



AIXM/UML/XML/GML Workshop

ICAO SAM, Lima, Peru, 28-SEP – 02-OCT-2015

AIM Unchained

based on the story by Ulrich Kaage
presented by Peter Cornelius

Development of the Industry related to AIXM, WXXM and FIXM

COMSOFT
dedicated to ATM

AIM Unchained



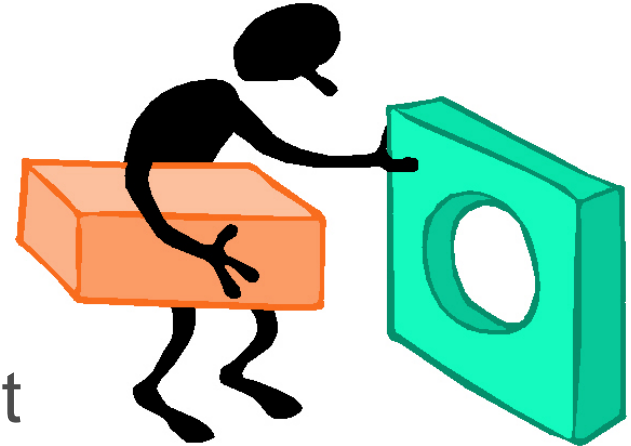
The Chains

- Text Based
- Product Centric
- Closed Architecture
- Proprietary Data Models

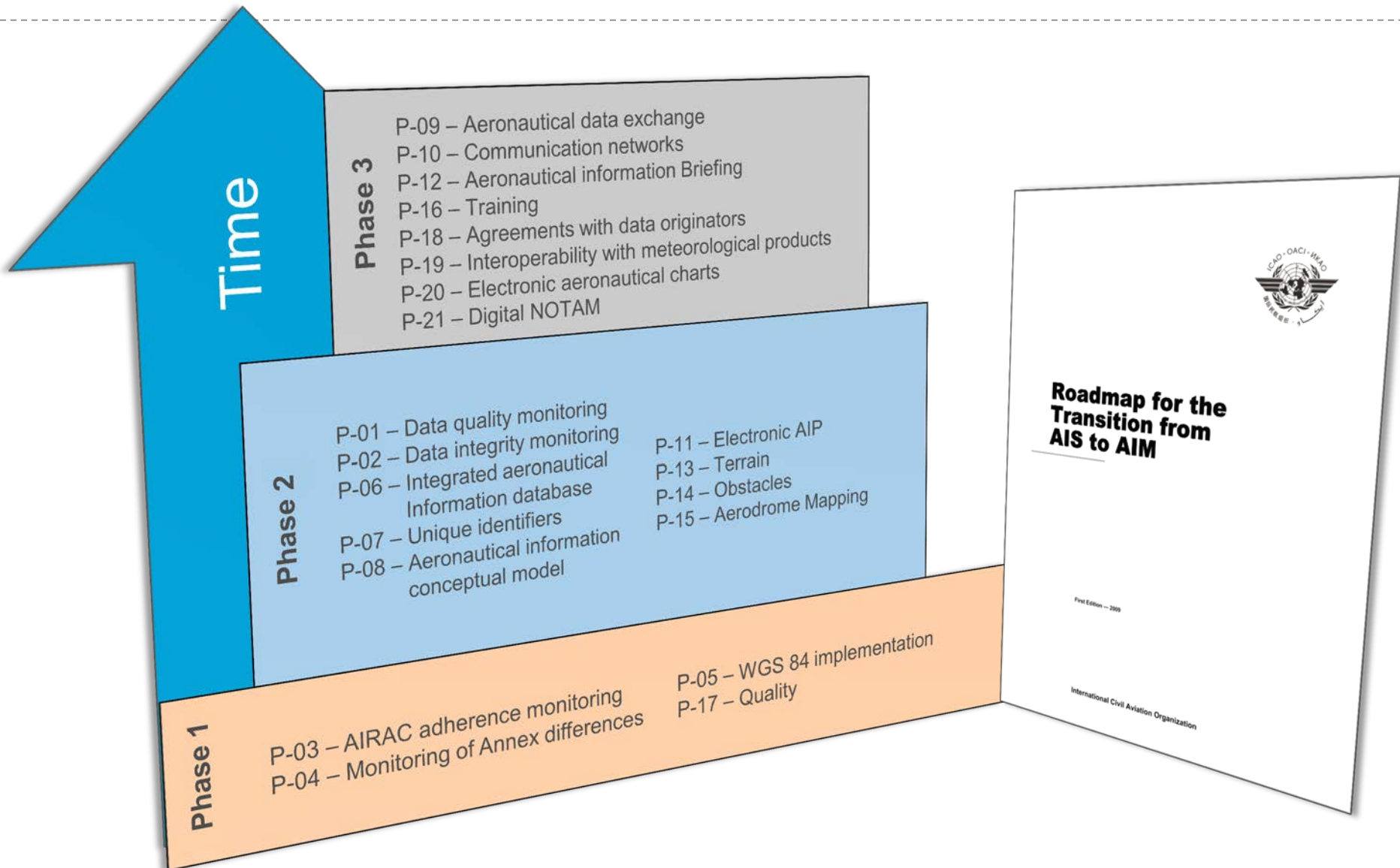


AIM Vision 2008 (COMSOFT)

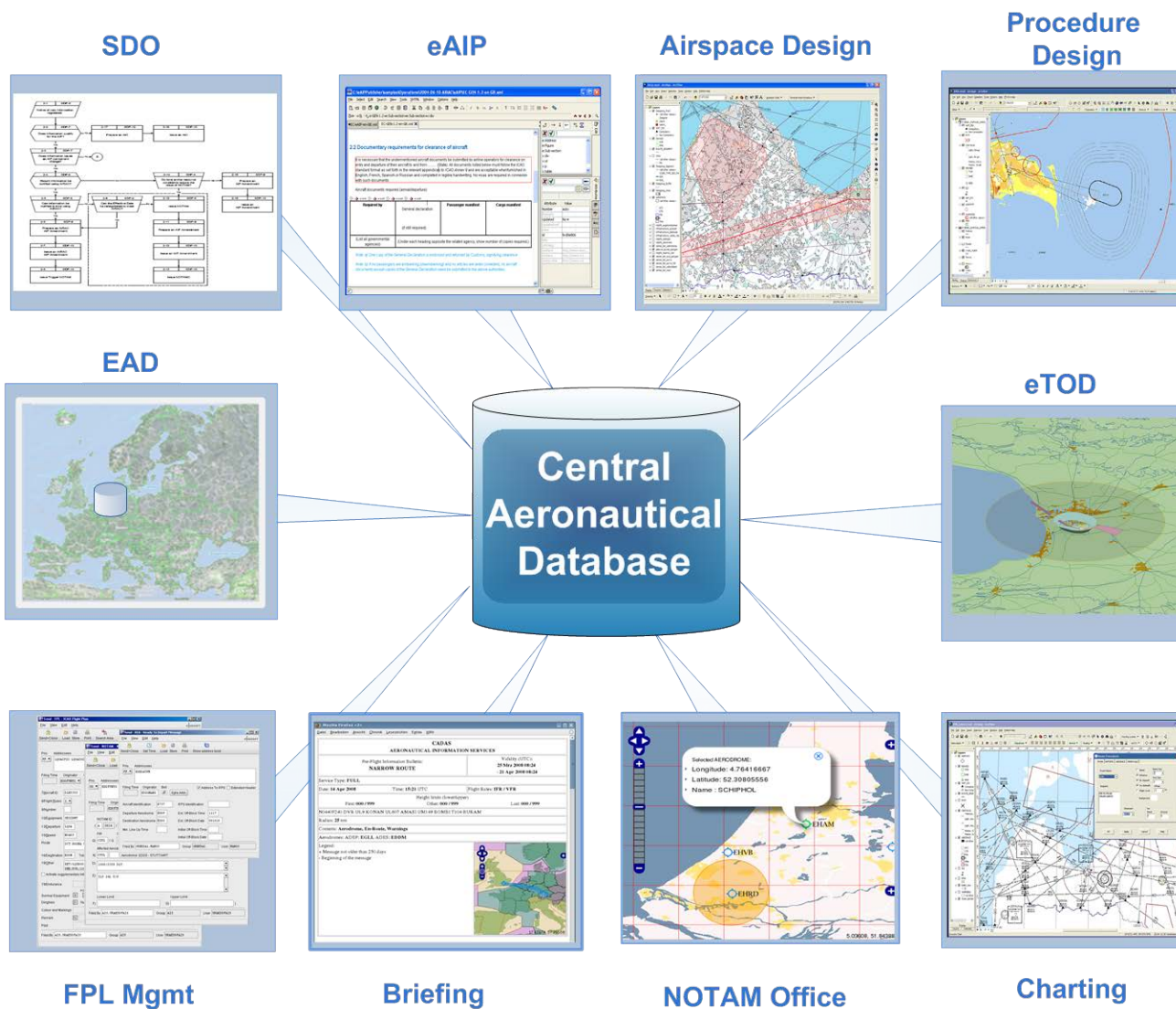
- Interoperability
 - Machine readable content
 - Open and standardised Interfaces
 - Open System Architecture
- Quality Control Process involving Data Originators
- No product centric view. Instead, access to all information in a uniform way.



