SESAR
JOINT UNDERTAKING

SESAR Overview

founding members

EUROPEAN COMMISSION

EUROCONTROL

EUROPEAN CONTEXT

Facts and Figures for Europe

- About 10 millions of flights per year in 2007 (peak days beyond 33.000 flights)
- Fragmented airspace with 72 en route control centres managed by 27 different air navigation service providers maintaining more than 20 different ATM systems
- ATM cost in Europe > € 4 Billion per year
- Fragmented decision-making

European Challenges

A new Air Traffic Management System is required:

SESAR JOINT UNDERTAKING

For the benefit of all air space users: airlines, business & general aviation, airports, air navigation service providers, military, passengers & citizens

WHAT IS SESAR ?

SESAR is Organised in 3 Phases:

Definition phase

Resulted in the **European ATM Master Plan**

2006-2008

Development phase

Managed by the **SESAR Joint Undertaking**

Based on the Master Plan, results in **Standards**, **new operational procedures, new technologies and pre-industrial components**,

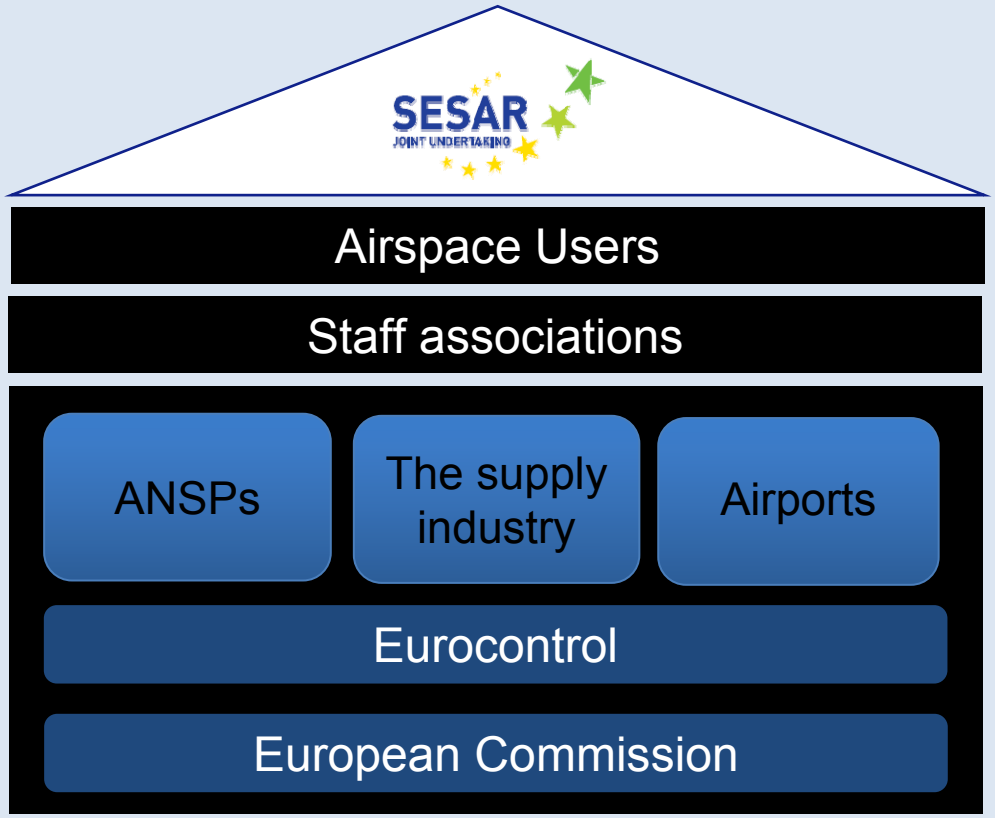
2008-2014

Deployment phase

Implements the results of the development phase, delivers **the performance increase** foreseen in the ATM Master Plan

2015-2025

SESAR
A public private partnership:



Ensure technology and operations developed deliver tangible benefit to users. Validate close to the market.

