The D-AIM Project and Trials

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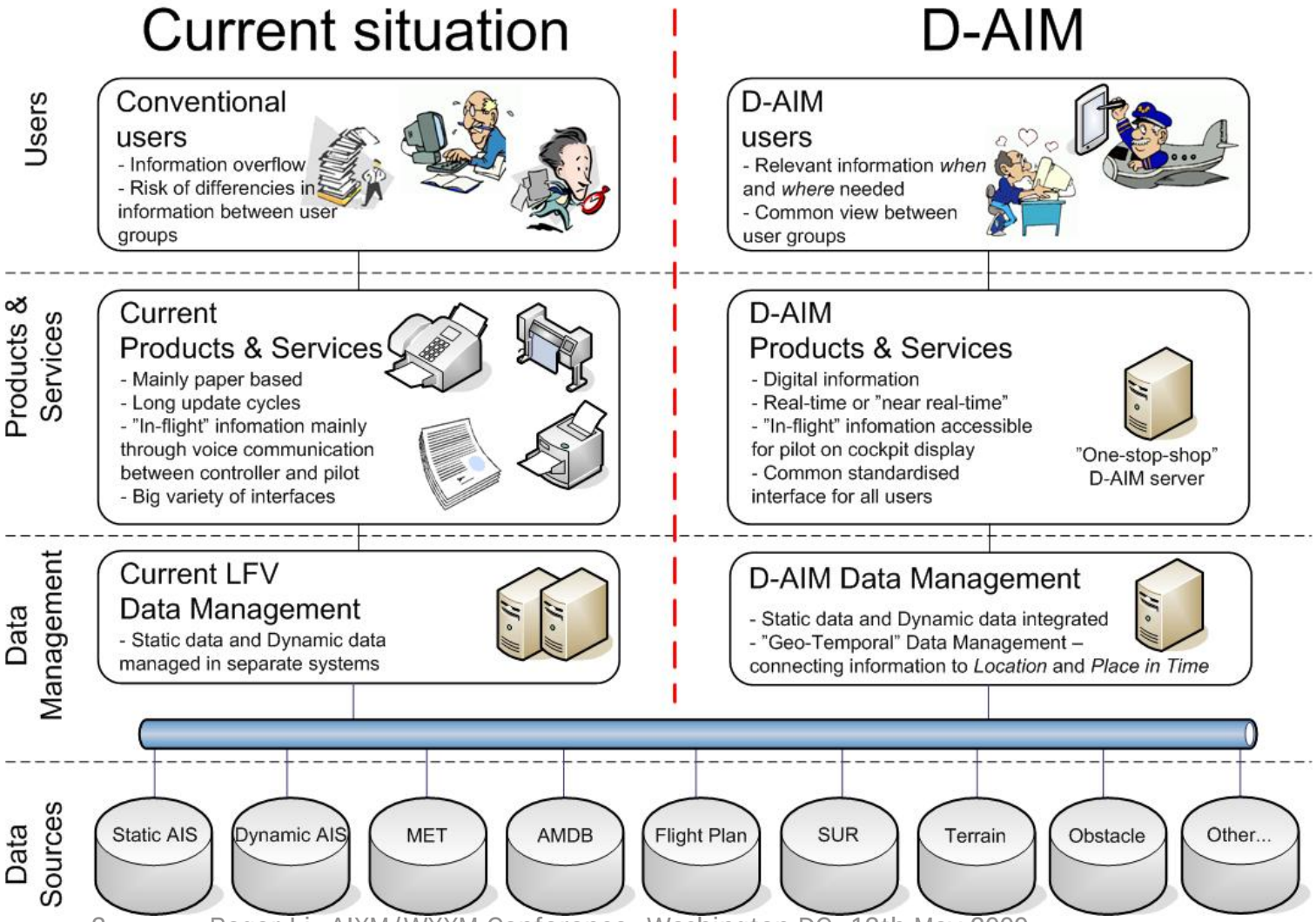
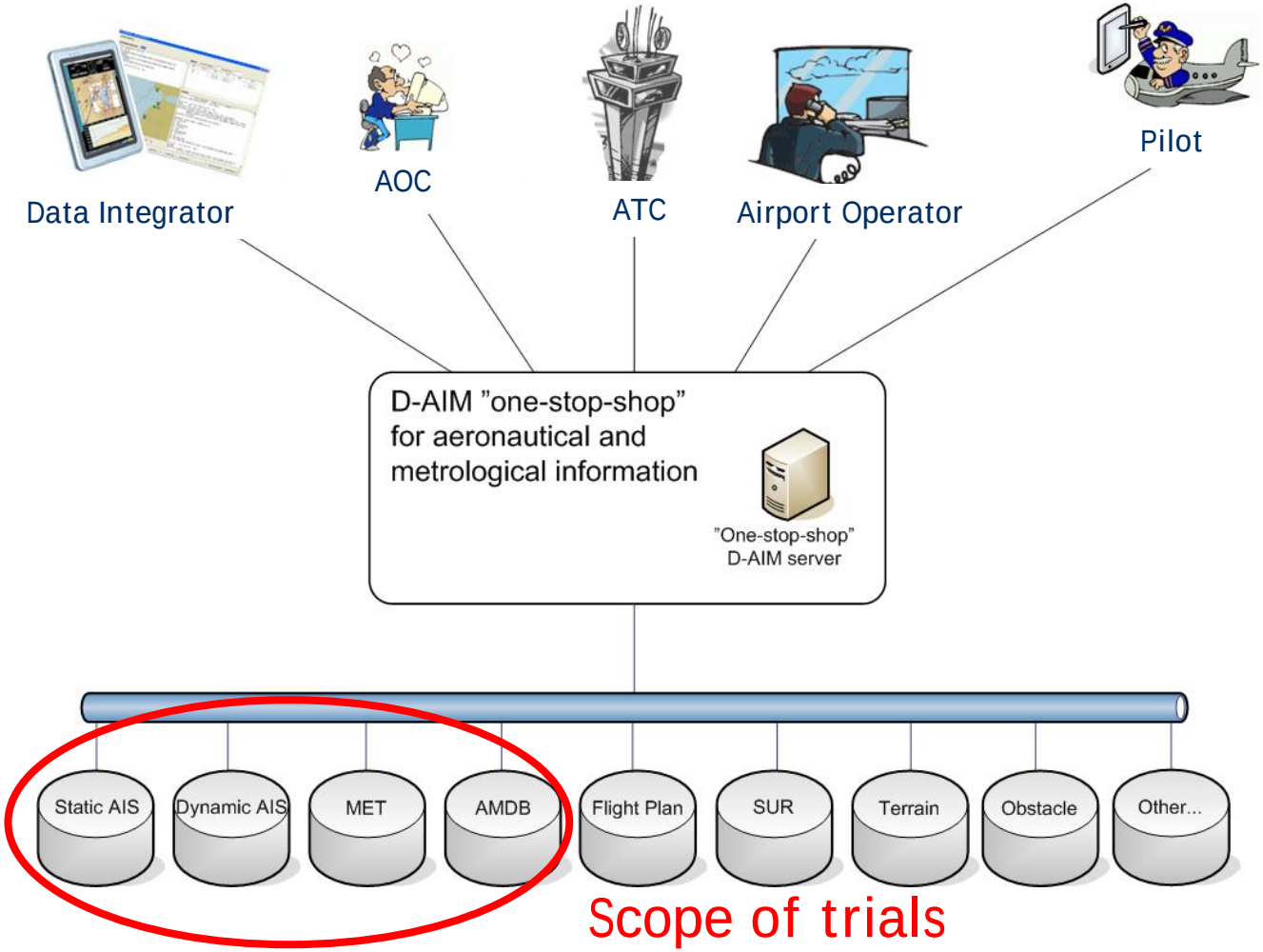
D-AIM Background