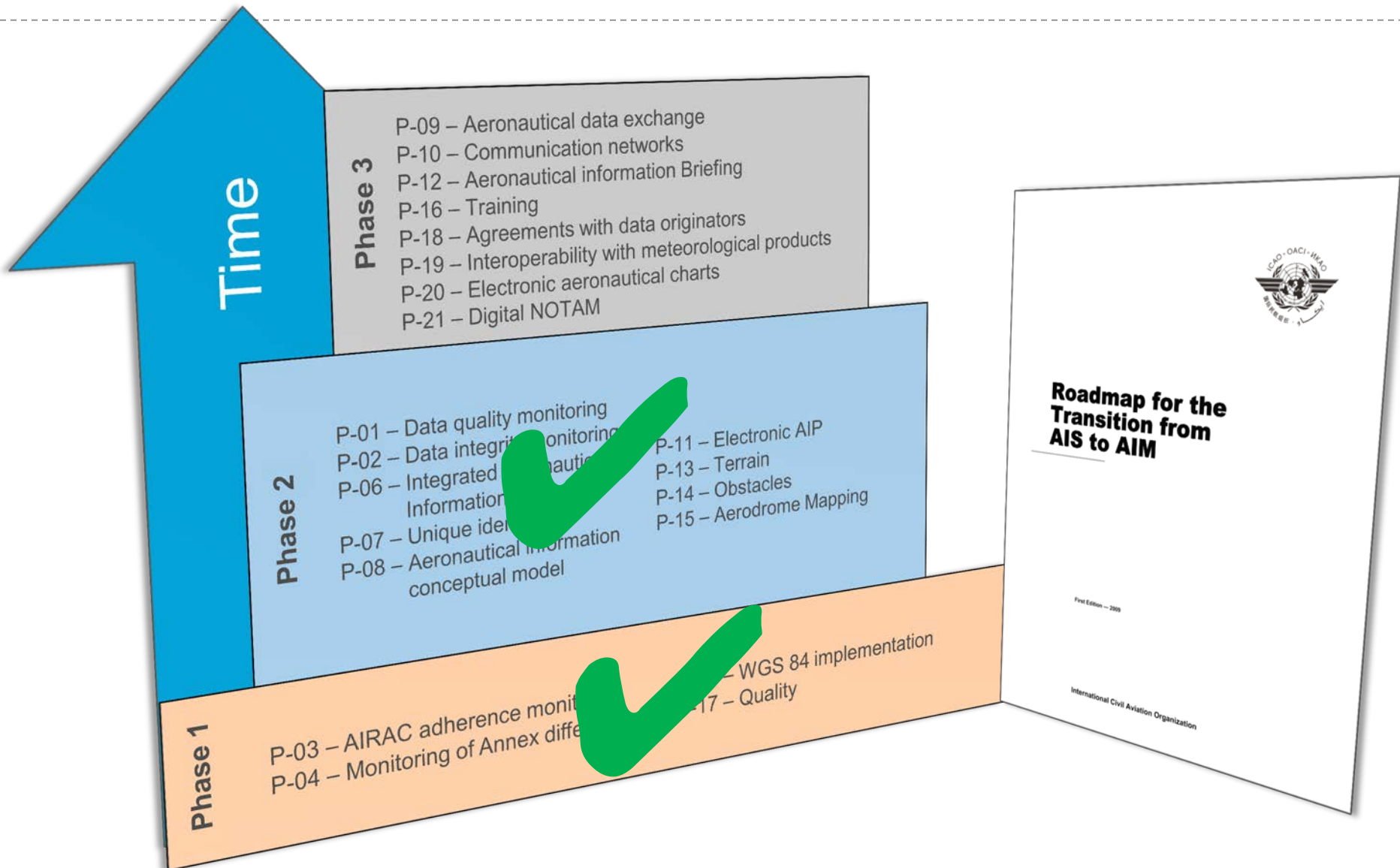
ICAO AIS to AIM Roadmap 2009



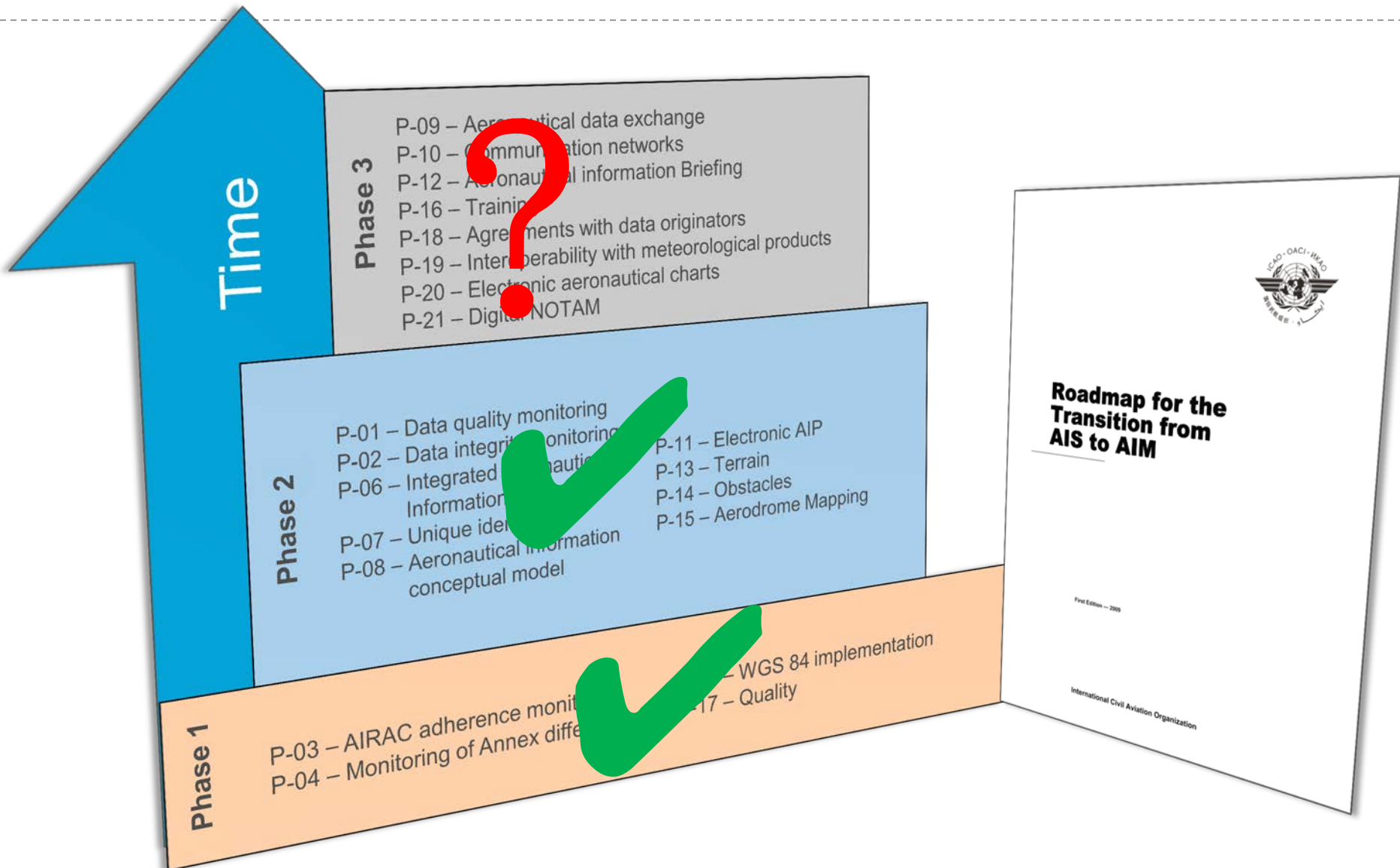
AIM Systems 2015



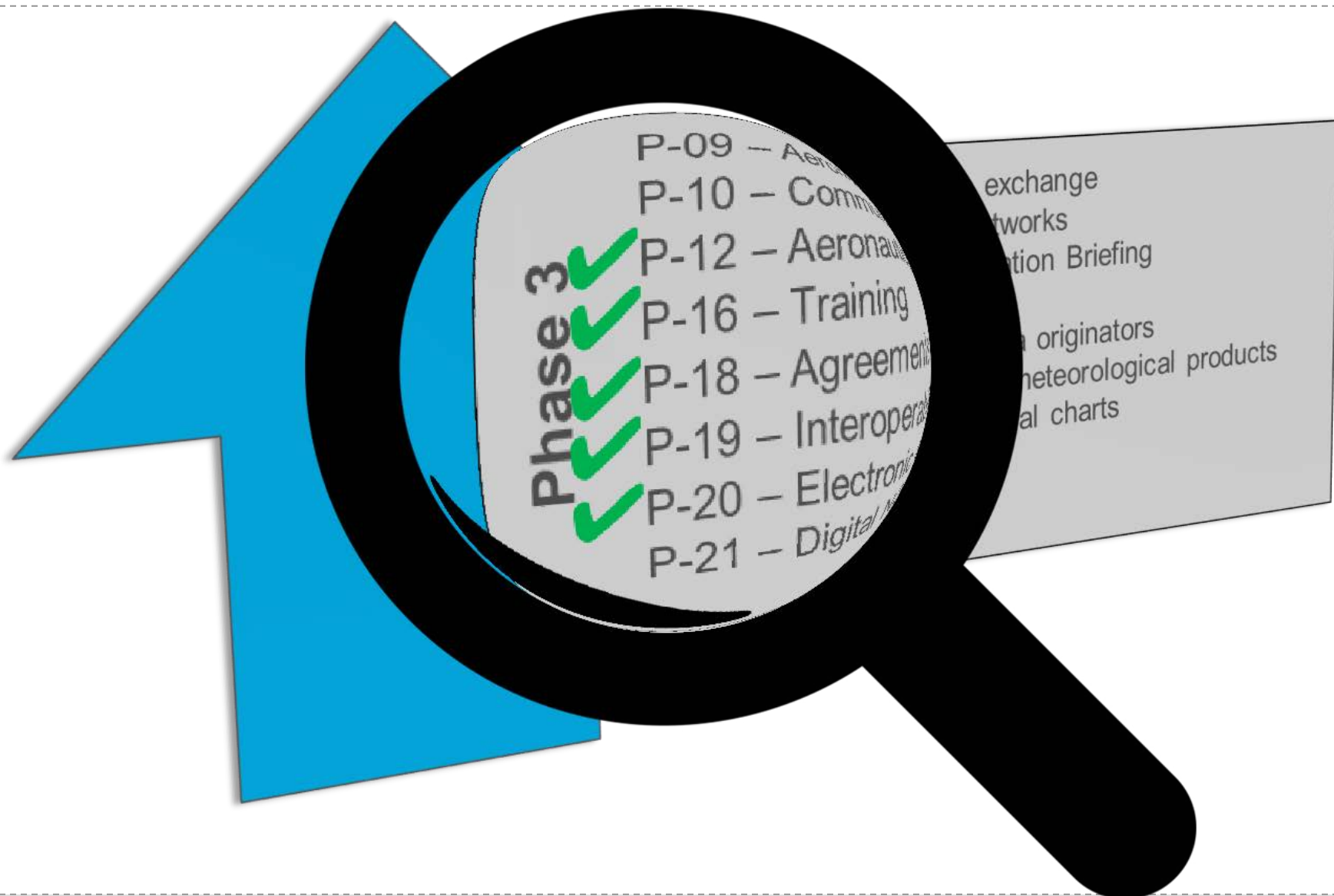
ICAO AIS to AIM Roadmap 2015



ICAO AIS to AIM Roadmap 2015

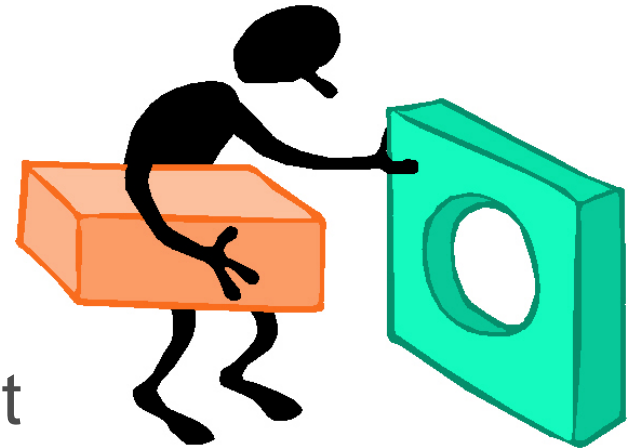


ICAO AIS to AIM Roadmap 2015



AIM Vision 2015

To Solve:
P-09
Aeronautical
Data Exchange



- Open and standardized Interfaces
- Open Standards

- Quality Control Involving Originators

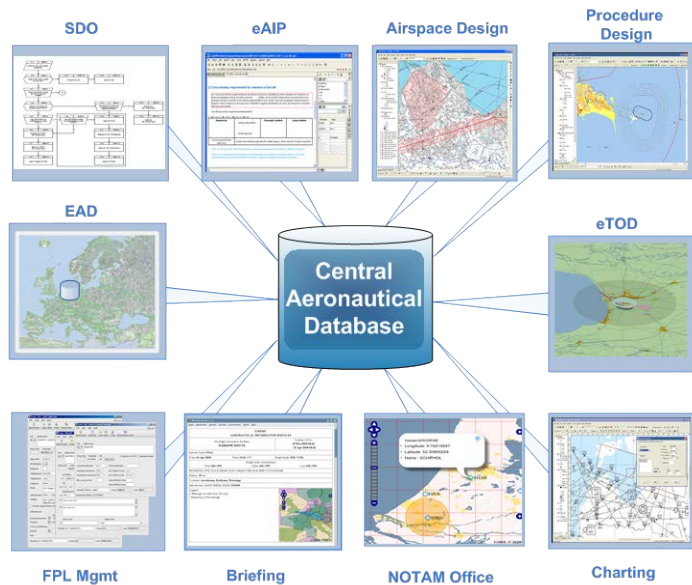
- No product development. Instead, information in a uniform way.

