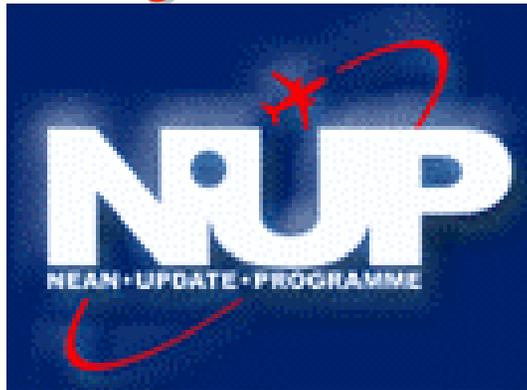


Operational Application of DAG-TM in the European NUP Project



NUP = NEAN Update Programme

*NEAN = North European ADS-B
Network*

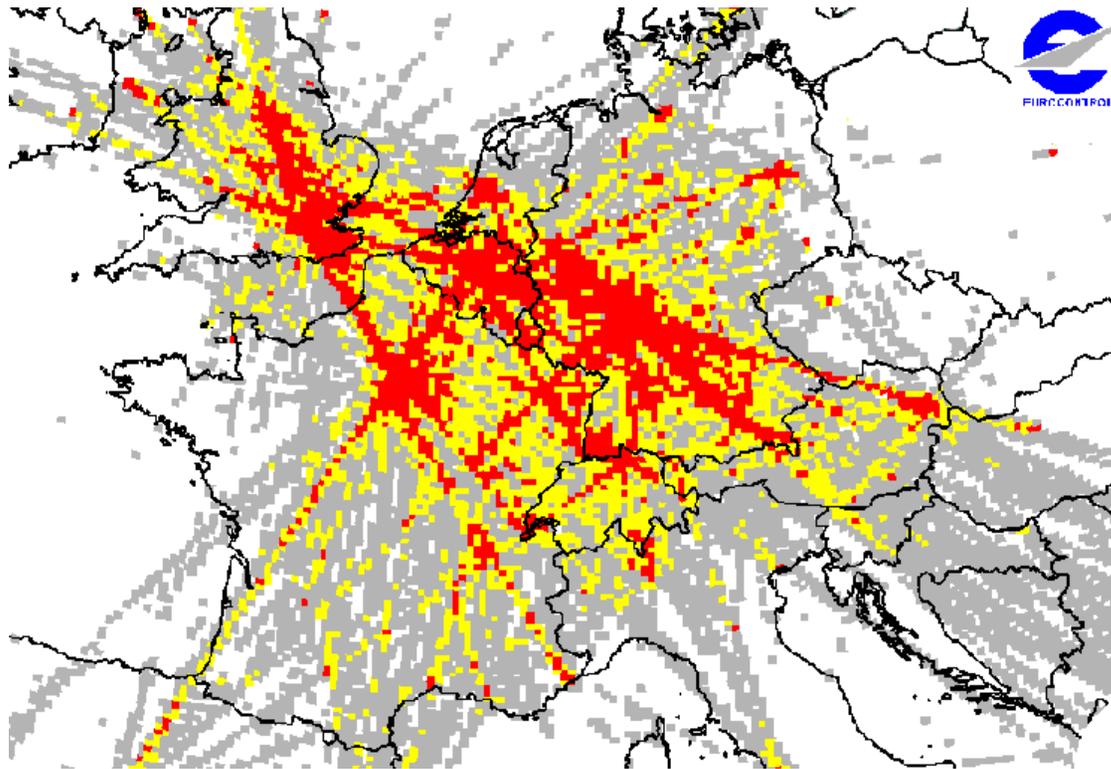
*A presentation of the work and thoughts
within the European NUP project.*

