



Air Traffic Alliance

A New Way Of Thinking

Flight Object, Interoperability and SWIM

Francois DELILLE, Thales Air Systems
ICNS 2007 Conference
Herndon, 1- 3 May 2007



ATM Data Management European Initiatives

- **SESAR Definition Phase** has delivered ATM Performance Targets and is providing plans for Ops Concept, ATM Network Architecture and Technologies
 - **Systems Interoperability is a key feature considered by SESAR**
 - **SWIM and Flight Object are major enablers of the future ATM network**

- **Flight Object Interoperability Proposed Standard (FOIPS) EUROCAE WG-59**
 - **Addresses Interoperability standards for sharing flight data between systems operated by ATC, ATFM, Aircraft Operators, Airports and Air Defense**

- **As well as:**
 - **Interoperability COnsultancy Group (ICOG) Programs related to Architectural Framework and Data/Services Modeling for Flight Data Processing Systems**
 - **Pan European IP based Network Communication Infrastructure Study (PEN)**
 - **SWIM FP6 European Commission project ...and many others related to AIM, Surveillance...**

ATM Service Oriented Architecture (SOA) - 1

➤ General Principles

- SOA approach recognizes the diverse location of information and enables different users to access information through the use of Services.
- Services can be offered by individual providers or from centralized provisions.
- Different methods may be used to identify how and from where these services are available and to enable their use
- Within the stakeholder (local) technical domain, either Services or other/legacy data exchange mechanisms may be used.

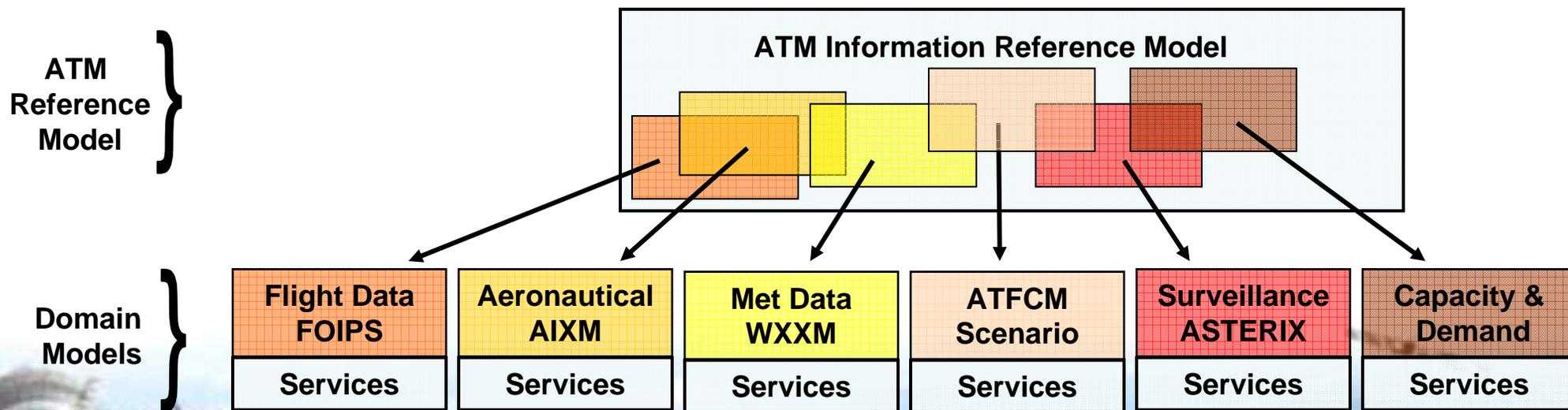
ATM Service Oriented Architecture (SOA) - 2

➤ **Several steps have been identified for the SOA development :**

- Modelling of domain reference data & services: nature, type and quality.
- Development of cooperation patterns: rules, roles and responsibilities.
- Assessment of technologies for technical services to be selected/adapted from commercial field proven solutions
- Development of Interfaces Control Documents and proposal for Standards

ATM Information Reference Model*

- **Within the SWIM, Interoperable ATM information will be precisely defined by a Reference Model**
 - Application independent and not constrained by implementation solutions
 - Addressing different domains of information as needed by the Users and expressed in business terms
 - Describing cross-domains data in a consistent way
 - Allowing to fulfill the SESAR overall information sharing requirement, across ground and air heterogeneous systems