- Cooperation between LFV (Swedish Airports and Air Navigation Services) and EUROCONTROL
- Focus on automation of aeronautical information, made available for ALL users, ground based as well as airborne.
- Project running 2007-2009
- Close connection to RTCA/EUROCAE work on AIS/MET Data Link

Digital Aeronautical Information Management

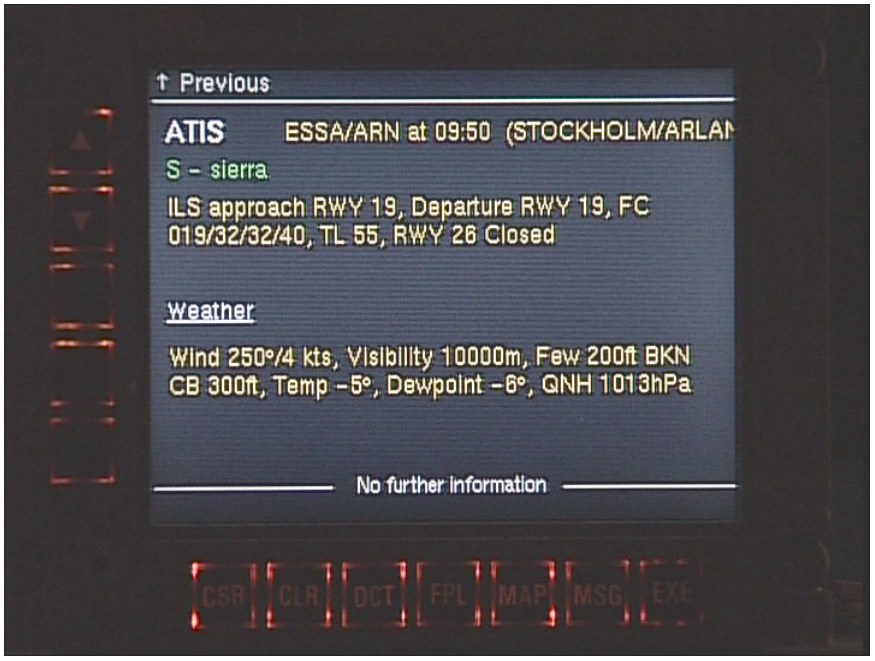


Digital Aeronautical Information Management



Flight Information Service Broadcast (FIS-B)

Previously performed work - mainly text based information



Above: Example of text based presentation of Met Report

Left: Cockpit Display screenshot of ATIS information

Digital Aeronautical Information Management

Focus on graphical presentation of temporary aeronautical information

Intitial airborne use cases:

- Taxiway or Runway Closure (Digital NOTAM)
- Temporary Segregated Area (TSA) Status
- Digital Meteorological Information, geo-spatially displayed