To Solve:
P-10
Communication
Networks

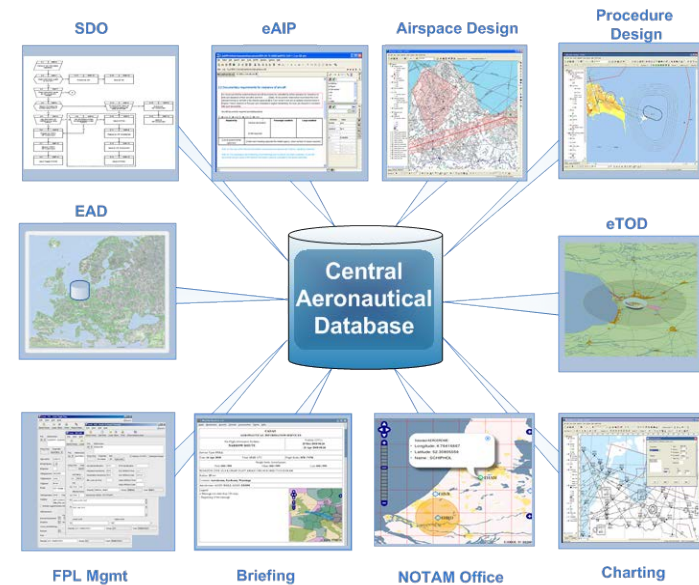
To Solve:
P-21
Digital
NOTAM

P-09 – Aeronautical Data Exchange

System Vendor A

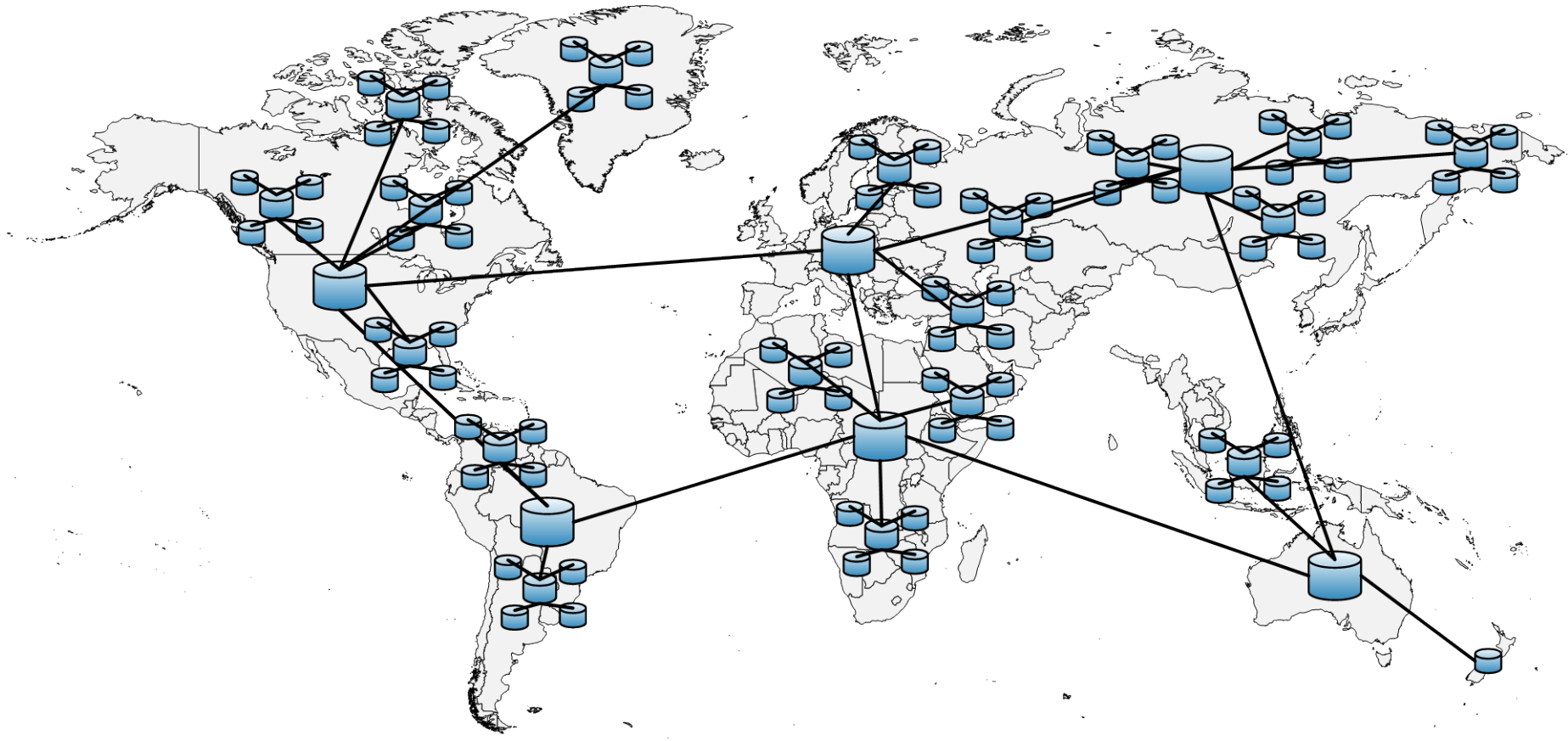


System Vendor B



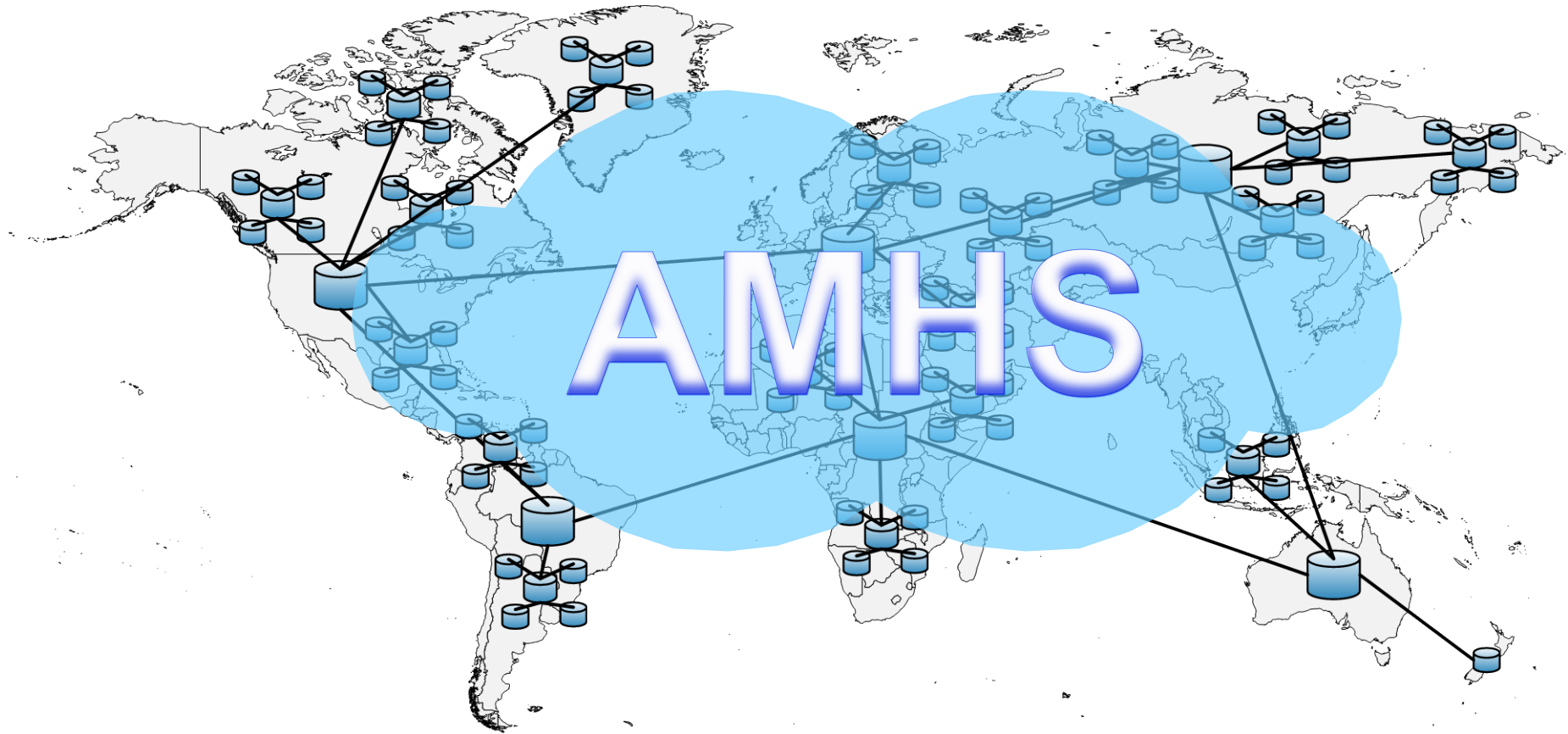
P10 – Communication Networks

A Physical Database Network Structure: Vision
Global AIM 2012 Buenos Aires

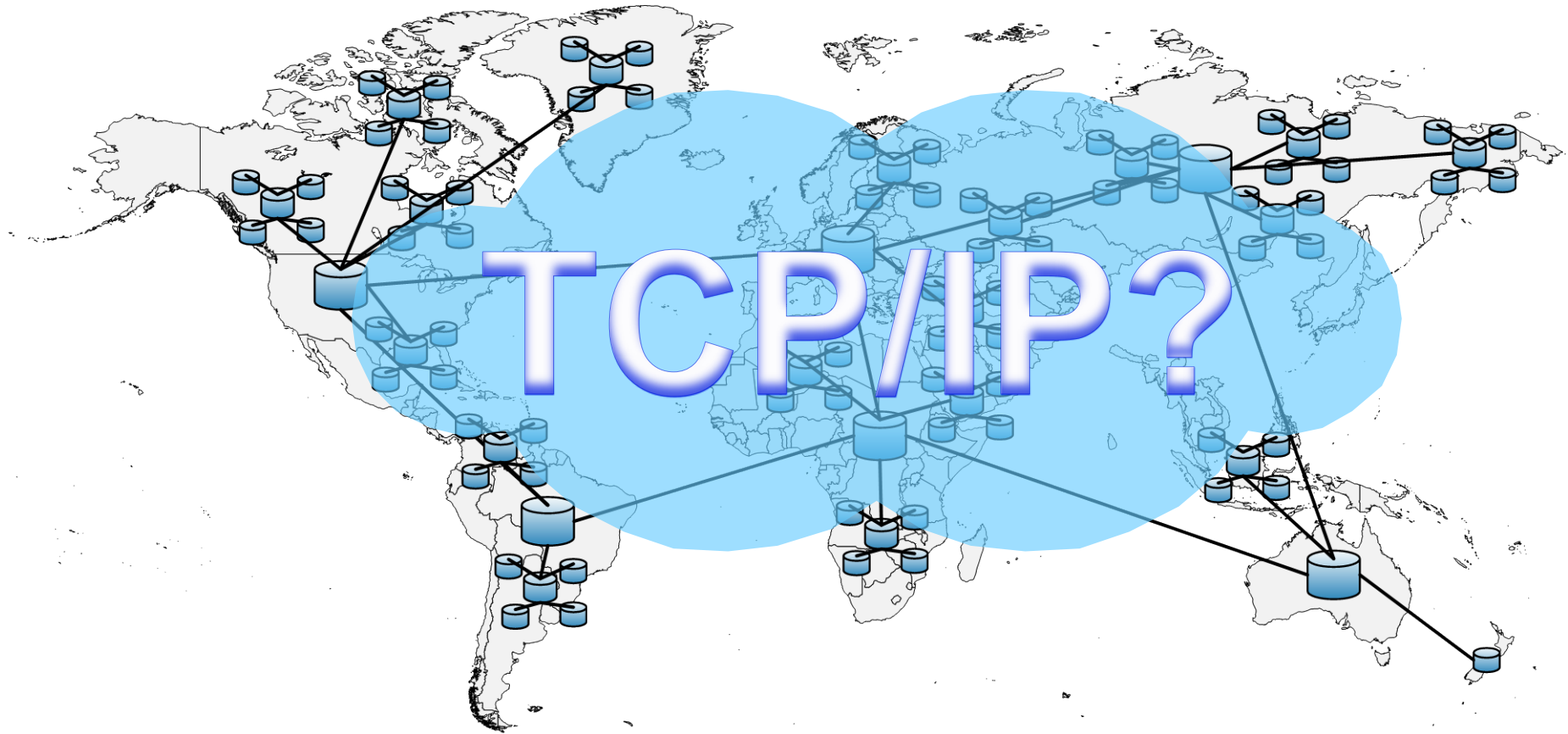


A Physical Database Network Structure: Vision

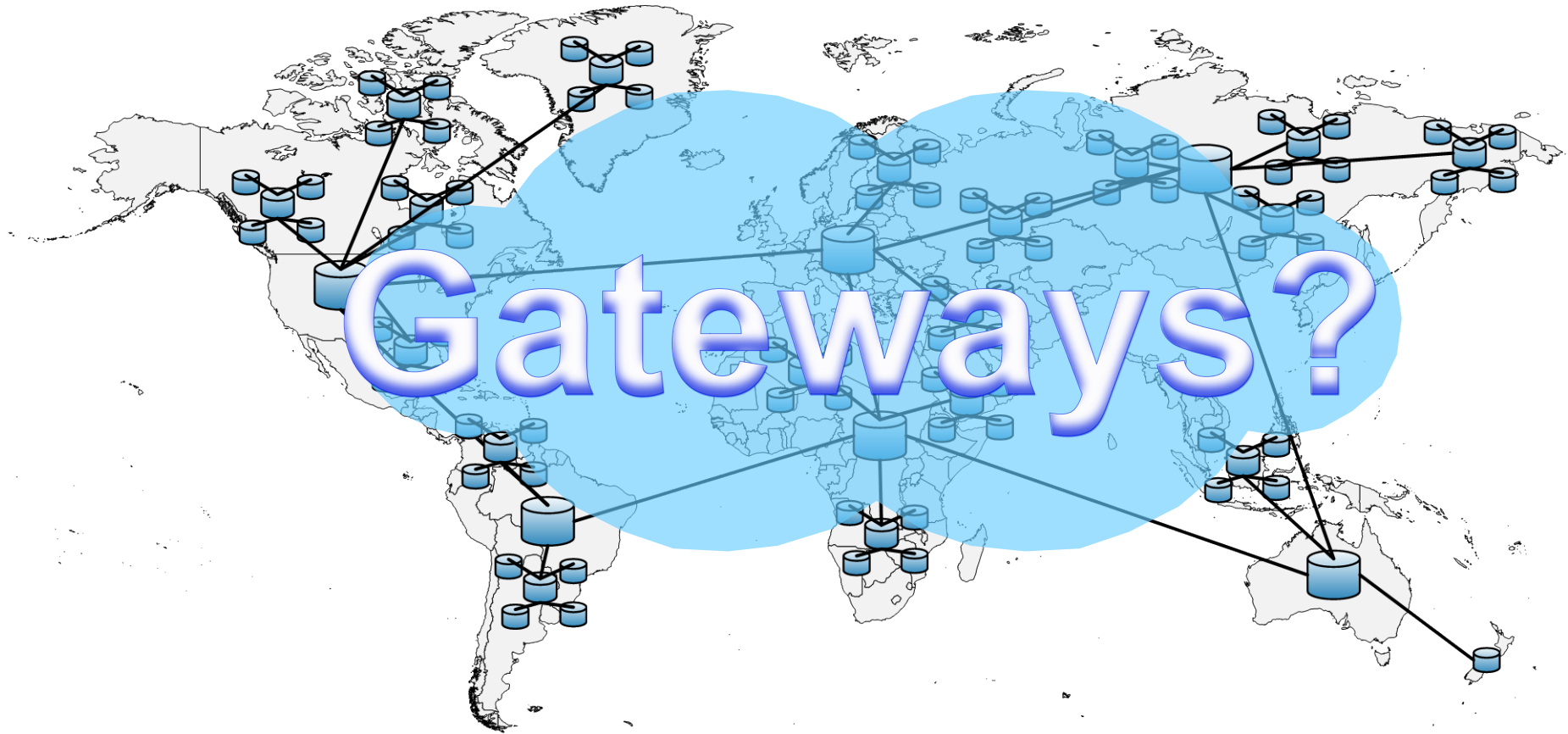
A Physical Database Network Structure: Vision
Global AIM 2012 Buenos Aires