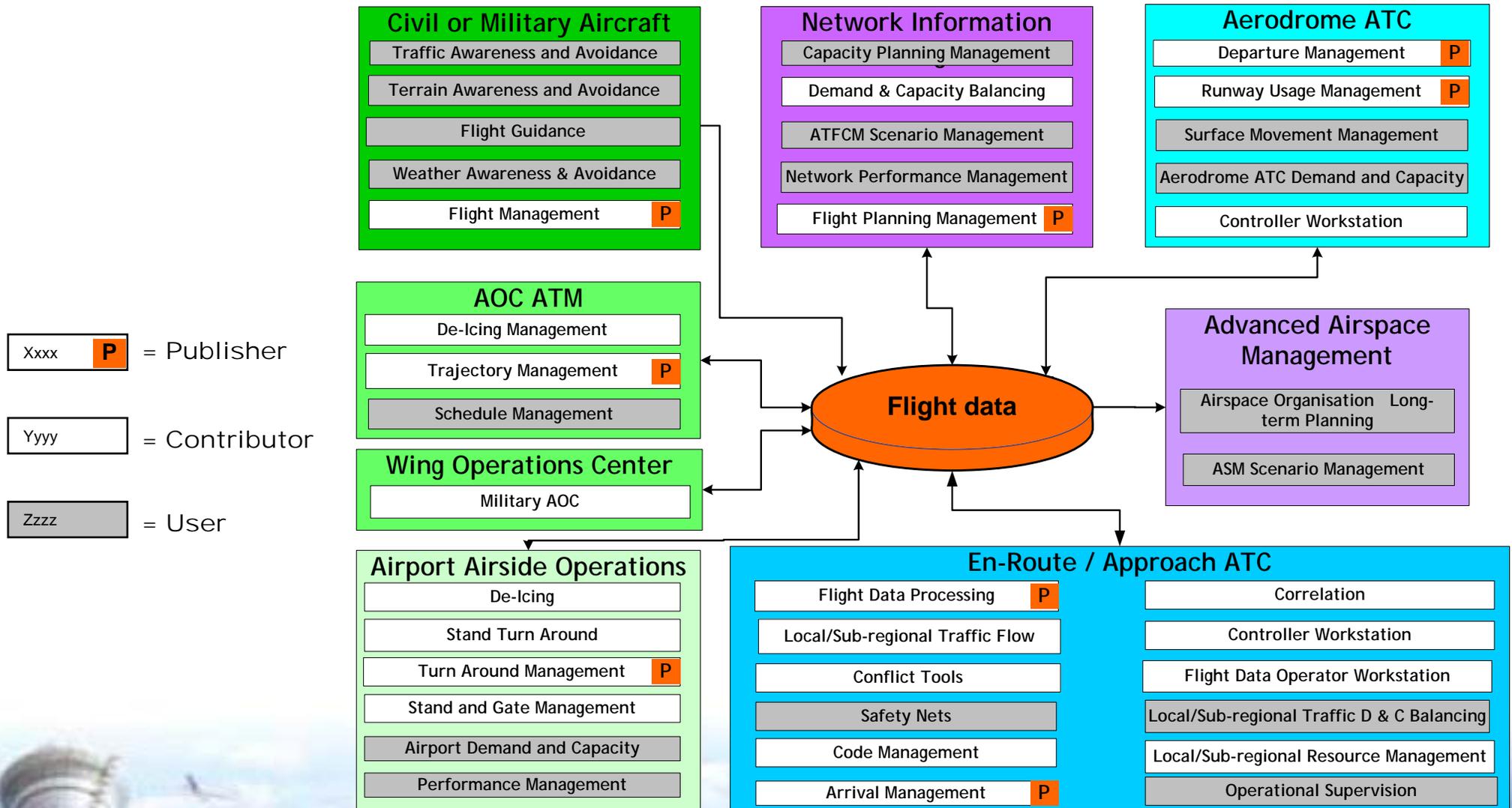
* As per SESAR ATM /CNS Architecture draft document

Coordination Patterns – Terminology

Interoperability Role	Responsibility
PUBLISHER*	<ul style="list-style-type: none">- Collects the partial contribution from the CONTRIBUTORS to compute a coherent D set of data- Distributes the coherent D set of data to the other stakeholders as a published service
CONTRIBUTOR	<ul style="list-style-type: none">- Sets the value to a subset of the information constituting the D data.- Passes the new value of a subset of D to the Publisher as partial contribution.
USER	<ul style="list-style-type: none">- Subscribes to the D data of a published service or to a part thereof.- Consumes the updates related to a topic of D Data