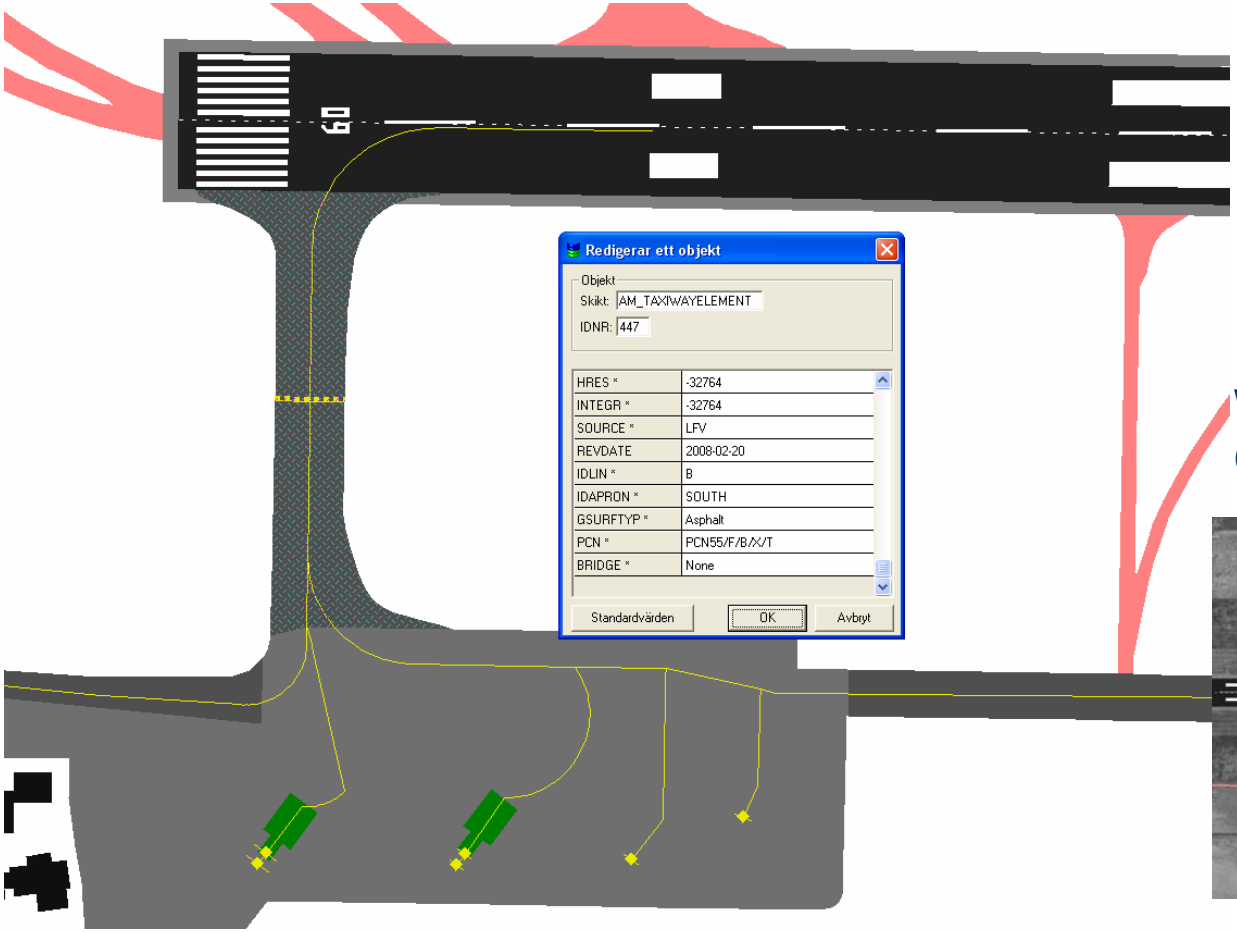
Aircraft passing activated Temporary Segregated Area (TSA), from D-AIM test flight, autumn 2008

Aircraft landing on RWY 09/27 at Norrköping Airport, EFB showing RWY 11/29 Closure, from D-AIM test flight, autumn 2008

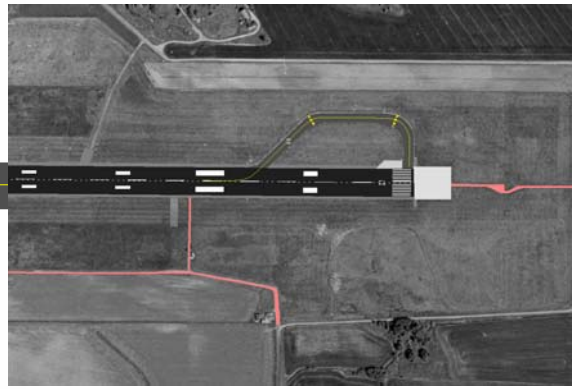
Picture from Digital NOTAM simulation performed by Technical University of Darmstadt in 2006

Aerodrome Mapping Database (AMDB)