The Physical Database Network Structure



The Physical Database Network Structure

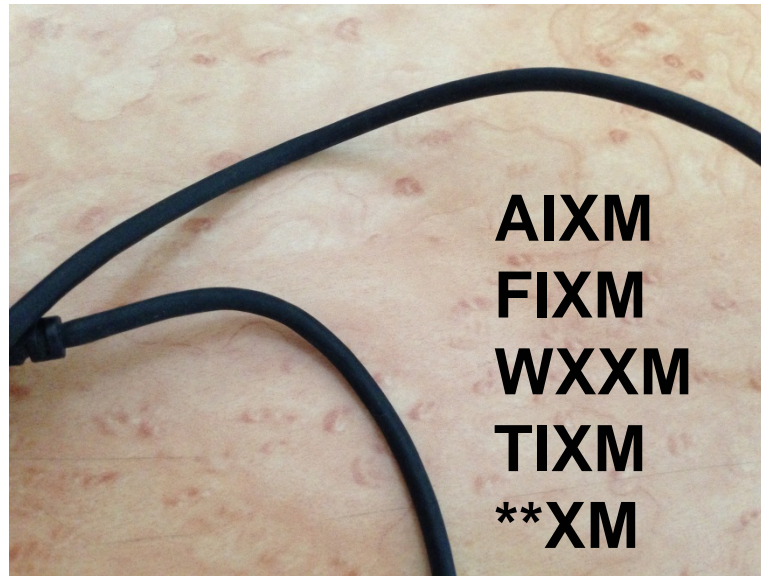


AIM Regulations At A Glance (courtesy of skyguide)

- Annex 3 - Meteorological Service for International Air Navigation
- Annex 4 - Aeronautical Charts
- Annex 10 - Volume II - Aeronautical Telecommunications
- Annex 11 - Air Traffic Services
- Annex 14 - Aerodromes, Volume I - Aerodrome Design and Operations (ADQ requirements)
- Annex 14 - Aerodromes, Volume II - Heliports (ADQ requirements)
- Annex 15 - Aeronautical Information Services
- DOC 4444 - Procedures for Air Navigation Services - Air Traffic Management
- DOC 7030 - Regional Supplementary Procedures
- DOC 7754 - European Region Air Navigation Plan, Volume I, Basic ANP
- DOC 7754 - European Region Air Navigation Plan, Volume II, FASID (Facilities And Services Implementation Document)
- DOC 7910 - Location Indicators
- DOC 8126 - AIS Manual
- DOC 8400 - ICAO Abbreviations and Codes
- DOC 8585 - Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services
- DOC 8643 - Aircraft Type Designators
- DOC 8697 - Aeronautical Chart Manual
- DOC 9082 - ICAO's Policies on Charges for Airports and Air Navigation Services
- DOC 9161 - Manual on Air Navigation Services Economics
- DOC 9377 - Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services
- DOC 9674 - World Geodetic System - 1984 (WGS84) Manual
- DOC 9683 - Human Factors Training Manual
- DOC 9705 - Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN)
- DOC 9713 - International Civil Aviation Vocabulary
- DOC 9750 - Global Air Navigation Plan
- DOC 9855 - Guidelines on the Use of the Public Internet for Aeronautical Applications
- ICAO EUR DOC 005, CIDIN Manual
- ICAO EUR DOC 010, Harmonized Access to AIS and MET Services Relating to Pre-flight Planning
- ICAO EUR DOC 014, European Region SIGMET Guide
- Roadmap for the transition from AIS to AIM
- European ATM Master Plan
- SESAR Master Plan - D5
- EC No 549/2004 laying down the framework for the creation of the single European sky
- EC No 552/2004 on the interoperability of the European Air Traffic Management network
- Commission Implementing Regulation (EU) No 1035/2011 laying down common requirements for the provision of air navigation services
- Guidance Material for Air Navigation Services Provider's compliance with the Common Requirements - Volume I Air Traffic Services Provider and Communication, Navigation and Surveillance Services Provider
- Guidance Material for Air Navigation Services Provider's compliance with the Common Requirements - Volume II Aeronautical Information Services Provider
- EC No 482/2008 establishing a software safety assurance system to be implemented by air navigation service providers and amending Annex II to Regulation (EC) No 2096/2005
- EC Regulation No 691/2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services
- EC No 1033/2006 laying down the requirements on procedures for flight plans in the pre-flight phase for the Single European Sky
- EC No 929/2010 amending Regulation (EC) No 1033/2006 as regards the ICAO provisions referred to in Article 3(1)
- EC No 1794/2006 laying down a common charging scheme for air navigation services
- EC No 1191/2010 amending Regulation (EC) No 1794/2006 laying down a common charging scheme for air navigation services
- EC No 216/2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC
- EC No 690/2009 amending Regulation (EC) No 216/2008 of the European Parliament and the Council on common rules in the field of civil aviation and establishing a European Parliament and the Council on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC
- EC No 1108/2009 of the European Parliament and of the Council of 21 October 2009 amending Regulation (EC) No 216/2008 in the field of aerodromes, air traffic management and air navigation services and repealing Directive 2006/23/EC
- EC Regulation No 73/2010 of 26 January 2010 laying down requirements on the quality of aeronautical data and aeronautical information for the single European sky
- Guidelines supporting the implementation of the regulation on ADQ
- EC No 255/2010 of 25 March 2010 laying down common rules on the air traffic flow management
- AIXM Conceptual Model (AICM)
- AIS Data Process (ADP) chart
- Static Data Procedures (SDP)
- Strategic Guidance in Support of the Execution of the European ATM Master Plan
- Network Operations HANDBOOK & Guides
- ATFCM Operations Users Manual
- IFPS Users Manual
- Common AIS Profiling (CASP)
- EUROCONTROL AIS Training Development Guidelines
- ESSIP
- LSSIP
- EUROCONTROL Report on the SES Legislation Implementation
- Operating Procedures for AIS Dynamic Data (OPADD)
- EUROCONTROL Guidelines for Contingency Planning of Air Navigation Services (including Service Continuity)
- SNOWTAM Harmonisation Guidelines
- Terrain and Obstacle Data Manual
- Guidance for the implementation of safety management in AIS/AIM in the ECAC region
- EUROCONTROL Specification for Data Assurance Levels
- EUROCONTROL Specification for the eAIP
- EUROCONTROL Specification for Aeronautical Information Exchange
- EUROCONTROL Specification for Data Quality Requirements
- EUROCONTROL Specification for the Origination of Aeronautical Data - Volume 1: Compliance Material for Commission Regulation (EU) 73/2010
- EUROCONTROL Specification for the Origination of Aeronautical Data - Volume 2: Guidance Material
- Integrated Briefing High-Level User Requirements Document - AIM/AEP/BRIEF/0021
- Integrated Briefing High-Level Concept Document - AIM/AEP/BRIEF/0024
- Integrated Briefing Technical Concept Document - AIM/AEP/BRIEF/0025
- Integrated Briefing - iPIB Guidelines for Presentation - AIM/AEP/BRIEF/0029
- EUROCONTROL - Centralised Service on European ATM Information Management (EAIMS) - Concept of Operations

SWIM is...

... a cable

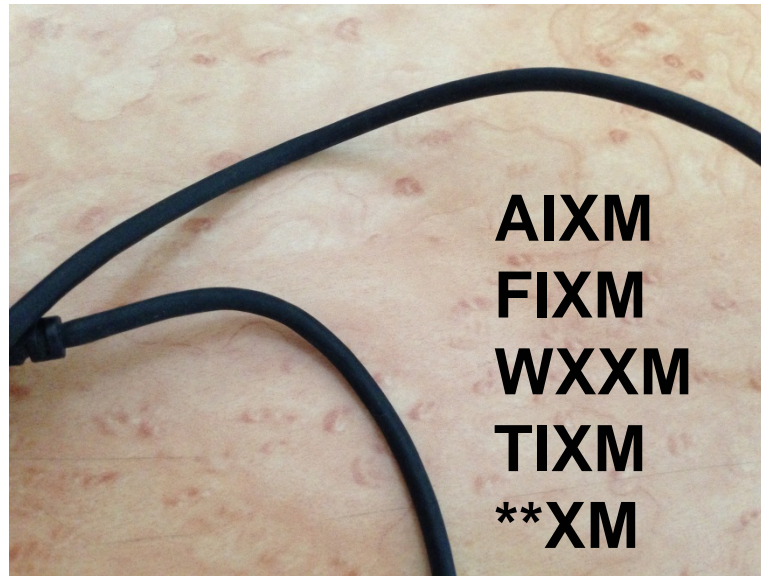


Which Plug?



SWIM is...

... a cable



... and a plug

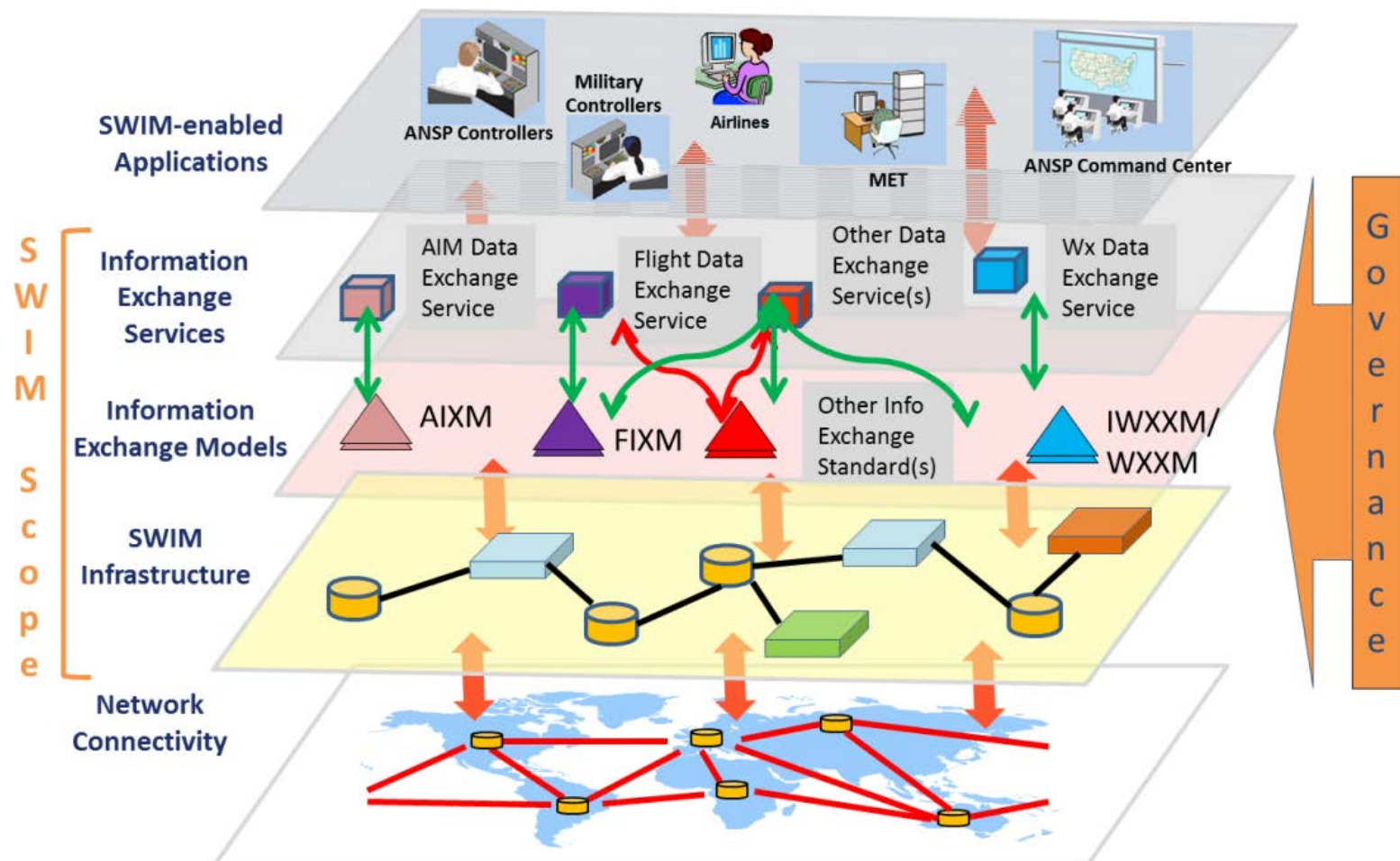


SWIM-Cable HowTo

- Define what comes through
 - AIXM
 - FIXM
 - WXXM
 - TIXM
 - AMXM
 - **XM ...