Secure buy-in given the changes in the role of the Human in the System (Pilots/Controllers/Engineers)

Innovations from the private sector, contributions from service providers and facility owners, contributing 700 MEUR

Maintain buy-in from member states. Major contributor across the work programme, contributing 700 MEUR

Maintain buy-in from EU member states, link to SES framework, contributing 700 MEUR

The 4 Goals of SESAR

Enabling EU skies to handle **3 times more traffic**

Improving safety by a factor of 10

Reducing the **environmental impact** per flight by 10%

Cutting ATM costs by 50%

Working Together in a Private-Public-Partnership for Deployment

AIRBUS

Honeywell

FREQUENTIS

ENAV S.p.A.
ITALIAN COMPANY FOR AIR NAVIGATION SERVICES

SEAC

NATS

DFS Deutsche Flugsicherung

dgac
DSNA

Aena

NORACON

Indra

NATMIG

founding members
EUROPEAN COMMISSION
EUROCONTROL

AleniaAeronautica

SELEX
Sistemi Integrati

THALES

And also:

- **Specific working arrangements with:**

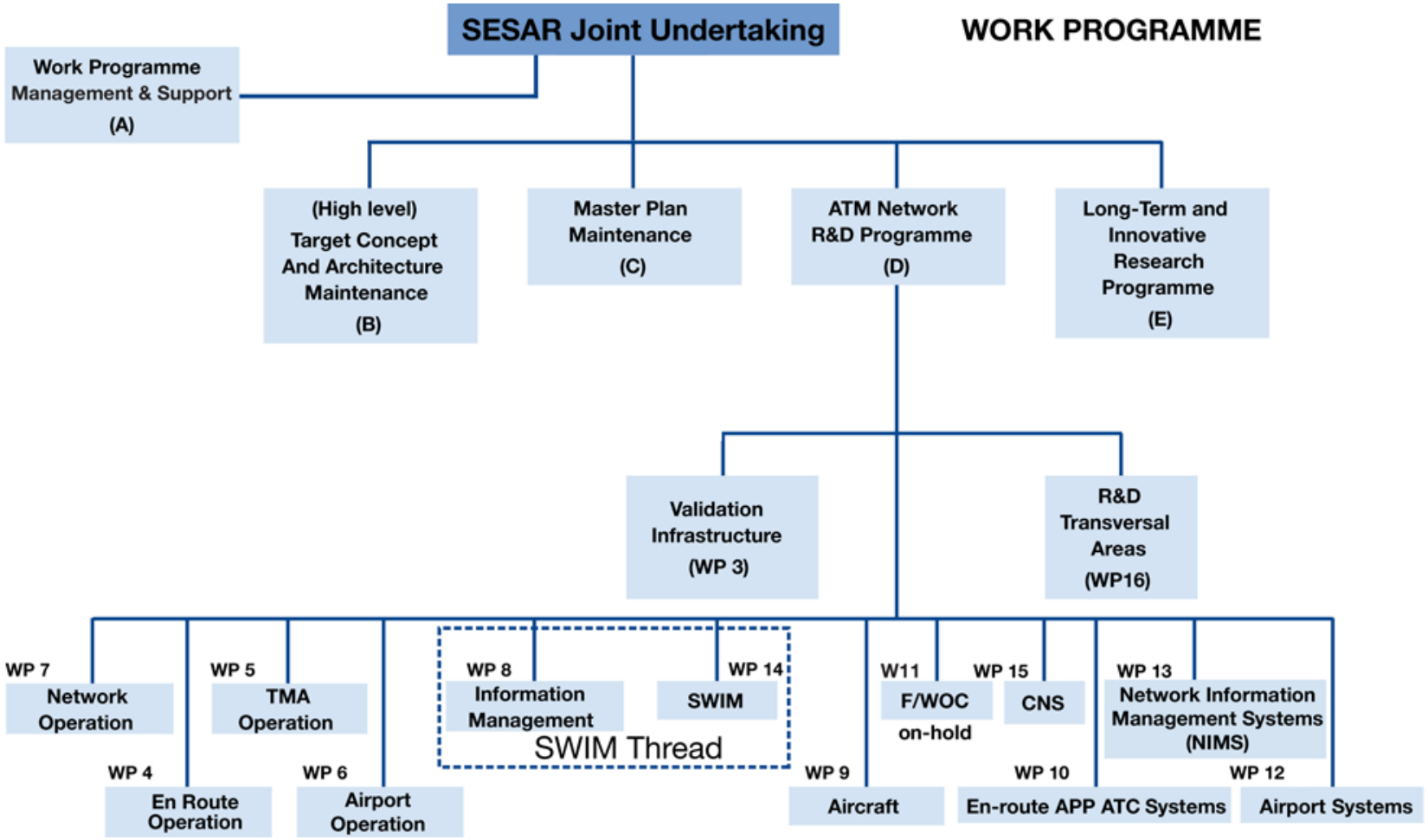
✓ Airspace users
✓ Military users
✓ Staff representatives
✓ Regulatory authorities
✓ Standardisation bodies