presented by Capt. Michael Agelii, Scandinavian Airlines

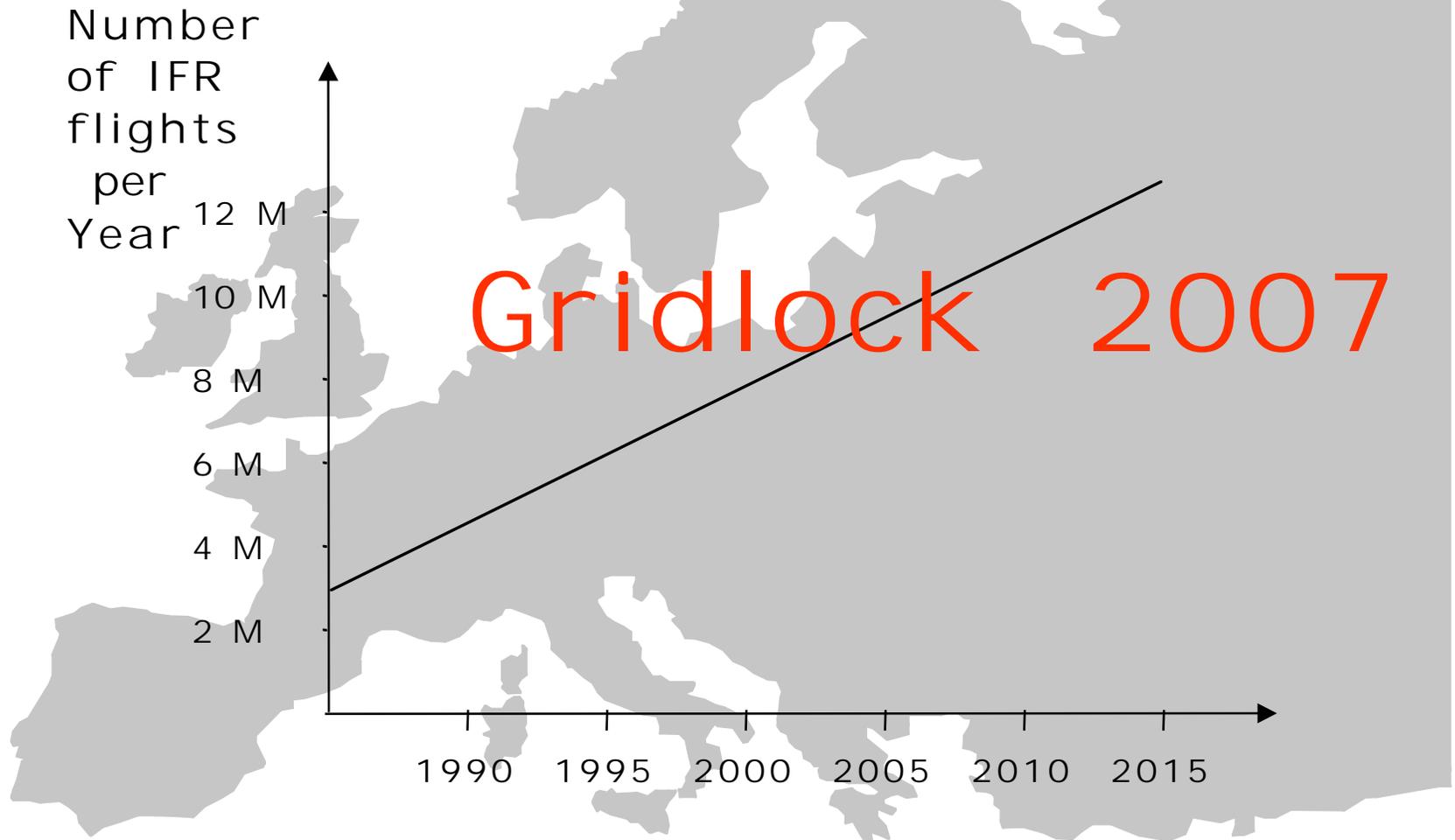
NUP issues in focus

- The Operational Concept
- The Technology
- R&D Activities
- NUP concept in relation to DAG-TM
- The Airline View
- Summary

North European Air Traffic Congestion 2010



source: Eurocontrol ATM strategy for 2000+



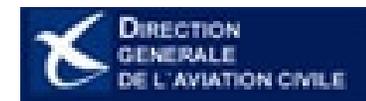
NUP objective

" Establish a European ADS-B network based on global standards with certifiable applications and equipment, supporting new ATM concepts that can be put into operation."

The target is an early gradual implementation of ADS-B applications. Early benefits is a priority.

NUP Partners

- Lufthansa DLH
- Scandinavian Airlines SAS
- Airbus
- Swedish CAA
- Danish CAA
- German CAA
- French CAA



Operational Concept

Scope

- Gate to Gate

Main Objective

- Reduce congestion in high density traffic areas and open up for increase in traffic capacity.