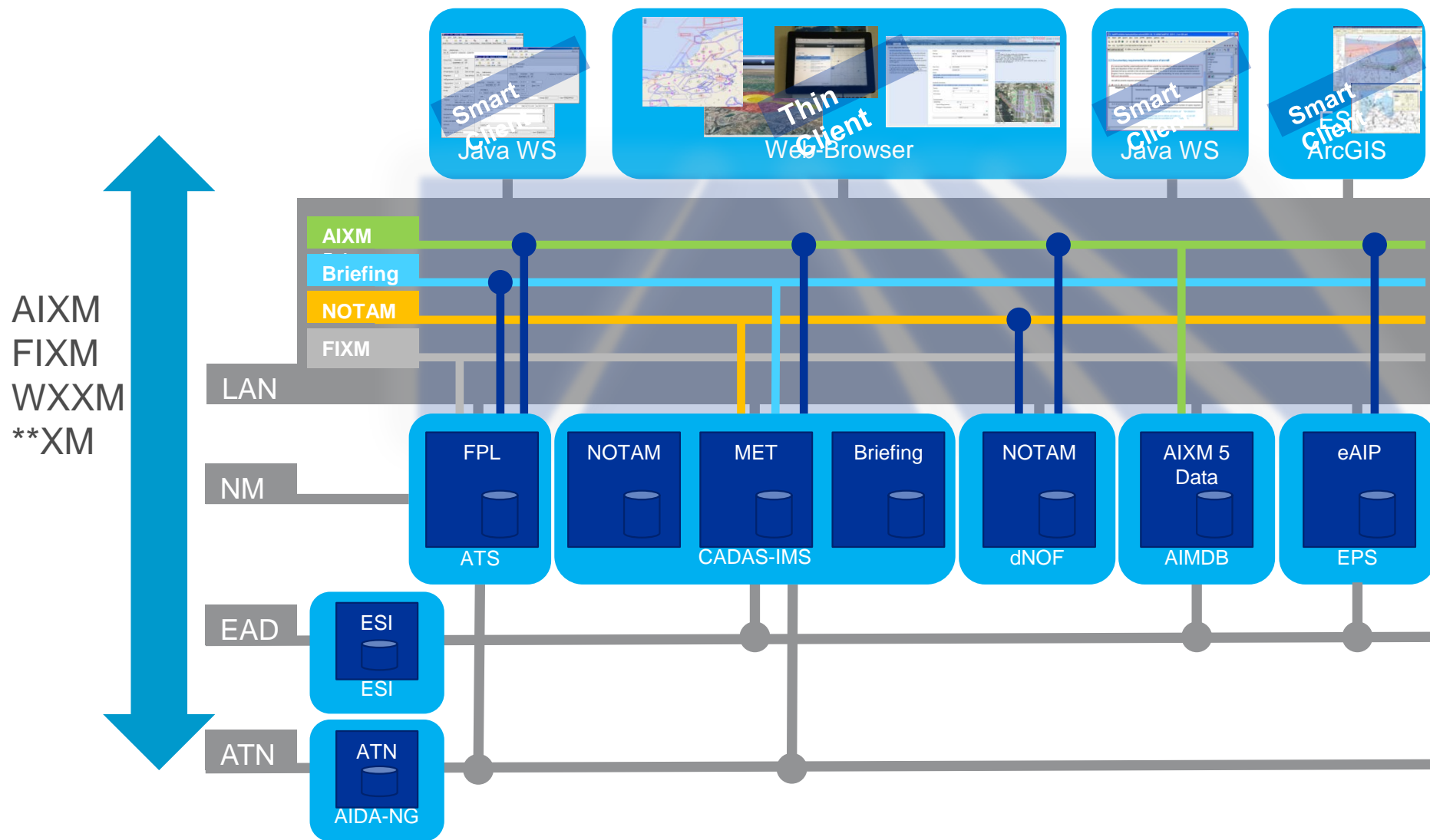
- Define the plug
 - WFS-T 2.0 (Web Feature Service Transactional version 2.0, ISO 19142 and 19143)
 - ISRM (Information Service Reference Model)
 - ...

SWIM Global Interoperability Framework



Source: ICAO

SWIM/SOA Concept



OWS Interoperability Research Project

- Main focus on

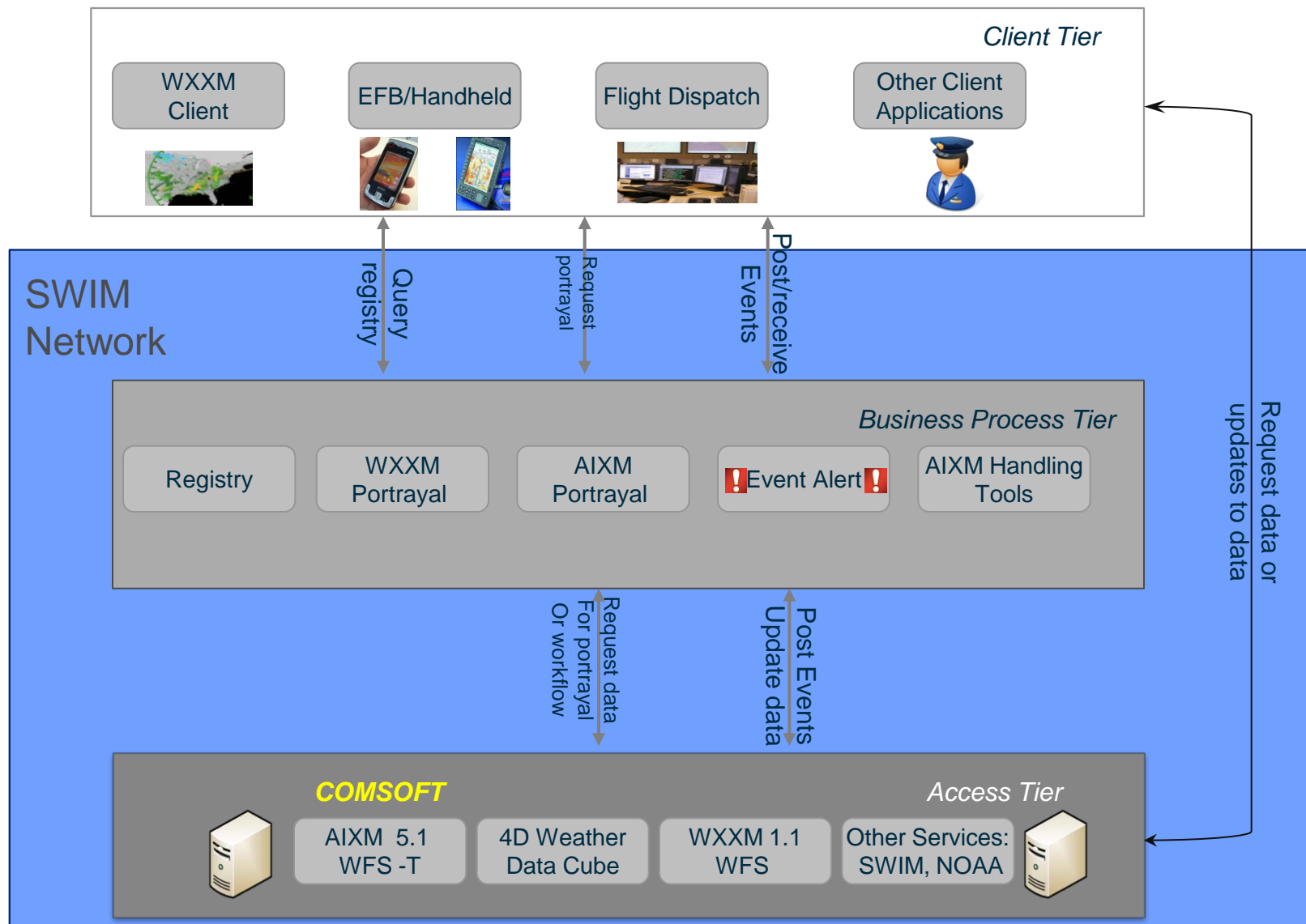
Interoperability
Open Standards
SWIM compliance



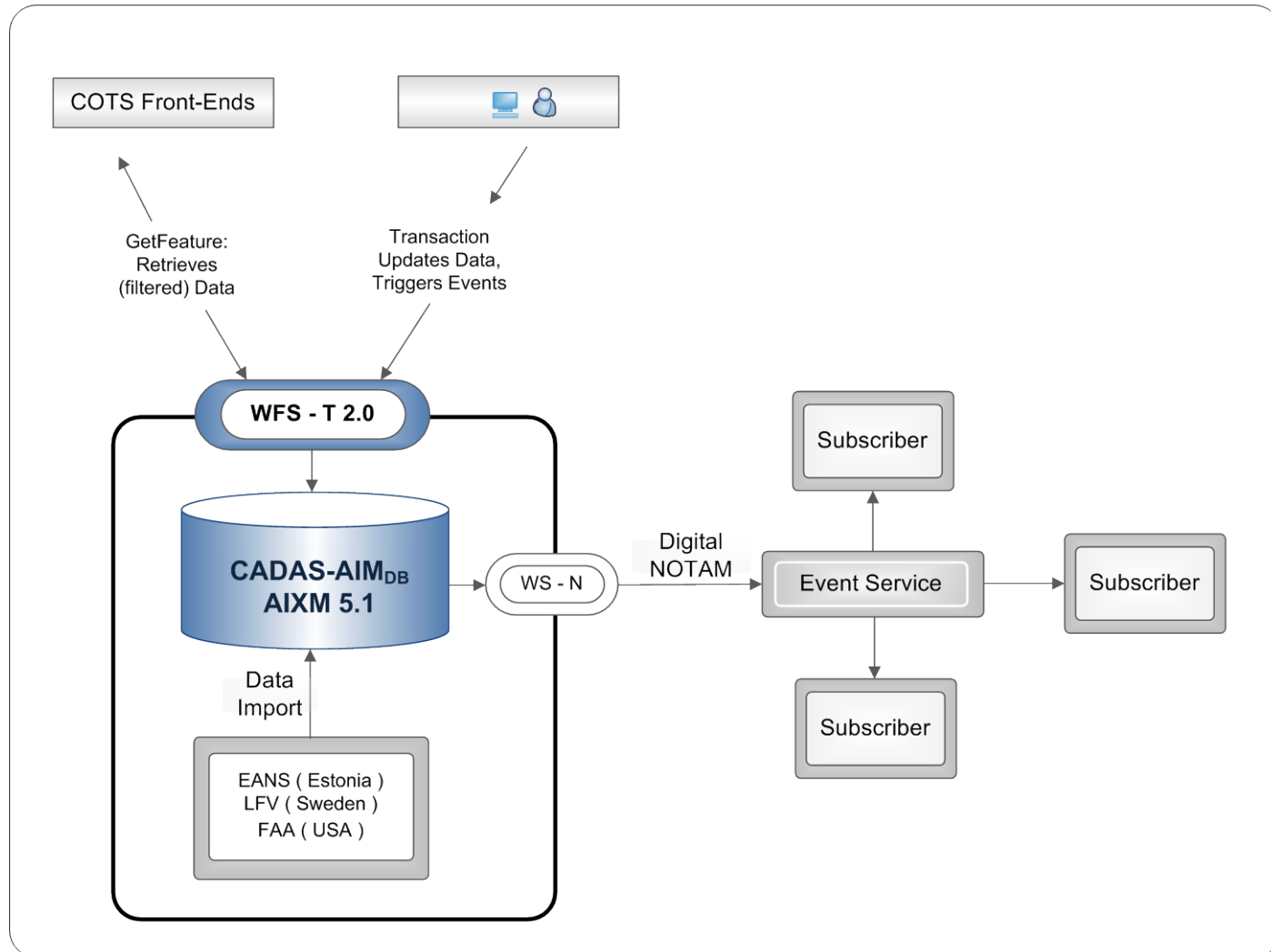
- Sponsored by EUROCONTROL and FAA
- Coordinated by OGC



OWS-7/8/9/10 Architecture



SWIM Interfaces: OWS Interoperability Research Projects



OGC/OWS-8: WFS-T 2.0 Temporality Extension

Discussion Paper: Use Case Oriented Approach to Time Slice retrieval with WFS 2.0: Temporality Extensions, i.e. client side temporal queries

OGC 12-027

Open Geospatial Consortium Inc.