- **Specific calls for tenders:**

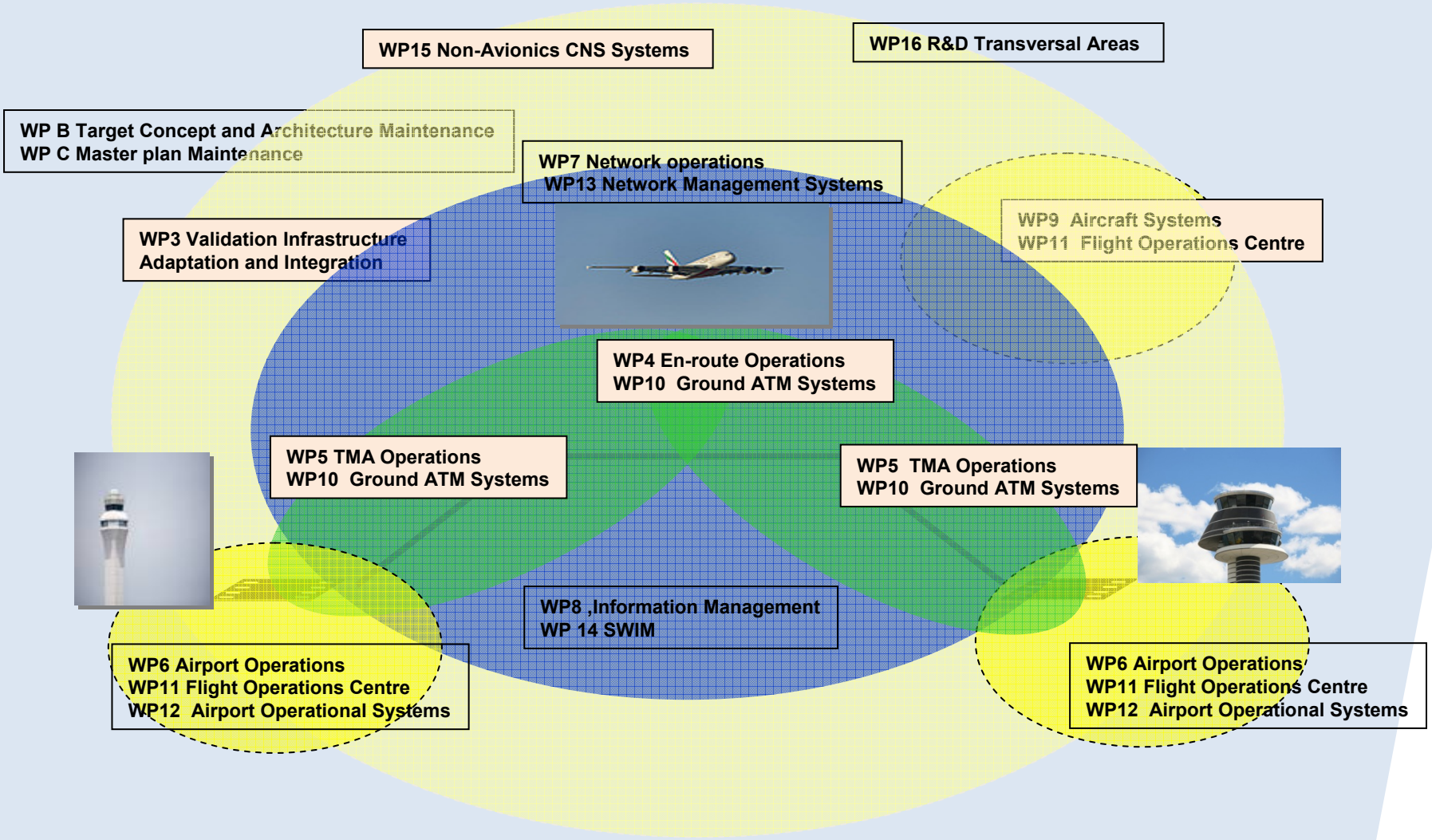
✓ Innovative research
✓ Independent studies
✓ Long term scientific networks