Part of Norrköping AMDB

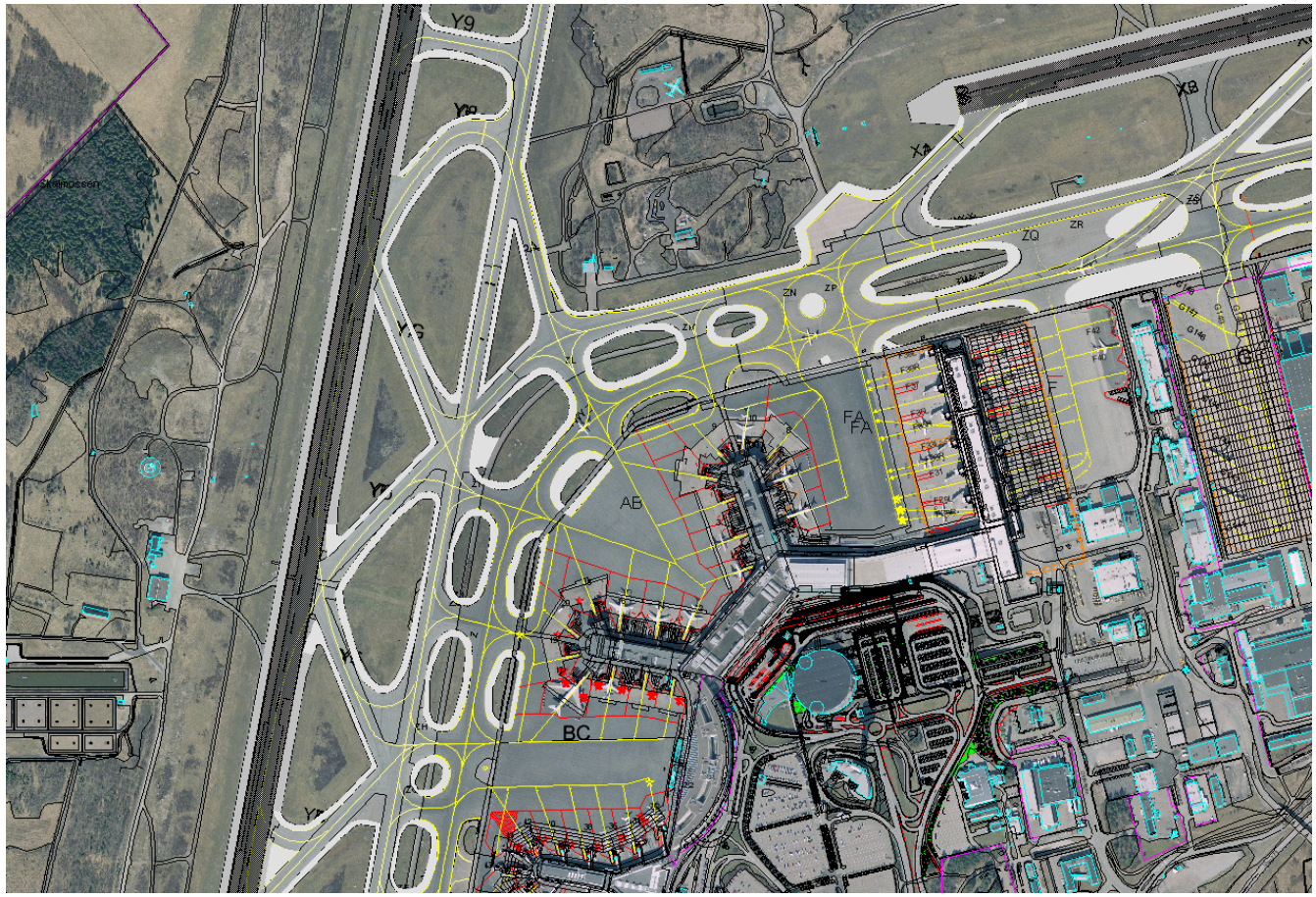


With orthophoto (for digitising/verification)

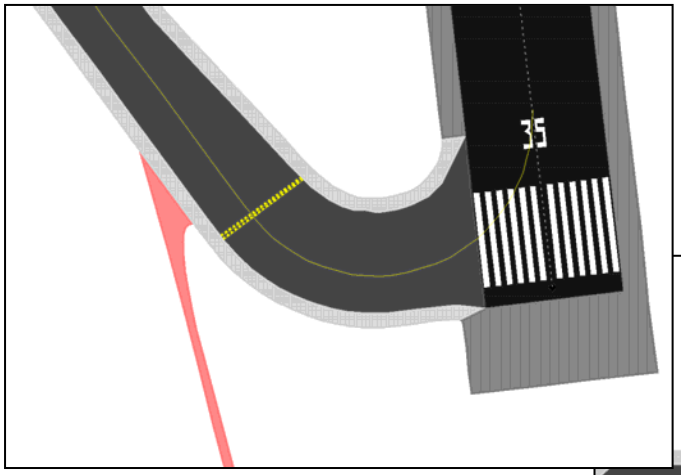


Aerodrome Mapping Database (AMDB)

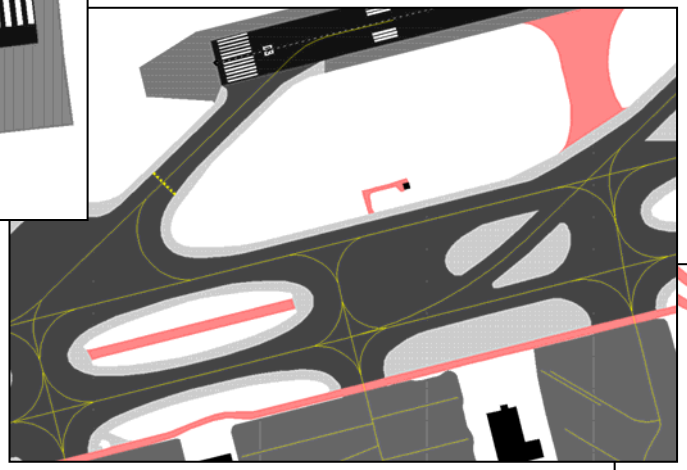
Input material for Stockholm-Arlanda AMDB (Orthophoto + CAD files)