Date: 2012-03-01

Reference number of this OGC® project document: **OGC 12-027**

Version: 0.1

Category: OGC® Discussion Paper

Editor: **Timo Thomas**

WFS Temporality Extension

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Document type: OGC® Discussion Paper
Document subtype: NA
Document stage: Draft
Document language: English

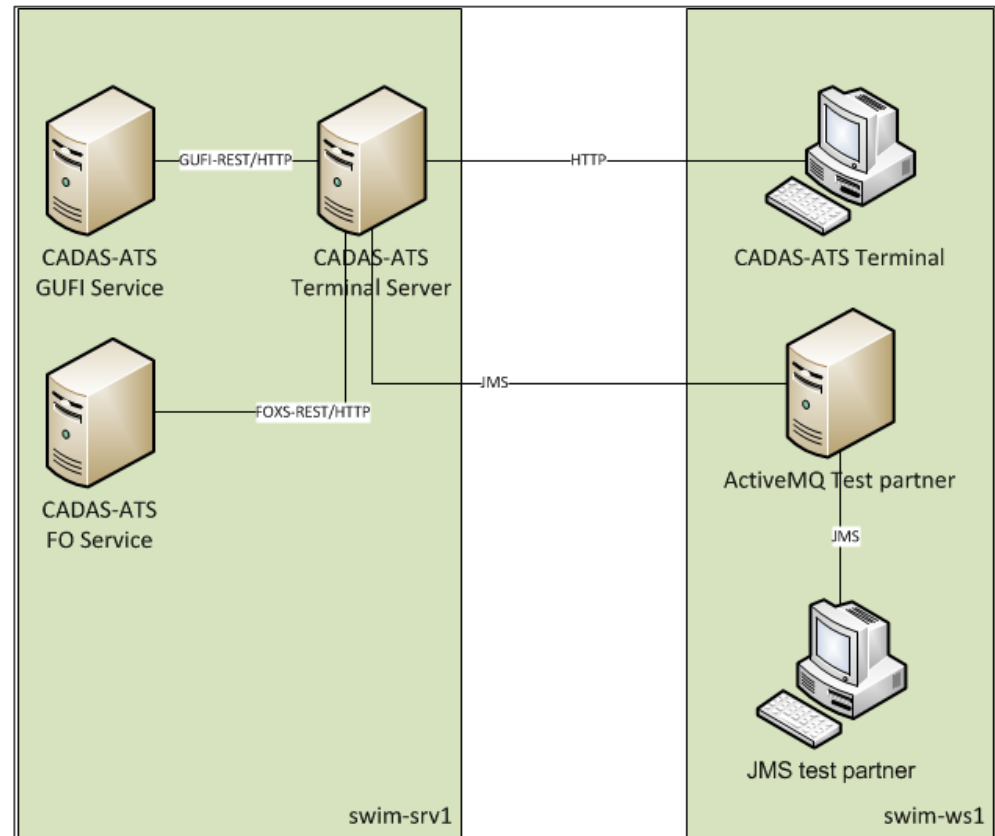
When Do We SWIM?



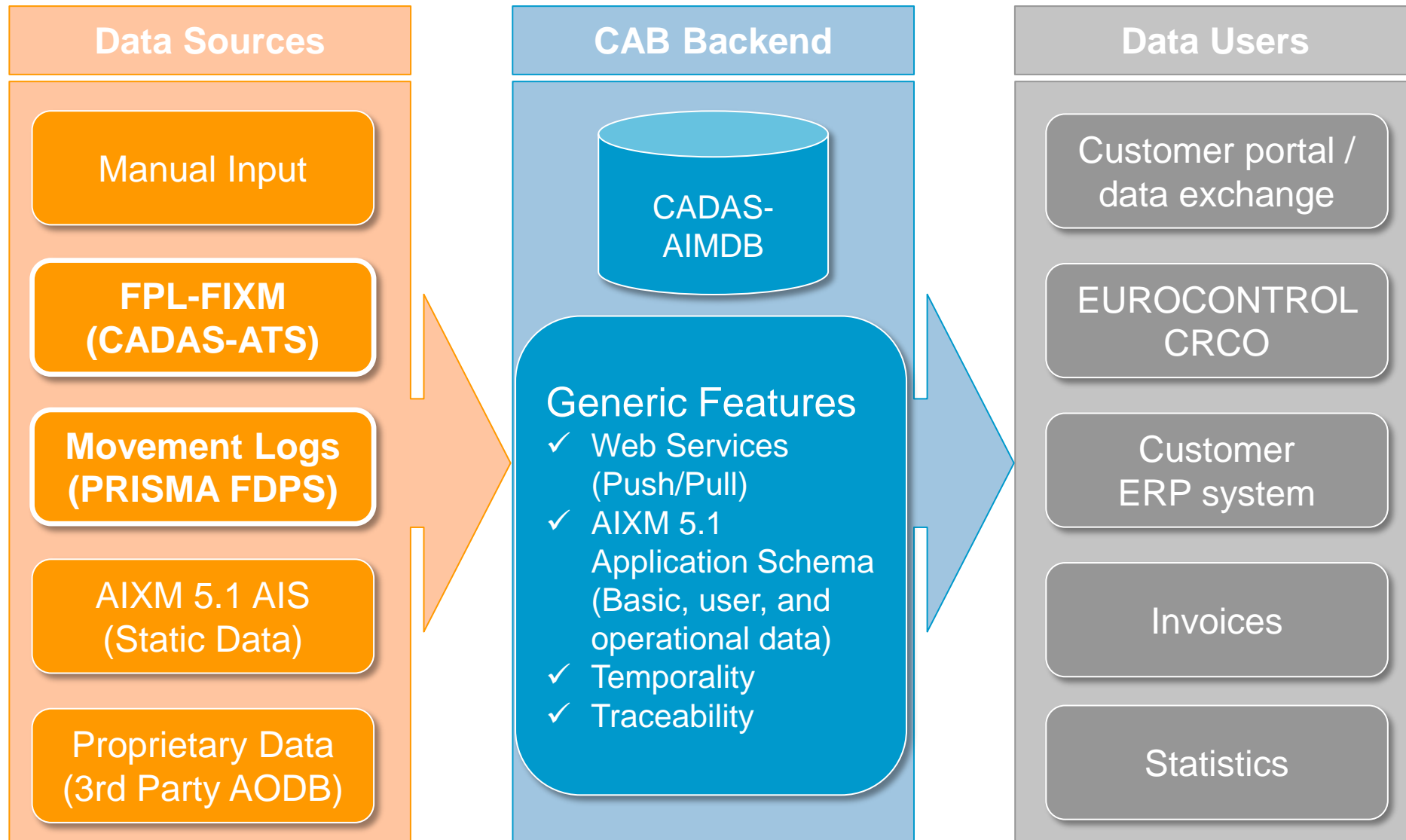
http://www.flickr.com/photos/anachronism_uk/280453752

FIXM – CADAS-ATS with FIXM 2.0 in a SWIM Environment

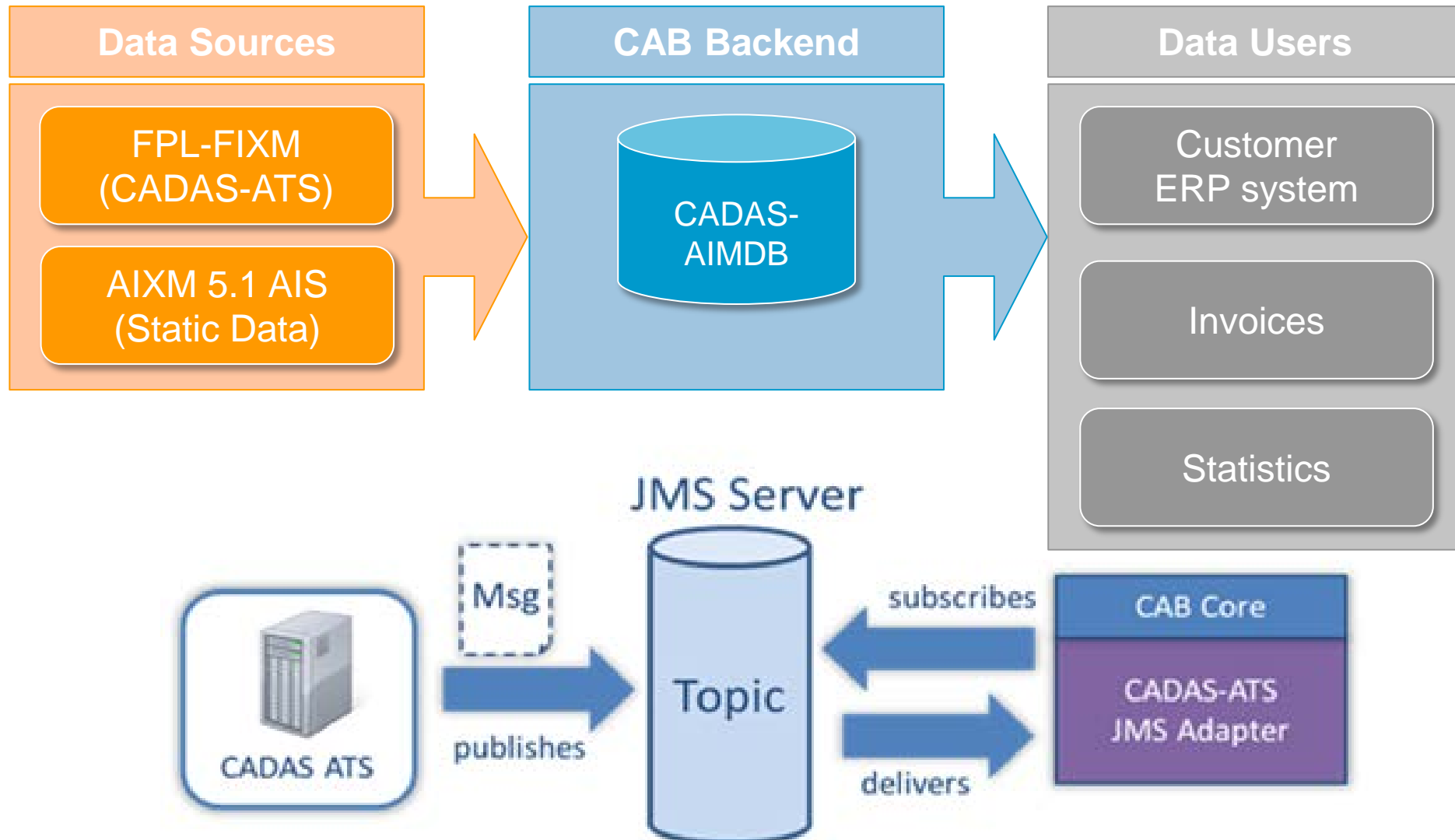
- Issuing of FIXM 2.0 messages in a SWIM environment
- Reception of FIXM 2.0 messages from the SWIM network
- Data Exchange with GUF I service
- Integrated FO server