SESAR Work Programme

SESAR Work Programme



Each Phase of Flight



Towards Implementation

- **IP1 - Deployment 2008-2012**
  - Improve the current system
  - Prepare for Trajectory/Time-based Operations
  - A ‘baseline’ for SESAR and transition to new operating concepts
  - Content is ‘maturity’ based
- **IP2 - Development for Deployment 2013-2019**
  - Described by the SJU Work Programme [www.sesarju.eu]
  - Over 250 projects, addressing all aspects of ATM
  - Validation using operational trials where practicable
  - Early implementation with quick-win projects included
- **IP3 - Research and Development for Deployment from 2020**
  - Under development in the SJU Work Programme
  - Long-term research agenda and Scientific Committee being established

International Cooperation

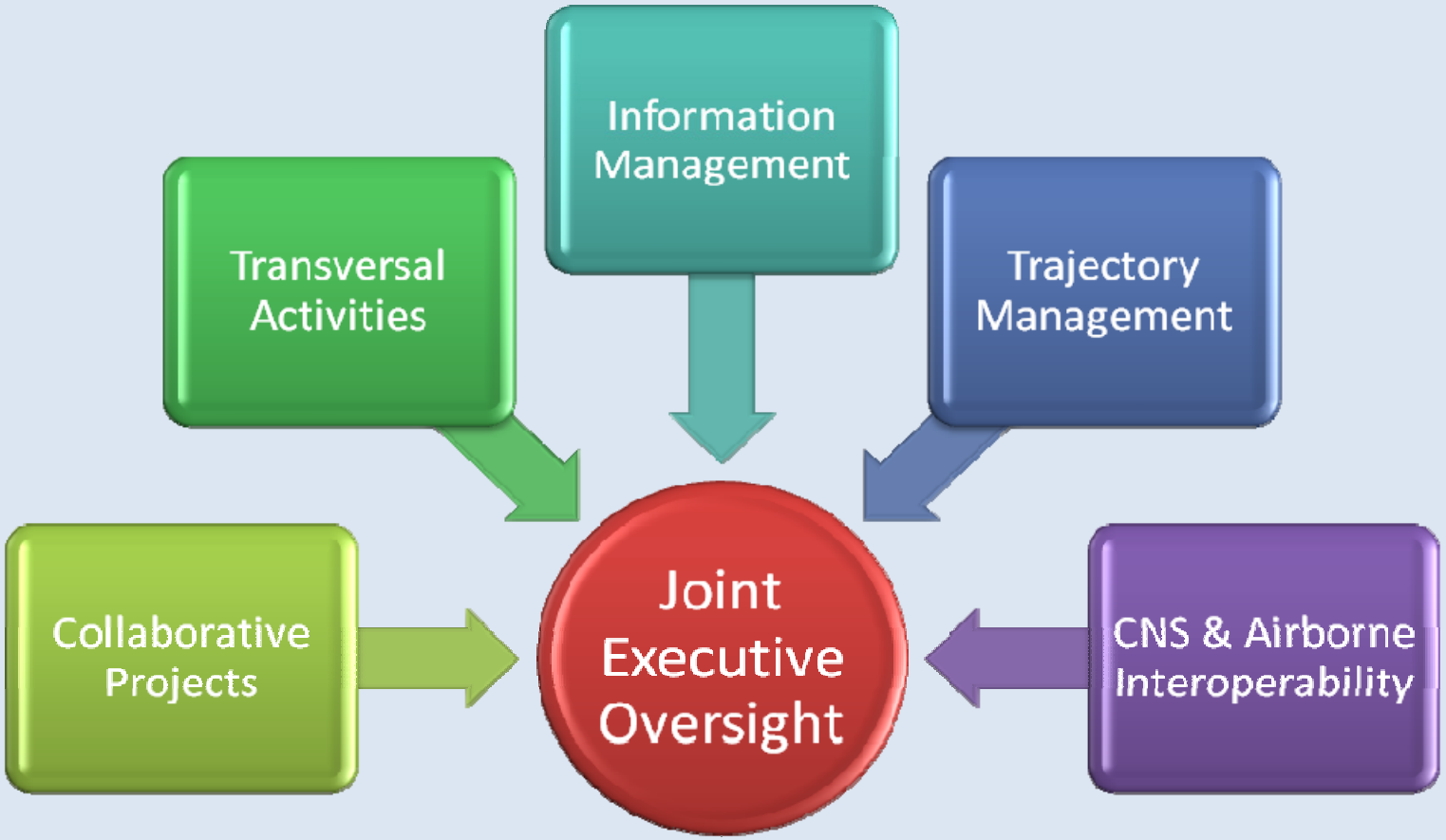
- **ATM modernisation is a global endeavour**
  - Cooperation with FAA
  - Discussions with others countries
- **Need to be pragmatic**