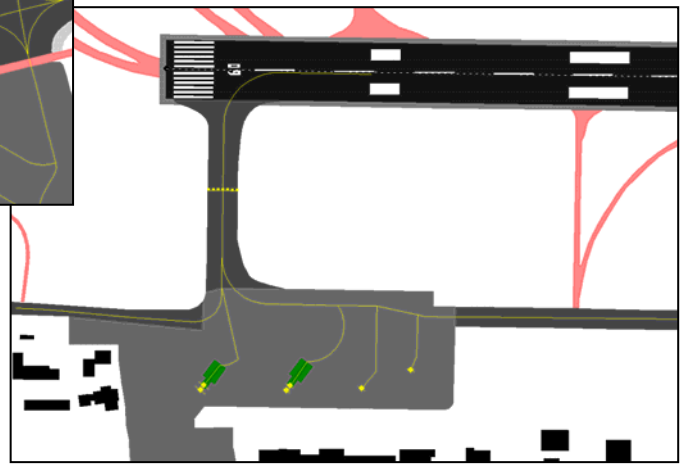
Snapshots from ESMS, ESSA and ESSP AMDB



Malmö Airport - ESMS



Stockholm-Arlanda Airport - ESSA

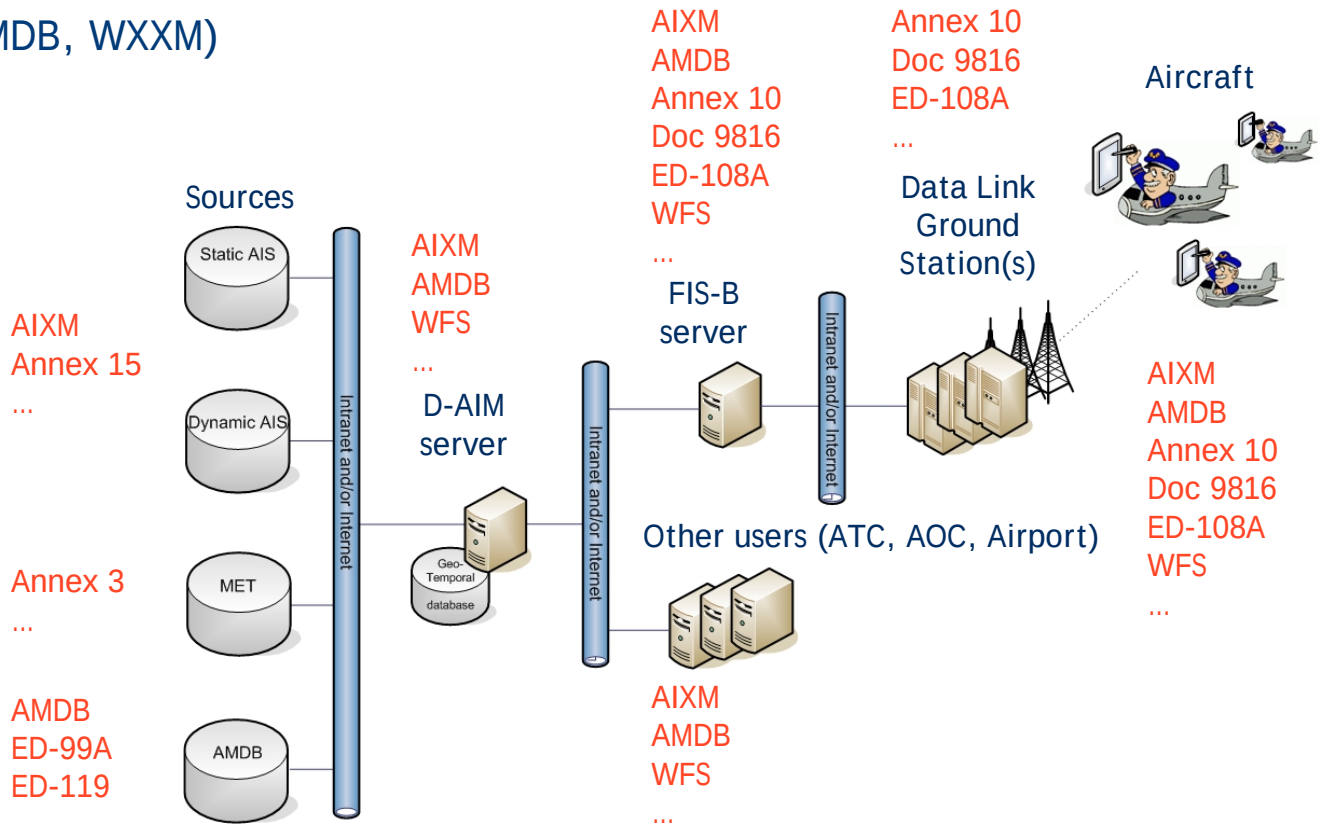


Norrköping Airport - ESSP

Digital Aeronautical Information Management

Following AIM principles based on service orientation as adopted by SESAR and using **open** global standards such as (list not exhaustive):

- ISO, Open Geospatial Consortium (ISO19100, GML, WFS)
- EUROCONTROL, FAA (AIXM, AMDB, WXXM)
- ICAO (Annex 3, 10 &15, Doc 9816)
- RTCA/EUROCAE (ED-99A, ED-108A, ED-119)
- ...



EVOLUTION rather than Revolution

- Adapting already existing systems where possible
  - to get payback on investments already made
- Overlap between introduction of new AIM services and use of traditional AIS/MET services
  - to facilitate for early adopters as well as other more "conservative" users

LFV before D-AIM

Source formats:

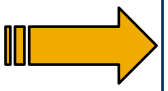
AIXM 3.3 and traditional weather formats

User output:

Voice

Paper

pdf



Current D-AIM trials

Source formats:

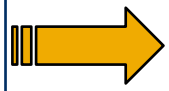
AIXM 3.3/4.5 and traditional weather formats, both with added geo-spatiality and temporality

User output:

Data Link

Web services

(Voice, Paper, pdf)



Goal

Source formats:

AIXM 5 and WXXM

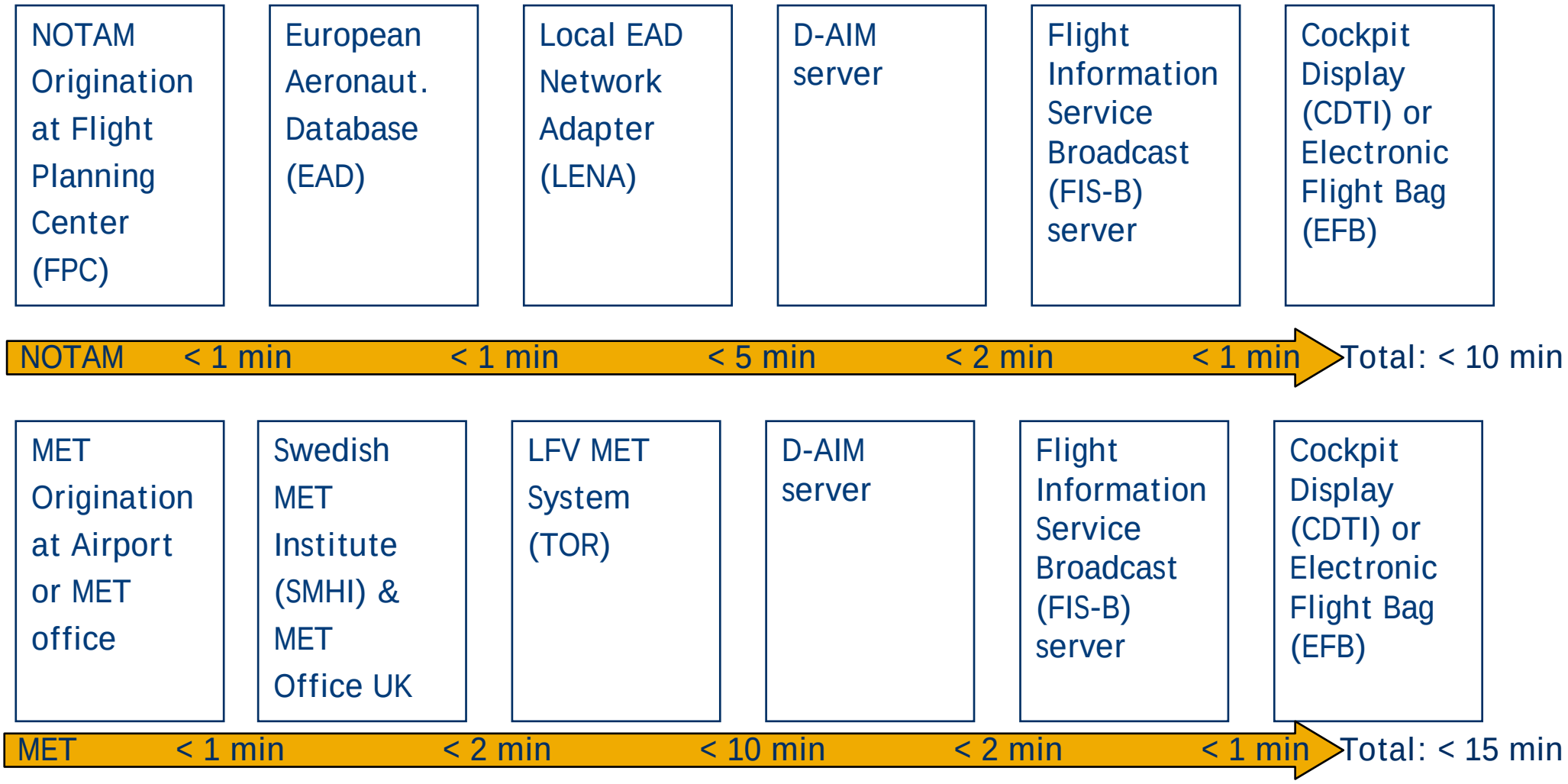
User output:

Data Link

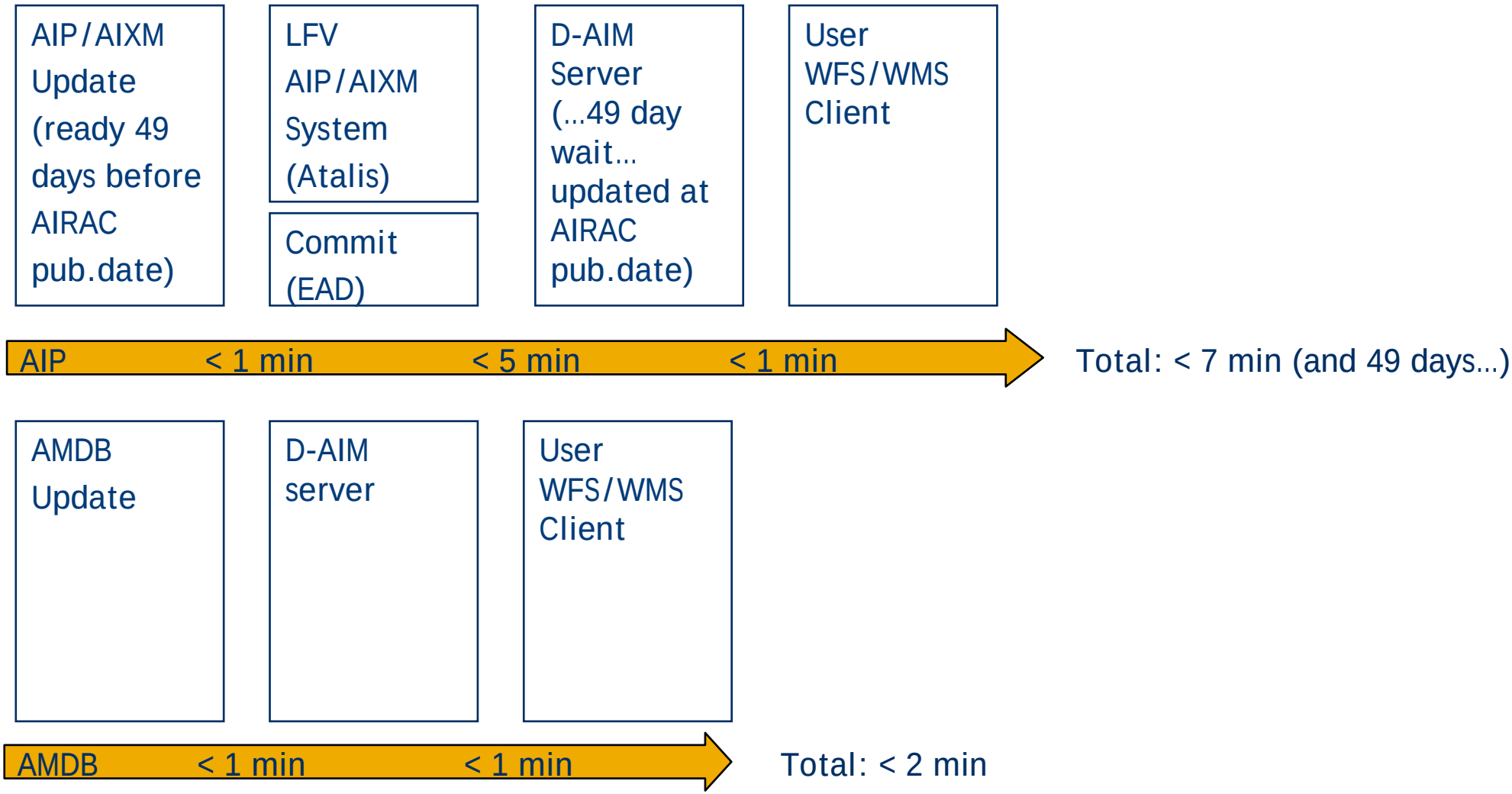
Web services

(Voice, Paper, pdf)