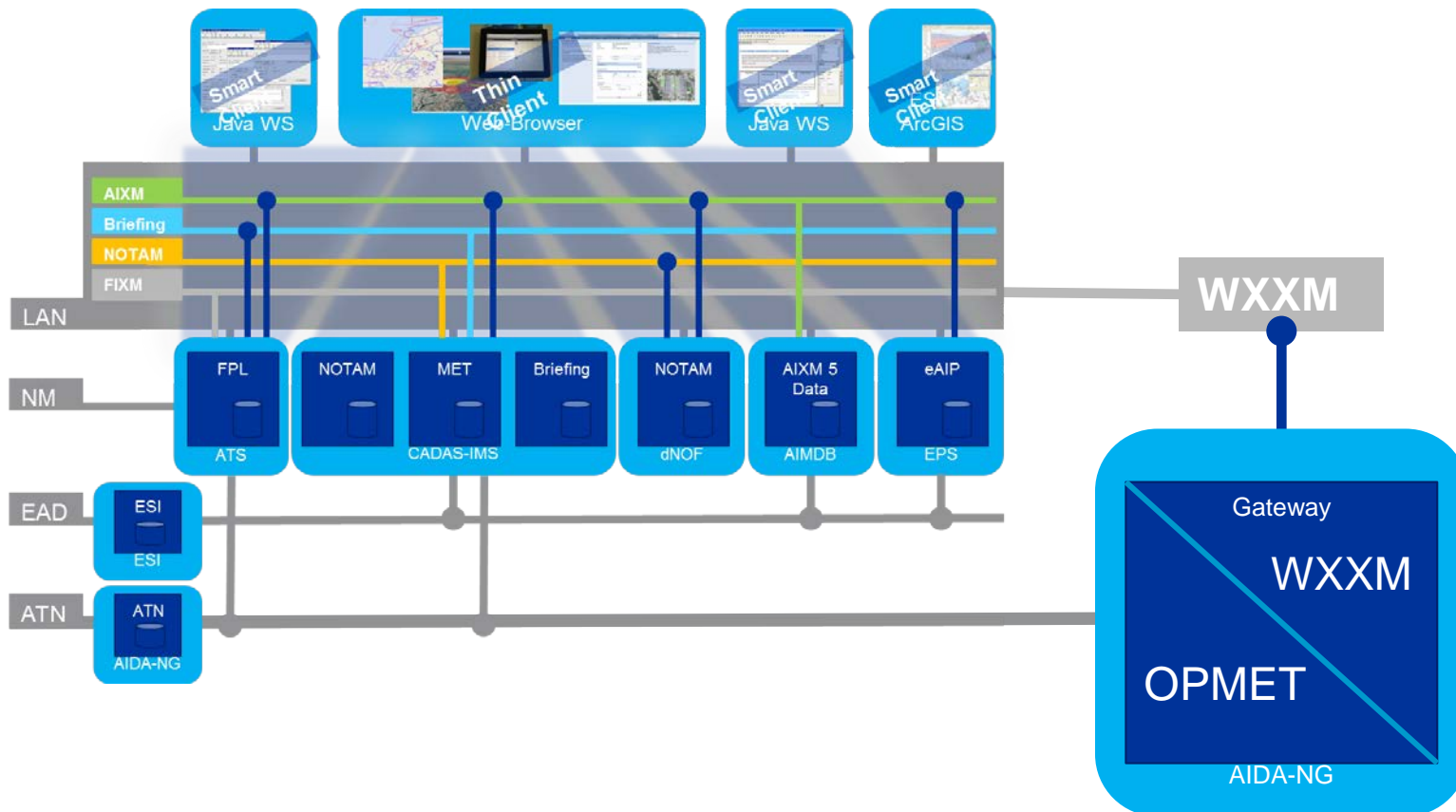
FIXM – Interface to Aeronautical Billing



FIXM – Interface to Aeronautical Billing



WXXM - Gateway



WXXM – Future Applications? – CADAS-IMS SIGWX

- Automated processing
- Automatic rendering

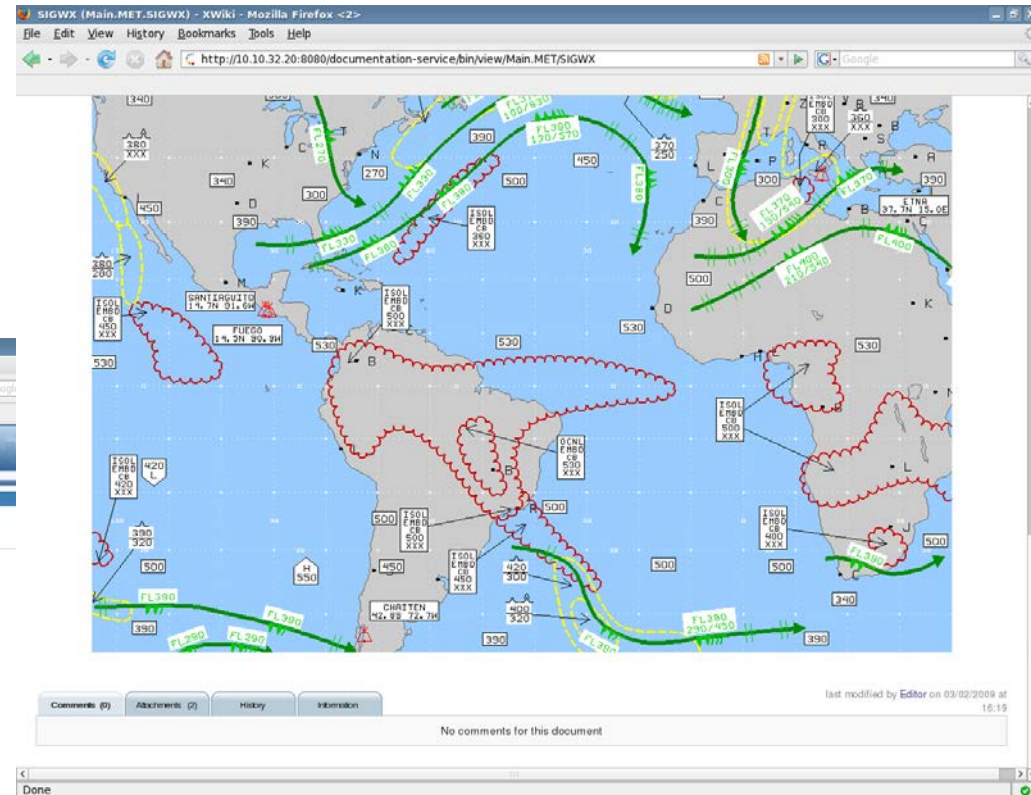
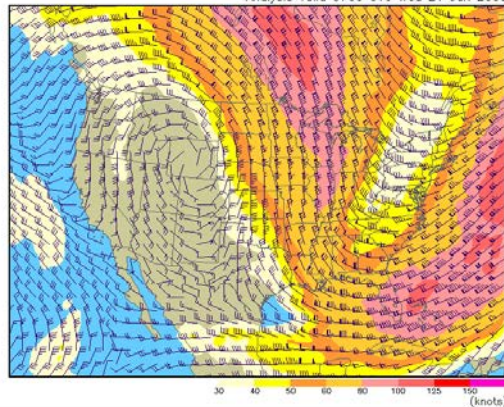


Wind Speed

0700 UTC

Wind speed (kts) at 48,000 ft MSL (125 mb)

Analysis valid 0700 UTC Wed 21 Jan 2009



last modified by Editor on 03/02/2009 at 16:19

No comments for this document

Done

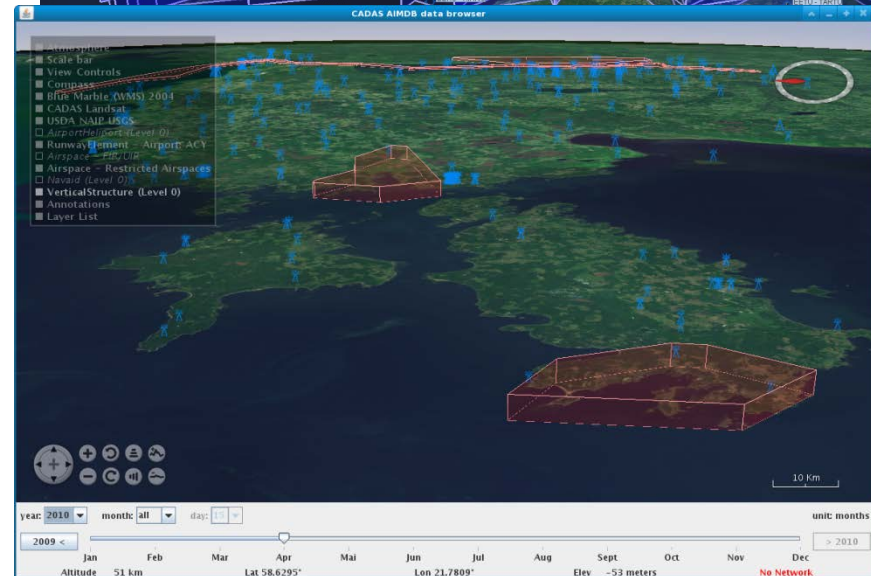
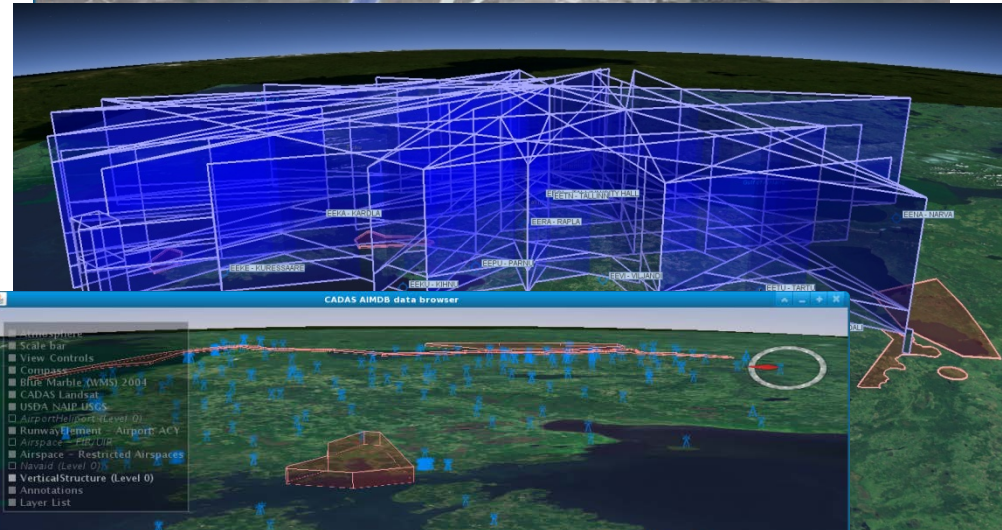
SWIM-Enabled Applications – CAD vs GIS

■ CAD

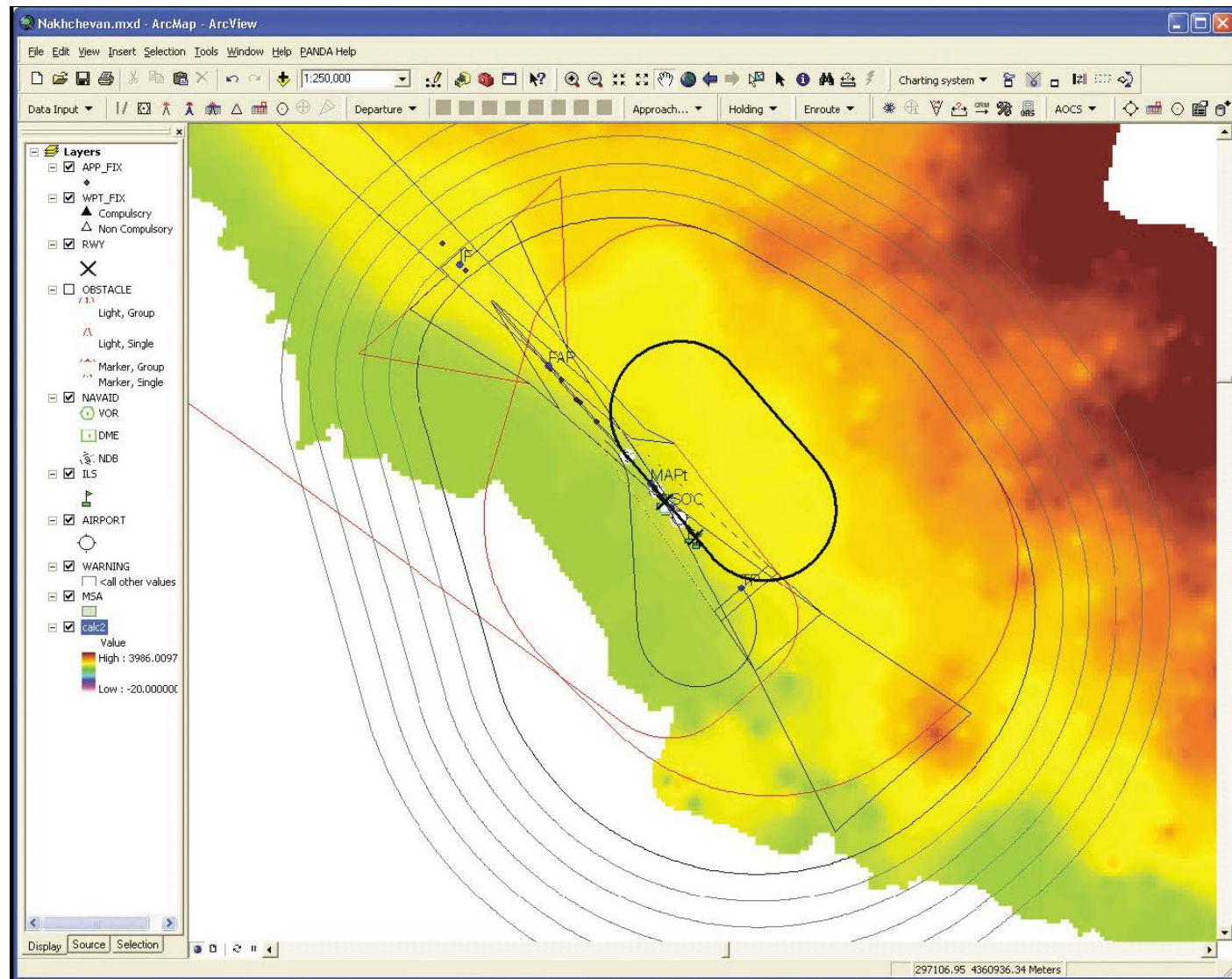
- Is a graphics program
- Lines and shapes are important
- Supports 2D and 3D
- Uses SQL
- Is deprecated