** In some cases Publisher role maybe split in two roles: (1) collection and computation of data (Manager role) and (2) distribution of the data (Publisher role)*

Flight Data Management through SWIM

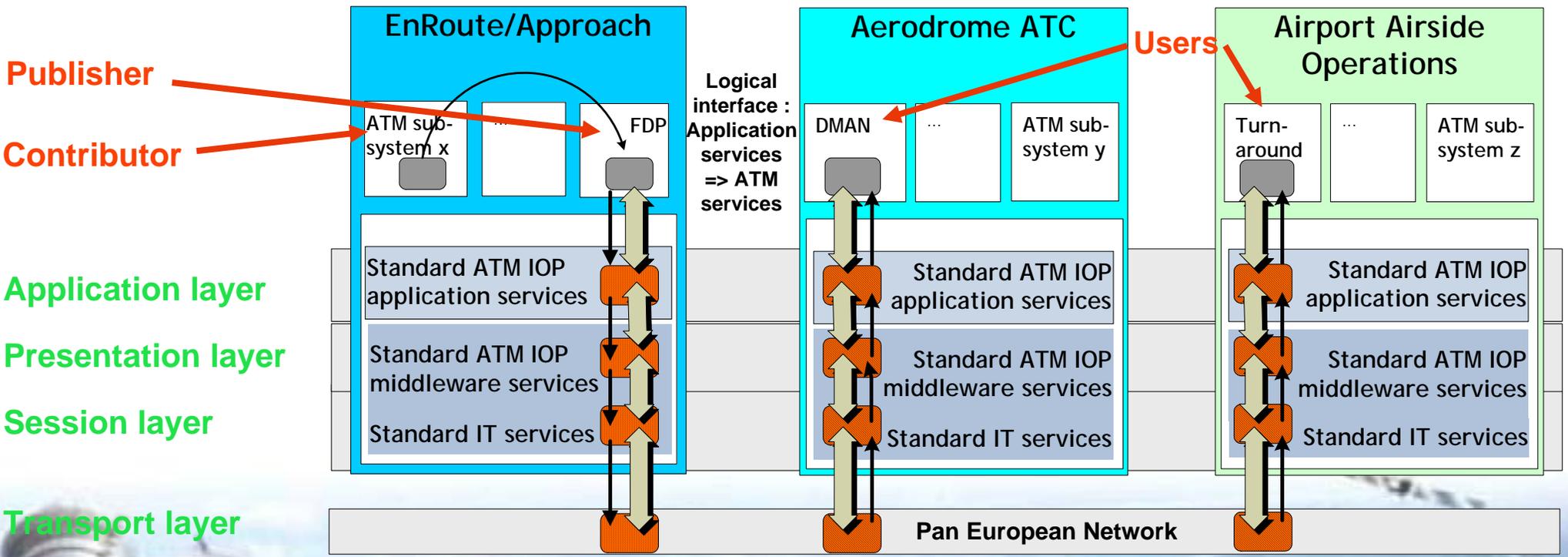


* As per SESAR ATM /CNS Architecture draft document

Ground-Ground Systems Interoperability Services

- **Services provision and data sharing over the European ATM Network need Interoperability (IOP) Requirements to be applied to technical systems**
- **This may be provided by a set of common and standard IOP services available to any stakeholder through Ground-Ground IOP/SWIM management**
- **These services may be performed through IOP layers supported by a Communication layer**
 - **The IOP application providing services to sub-systems that act as publishers or users**
 - **The IOP middleware providing a set of standard middleware services based at the maximum extent on IT technologies**
 - **The IP based Communication Pan-European Network (PEN) infrastructure providing the OSI 1-4 communication layers**

