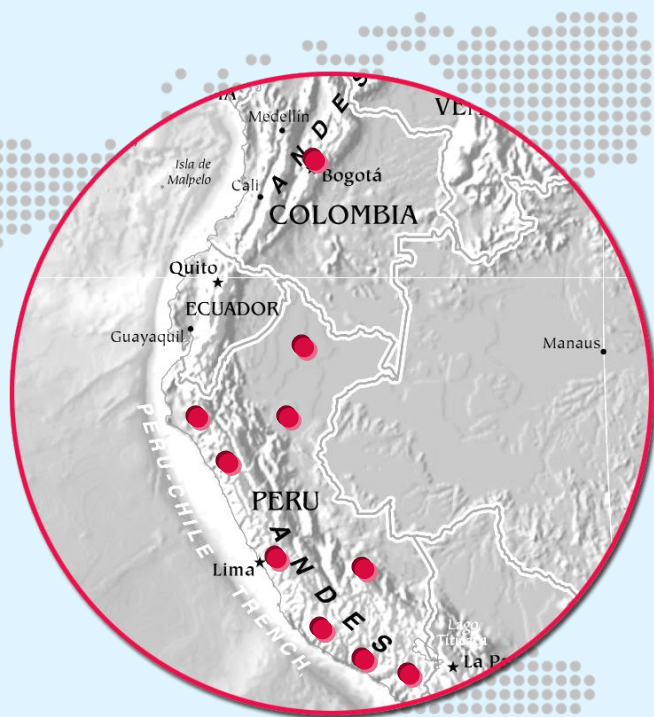
Airways New Zealand

Location: Christchurch (OPS, DEV), Auckland (BCK)
3x redundant AFTN/AMHS Systems (OPS, BCK,
DEV)
Up to 120 CADAS AFTN/AMHS UA User Terminals

Papua New Guinea

Location: Port Moresby 2x redundant AFTN/AMHS
System (OPS, BCK)
12 CADAS AFTN/AMHS UA User Terminals

Customer Base – References/Projects in South America/Caribbean



U.A.E.A.C, Colombia

Location: Bogotá and 6 domestic local and remote sites
1 redundant AFTN/**AMHS** system
63 CADAS **AMHS UA** User Terminals

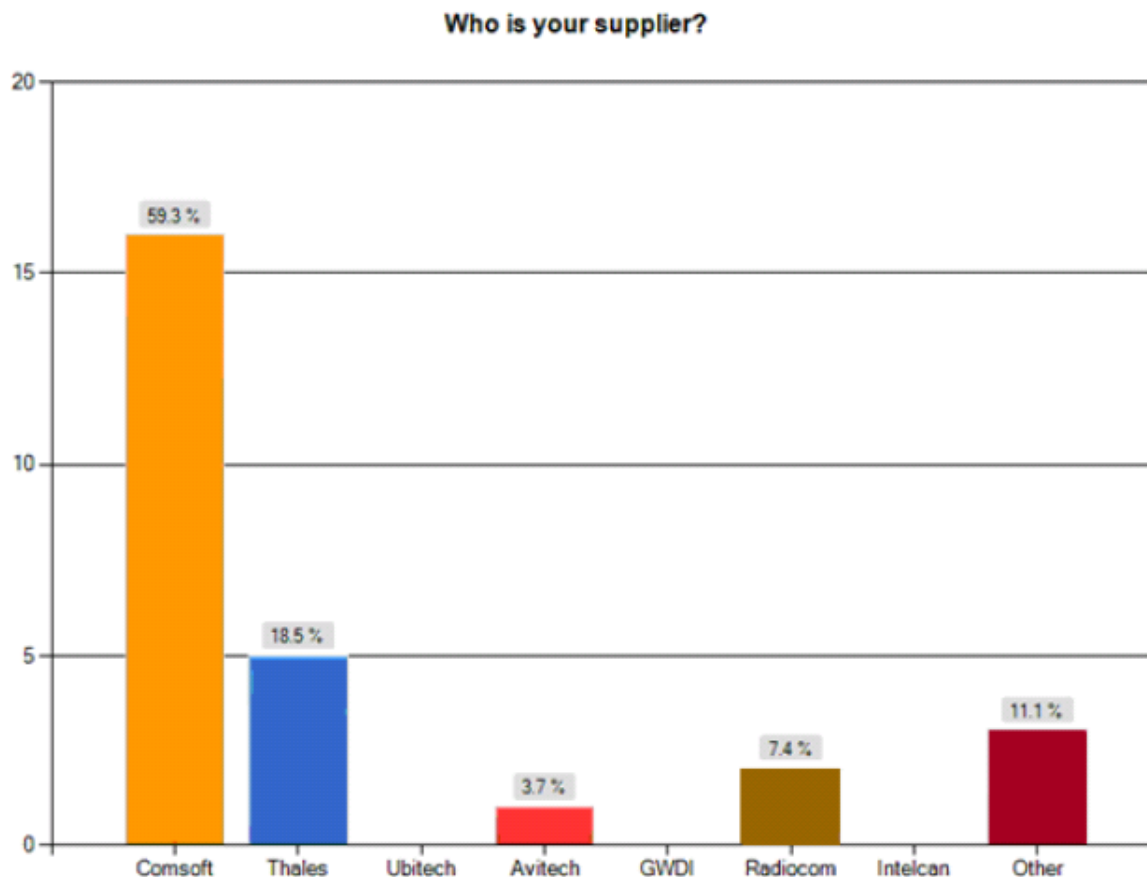
CORPAC, Peru

Location: Lima and 31 domestic local and remote sites
1 redundant AFTN/**AMHS** system with **AIM** extension
86 CADAS **AMHS UA/AIM** User Terminals

TTCAA, Trinidad-Tobago

Location: Port of Spain and 14 Caribbean
1 redundant AFTN/**AMHS** system
46 CADAS **AMHS UA** User Terminals

SITA AMHS Market Survey (published on the ICAO AMHS workshop in Santo Domingo, November 26th, 2009)



AIR TRAFFIC CONTROL KNOW-HOW

COMSOFT – AMHS Activities 2010 - 2013

In the period from 2010 – today COMSOFT was extremely successful and won multiple AFTN/AMHS customers:

**54 ANSPs are equipped with
the AIDA-NG/CADAS
AFTN/AMHS**

AIDA-NG – Result of the Evolution



AIDA-NG has evolved to the most mature AFTN/CIDIN/AMHS system on the market

COMSOFT is the AMHS Market Leader

CAUG – COMSOFT AIDA User Group



CAUG 6th Annual Meeting 07 – 08 May 2013, Karlsruhe, Germany