Means

- Delegation of Separation Assurance

Delegation of Separation Assurance

- **Scope** of Delegation of Separation
 - En Route, In Terminal areas, On ground
- Operational **Tools** (applications)
 - Traffic situation awareness
 - Station Keeping (In-trail separation)
 - Parallel Flight (cluster control)
 - A-SMGCS (surface movement control)

Technology

- ADS-B (suggested flight parameters)
 - Lat, Long
 - Altitude (barometric or geometric)
 - True Track TT
 - Ground Speed GS
 - Vertical Speed VS
 - Future Trajectory
- Datalink
 - NUP prerequisite is the VDL Mode 4 datalink

NUP R&D Parallel Activities (1)

- 7 Tiger Teams (Working Groups)

<u>Tiger Team</u>	<u>Application</u>
- Frankfurt	Extended Visual Aquisition
- Paris	A-SMGCS (surface control)
- Stockholm	Delegation of separation in TMA
- Nice	VFR-IFR Integration
- Maastricht	Delegation en route in dense
airspace	
- North Sea	Helicopter applications
- Reykjavik	Delegation in Oceanic applications

NUP R&D Parallell Activities (2)

- Application Description & Definition
- Safety Assessment
- Fasttime simulations
- ATC and Flight Simulations
- Deployment of ADS-B ground stations
- Development of ADS-B data network
- Development of airborne transponders

Operational CDTI testbed



MMI 5000
operational CDTI
prototype
installed in
several Lufthansa
B747s.

Has been used for
extensive testing
of the ADS-B
concept.

Airbus experimental CDTI



Airbus will provide for the airborne architecture and human machine interface

NUP in relation to DAG-TM

- Differences
 - DAG-TM wider scope - NUP is more narrow
 - NUP focus on congestion problems
 - DAG-TM top-down - NUP bottom-up
 - NUP short time frame, early benefits
- Similarities
 - Gate-to-Gate scope
 - Delegation/distribution of separation assurance
 - ADS-B applications similar or same

The Airline view

- Congestion is a threat to aviation
- Major technology/operational leap necessary
- ADS-B is the primary solution to congestion
- ATM capacity and safety benefits are envisaged
- One global standard is vital
- One sky over Europe is vital
- Political concerns risks lengthy implementation
- Benefits directly accrued to investors is a must

Benefits linked to investment (1)

- **Service Providers** Investment vs Capacity
 - It is likely that the service providers investments will result in more traffic (*increased revenues*) and reduced ATC workload (*increased efficiency*). Hence service providers **will benefit directly**.

Benefits linked to investment (2)

- **Airlines Investment vs Capacity**
 - Implementation through **regulations** is a possible, however **not preferred** alternative.
 - If benefits are **not linked** to investment, then investing airlines may lose market shares (*slots*) and contribute to lower operating costs for its competitors. This is totally **unacceptable** from an airlines perspective.
 - It is of utmost importance that the **benefits** achieved such as improved ATM efficiency and released slots will be **directly accrued to the investing airlines only**.

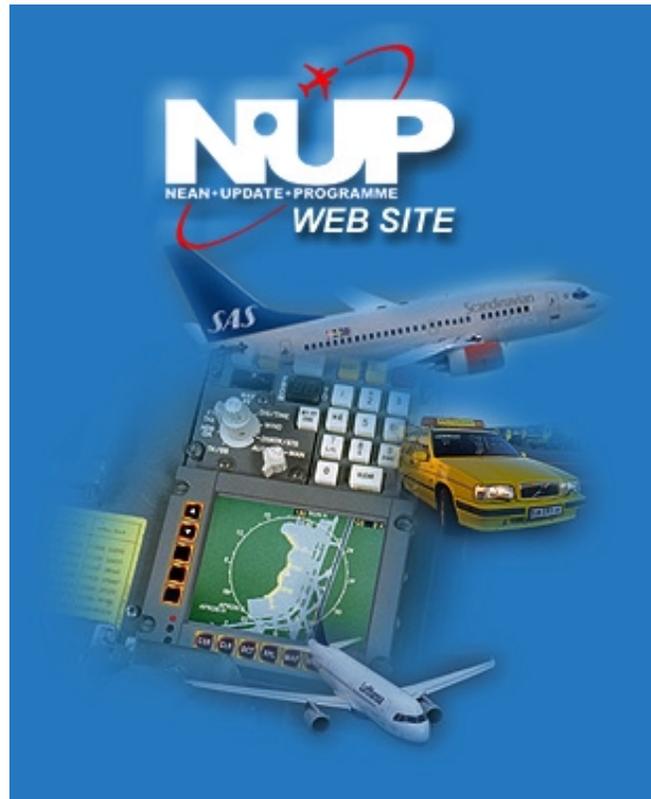
NUP in short

- **Delegation** of Separation Assurance
- **ADS-B** concept - **VDL4** technology
- Focus on **congestion** problems
- **Early** Benefits
- Tiger Team work - **operational** focus

Airline view in short

- One global standard and one sky
- Benefits accrued to investors

Thank you for your time!



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