■ GIS

- Is a database program
- The data behind the lines is important (data-driven)
- Supports 2D and 3D
- Uses Web Services
- AIXM 5 is a GIS format (GML)
- Is recommended by EUROCONTROL and FAA SWIM activity
- Is the future

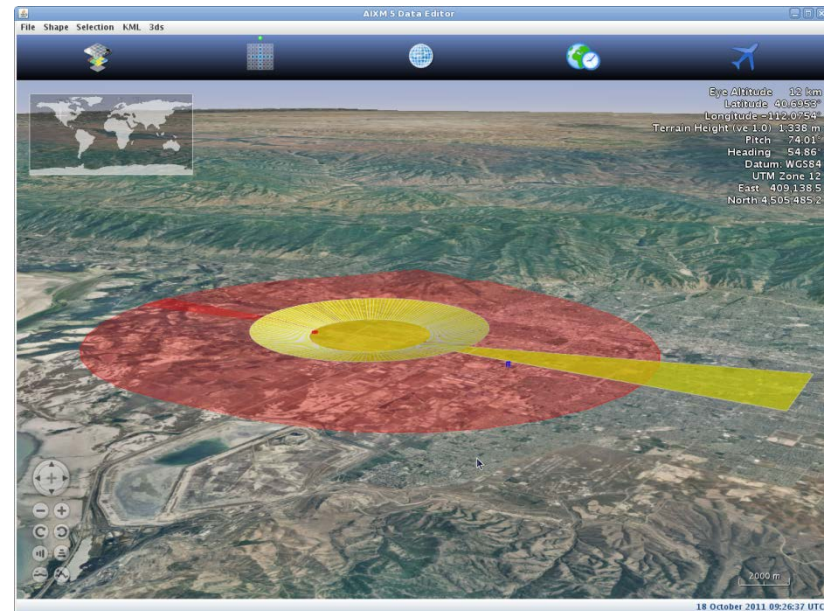


SWIM-Enabled Applications – Procedure Design (Approach)



SWIM-Enabled Applications – eTOD/Obstacle Management

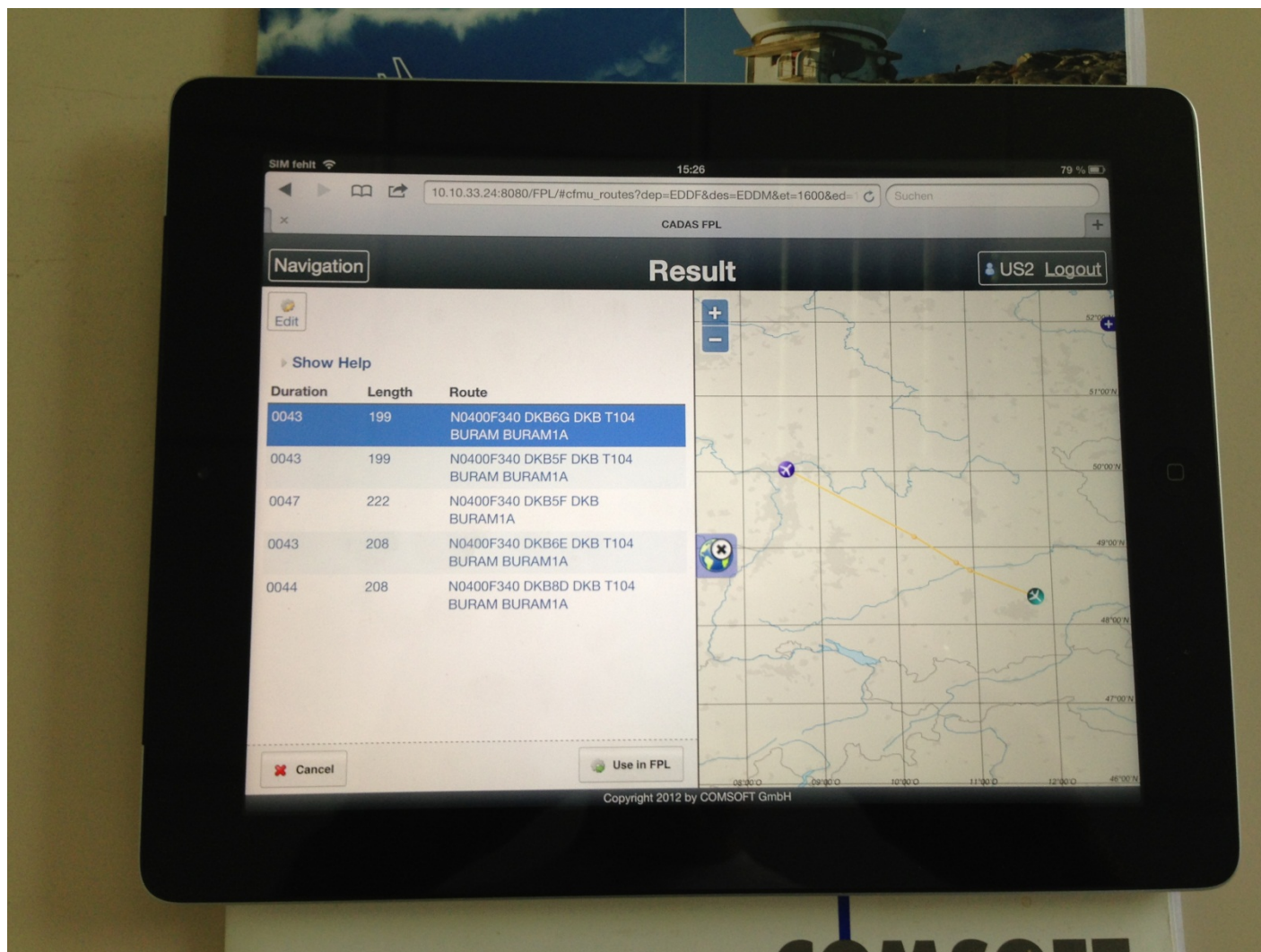
- Use-case oriented input forms for AIXM5
 - Input and editing of electronic obstacle data
 - Checking via Business Rules Framework
 - Integration into Business Workflows
- Publishing via the well-established tool-chain comprising CADAS-EPS
- Complemented with an elaborate 3D viewer for verification



SWIM-Enabled Applications – CADAS-ATS Route Planning



SWIM-Enabled Applications – CADAS-ATS CFMU B2B Interface



P21 – Digital NOTAM

CADAS IMS Information Management & Services

Home Create Retrieve Bulletins Operator's Queue Briefing Data Administration Administration Quick Briefing Documentation Service

Number of items in the operator's queue: 6 (0) EAD: No connection!
 Number of proposals: 0 AFTN: No connection! CADASIMS 10.10.32.231
 You have new items in the queue
 Number of items in the ESI queue: 1 System time (UTC): 11:17:21 28.05.2012

Create Digital NOTAM Event

Excepted Operation Characteristics

The t

Operational Concept?

Airport: DFW - DALLAS/FORT WORTH INTL

Runway: 13R/31L

Closure reason: DUE TO DIGITAL NOTAM DEMO

Start time: 1205290000

End time: 1205291530 EST

Notes

DISCLAIMER: FOR USE IN PRESENTATION ONLY
 FOR GLOBAL AIM

Accepted operations

TAXIING ACFT WITH WINGSPAN EQUAL OR SMALLER THAN 12 M FOR 20 MINUTES

Except: TAXIING

PPR time: 2 MIN

PPR details

Characteristics

WINGSPAN: 12

Unit of Measurement: M

Wingspan interpretation: AT_OR_BELOW

publish

ICAO Text NOTAM Preview

NOTAMN
 Q) EETT/QMRLC/IV/NBO/A/000/999/3254N09702W005
 A) DFXB B) 1205290000 C) 1205291530 EST
 E) RWY 13R/31L CLOSED DUE TO DIGITAL NOTAM DEMO
 DISCLAIMER: FOR USE IN PRESENTATION ONLY
 FOR GLOBAL AIM EXCEPT FOR TAXIING ACFT WITH WINGSPAN EQUAL OR SMALLER
 THAN 12 M PPR 20 MINUTES

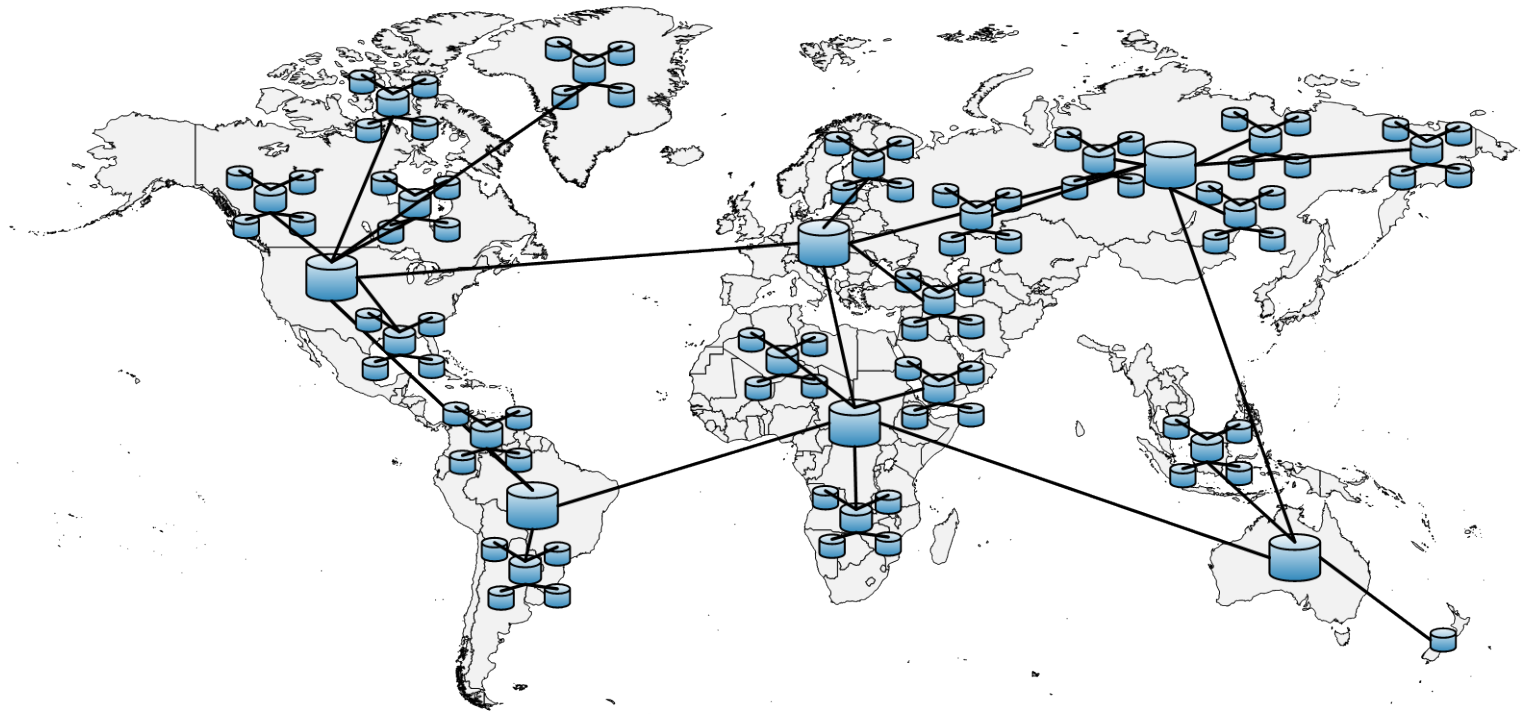
3D AIXM Viewer

Altitude 8 km Off Globe No Network

Prototype 2011

P21 – Digital NOTAM Concept of Operation

1. Worldwide AIXM 5.1 Static Data Exchange
2. Worldwide Digital NOTAM Data Exchange



AIM Unchained! (COMSOFT Roadmap)

- 2015/16 -

AIXM 5.1
Interoperability
Trials

- 2016 -

WFS-T 2.0

- 2016 -

Digital
NOTAM



THANK YOU

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COMSOFT
is making the link