Time line – from origination to use – dynamic info



Time line – from origination to use – baseline info



Data link channel load

- Data link used: VDL Mode 4 (VHF link with 19200 bps)
- Update rate per service: 2 minutes
- Message size per service:

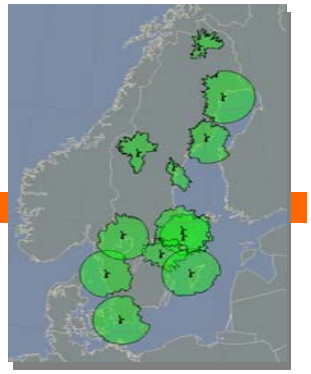
Message type	Message size in bits*	Cost
METAR & SIGMET	Average: 452 bits	0
RWY/TWY Closure NOTAM	Average: 504 bits	0
Temporary Segregated Area	Average: 152 bits	0

* Per message. The coordinates for the affected airport or area are available in the onboard data base and not being broadcast.

- Cost: The Swedish VDL mode 4 network can encompass both free services from the Air Navigation Service Provider as well as other services from commercial providers. The services listed above are all examples of services that are/will be free of charge when operational.

D-AIM Infrastructure

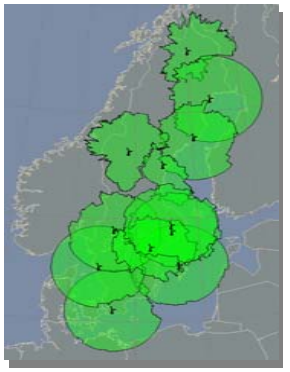
Ground station coverage 2006-2009



Coverage at 3000 ft

2006 – May 2009:

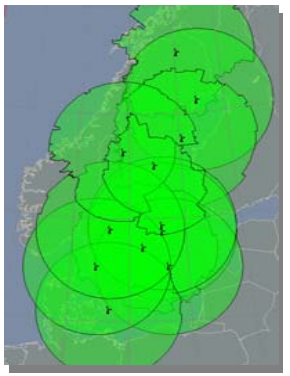
(D-AIM AMDB) • Malmö
(D-AIM AMDB) • Stockholm-Arlanda (replacing old station)
(D-AIM AMDB) • Umeå
(D-AIM AMDB) • Norrköping
(D-AIM AMDB) • Stockholm-Bromma
• Kiruna (replacing old station)
• Östersund
• Sundsvall
(D-AIM AMDB) • Göteborg
• Visby
• Karlstad



Coverage at 10000 ft

May 2009-

• Luleå



Coverage at 33000 ft

D-AIM Current Status

- Ground part of D-AIM trials infrastructure and connection to operational infrastructure in place in autumn 2008
- First release of
  - Cockpit display/
    Electronic Flight Bag (EFB) software
  - ground user application software

  in autumn 2008
- First test flights autumn 2008
- First demo and workshop Nov 2008
- Stockholm-Arlanda Airport cooperation initiated Jan 2009
- Jeppesen cooperation initiated Feb 2009
- All six AMDBs available spring 2009
- New release of EFB software May 2009

Screen dump from Beta version of EFB software showing Malmö Airport AMDB

D-AIM Upcoming Work

- D-AIM Demonstration and Workshop
  - Stockholm-Arlanda Airport, June 5, 2009
- Web site application summer 2009
- Continued system verification and development – Airport and Data Integrator use case during 2009
- Continued validation during 2009
- Final report late 2009