Sub-systems interacting using SWIM Structure



* As per SESAR ATM /CNS Architecture draft document

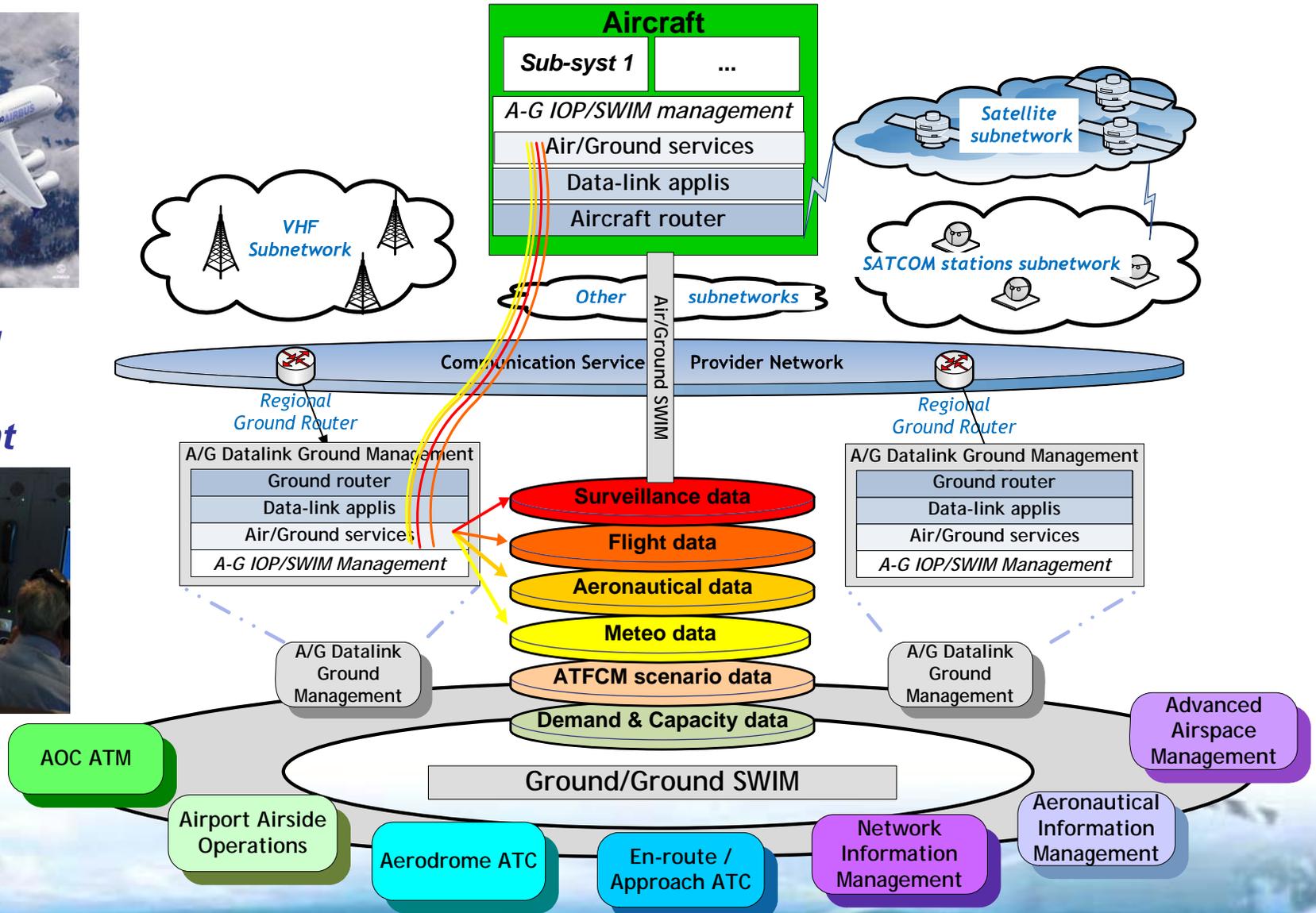
Air Ground Data-Link Management

- **There is a trend towards setting for an European Sub-region an unique point of interface between the Ground ATM Systems and the Aircraft**
 - It would prevent each stakeholder of this sub-region from individually opening a connection with an aircraft
 - From the aircraft perspective, it would simplify the process through only one connection address, avoiding multiple session closings/openings
 - Sub region may be for example a Functional Block of Airspace (FBA)
- **The management of services would be assured by a A/G data link Ground Management System in relation with the Aircraft**
 - A study, including CBA and Safety assessment, is needed to select the topology and infrastructure of this system

The Aircraft Participation in SWIM



Air-Ground Data Link Management



**More information will be presented at the SESAR D3 Stakeholder
Forum on the 26 of September 2007 in Berlin**

Visit www.sesar-consortium.aero

Thank you



**Air Traffic
Alliance**

A Grouping of EADS-Airbus-Thales

www.airtraffic-alliance.com