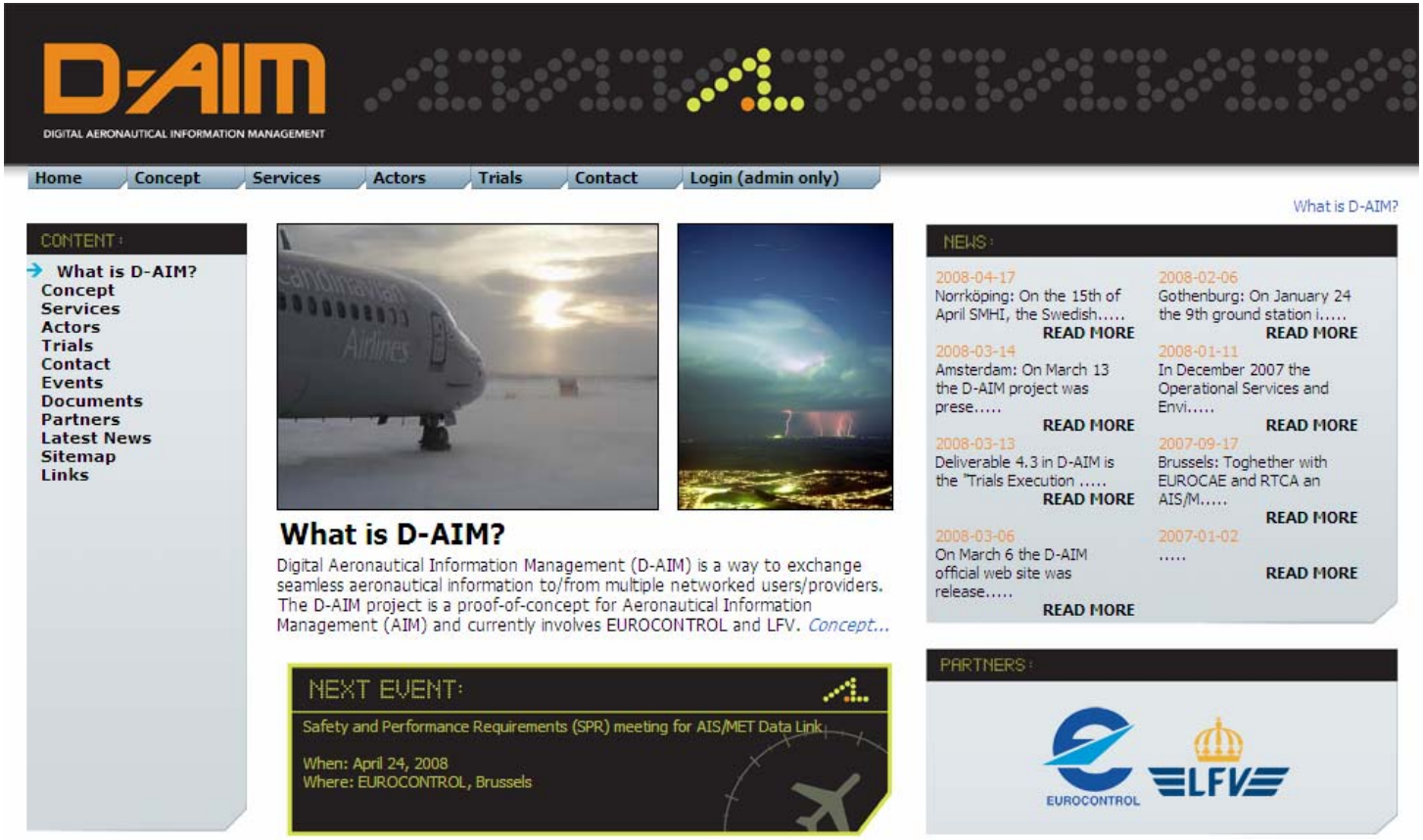
Way ahead after trials

- Implementation (for use cases considered mature, e.g. AMDB, subset of FIS-B applications)

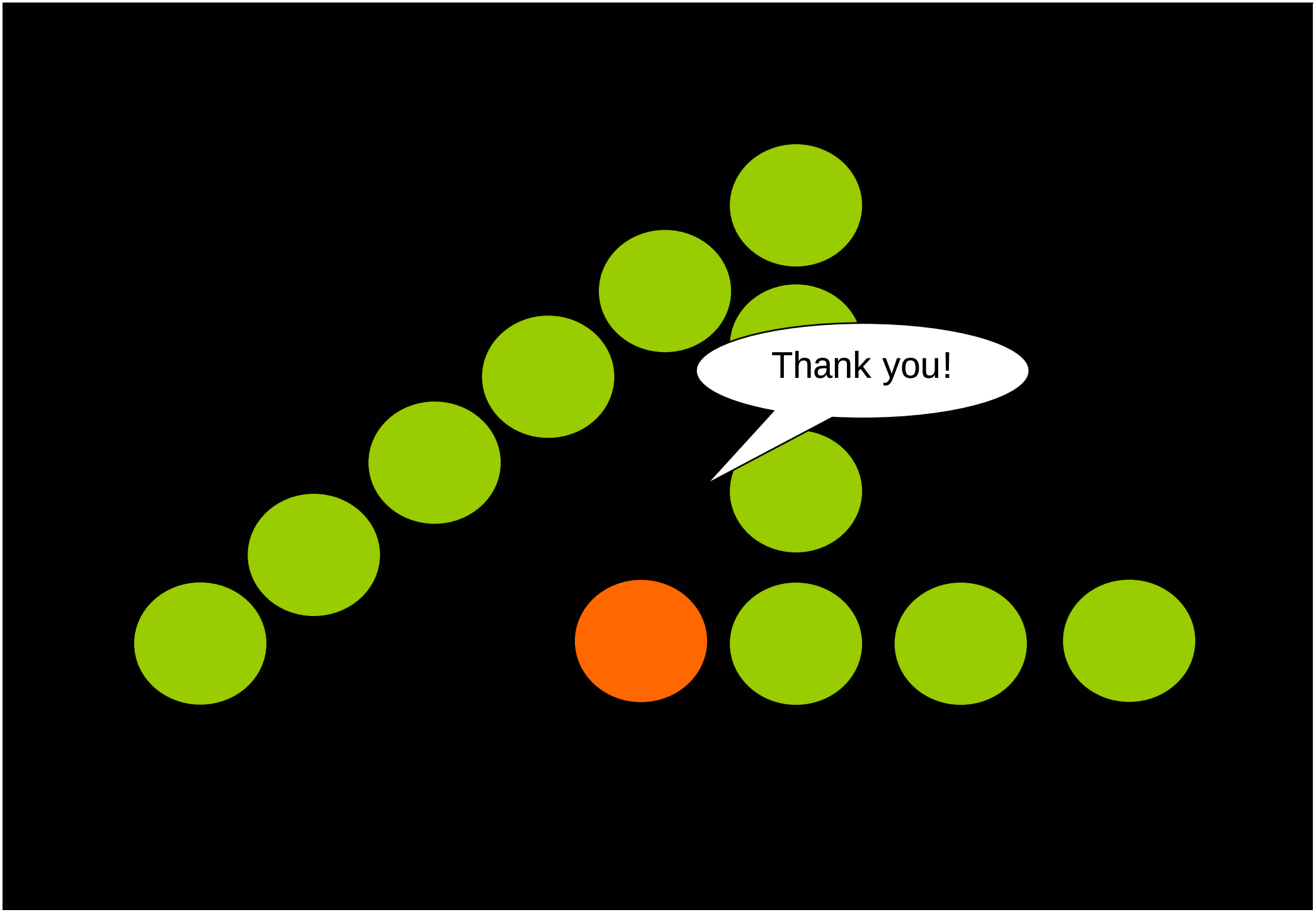
D-AIM phase II – (still TBD)

- More validation (more users active in trials, e.g. ATC, Airlines)
- Extended scope (include more data formats, sources and/or applications, e.g. AIXM5, WXXM, terrain and obstacle data base, D-TAXI, etc)
- Potential part of SESAR Joint Undertaking work in WP8 and 14

Questions?



For more information see www.d-aim.aero or contact roger.li@lfv.se.


Thank you!