SESAR-FAA Collaboration

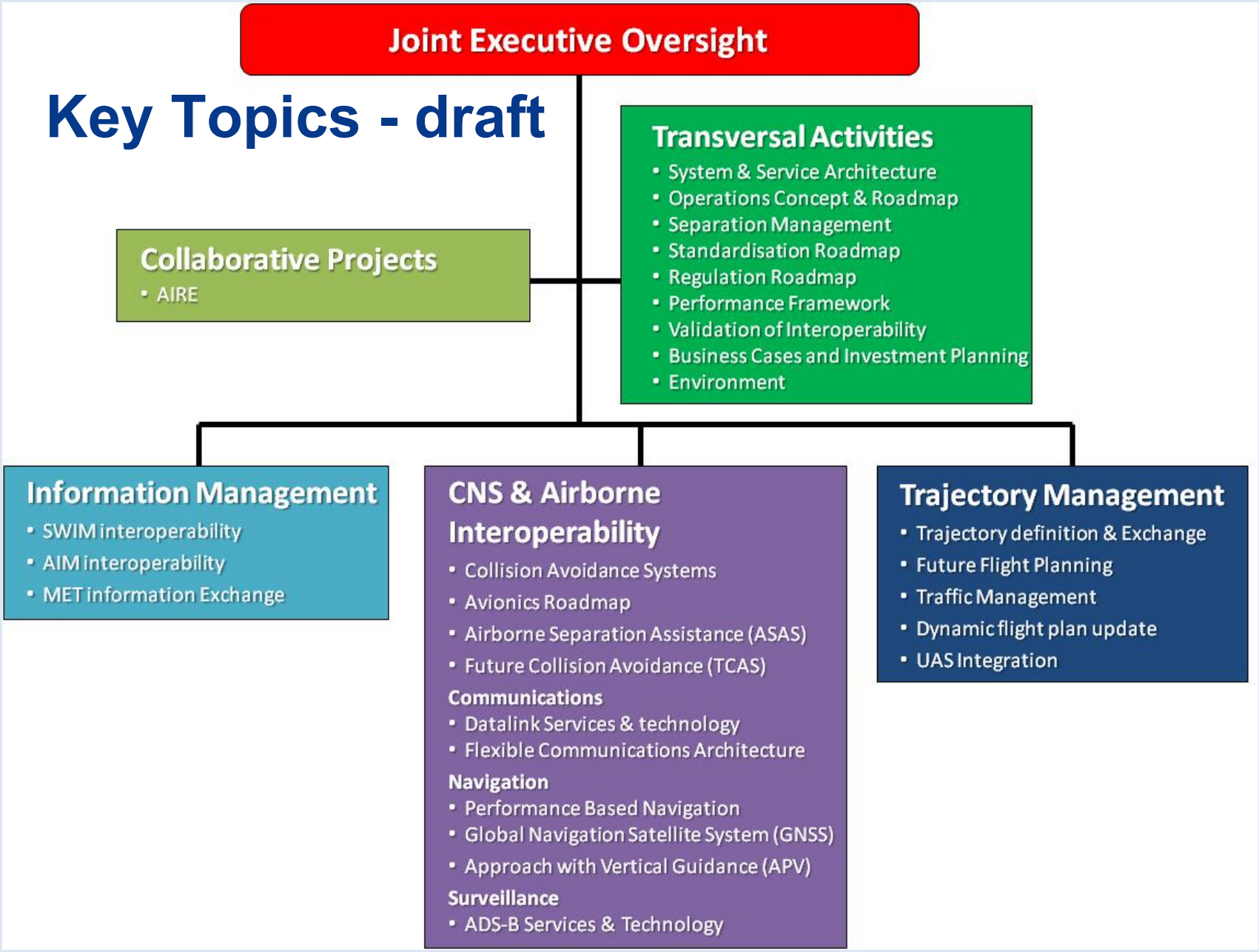
Background

- **Two of the major ATM change Programmes**
  - EUROPE - SESAR
  - USA - NextGen
- **Interoperability (for Airline Operations) is key to success for both Europe and the US.**
- **Alignment required in key areas by Identifying operational and technical topics of interest within a cooperation framework.**
- **SESAR, using its Public-Private partnership, will engage partner organisations to deliver results on a number of key topics.**

SESAR-FAA Collaboration Framework



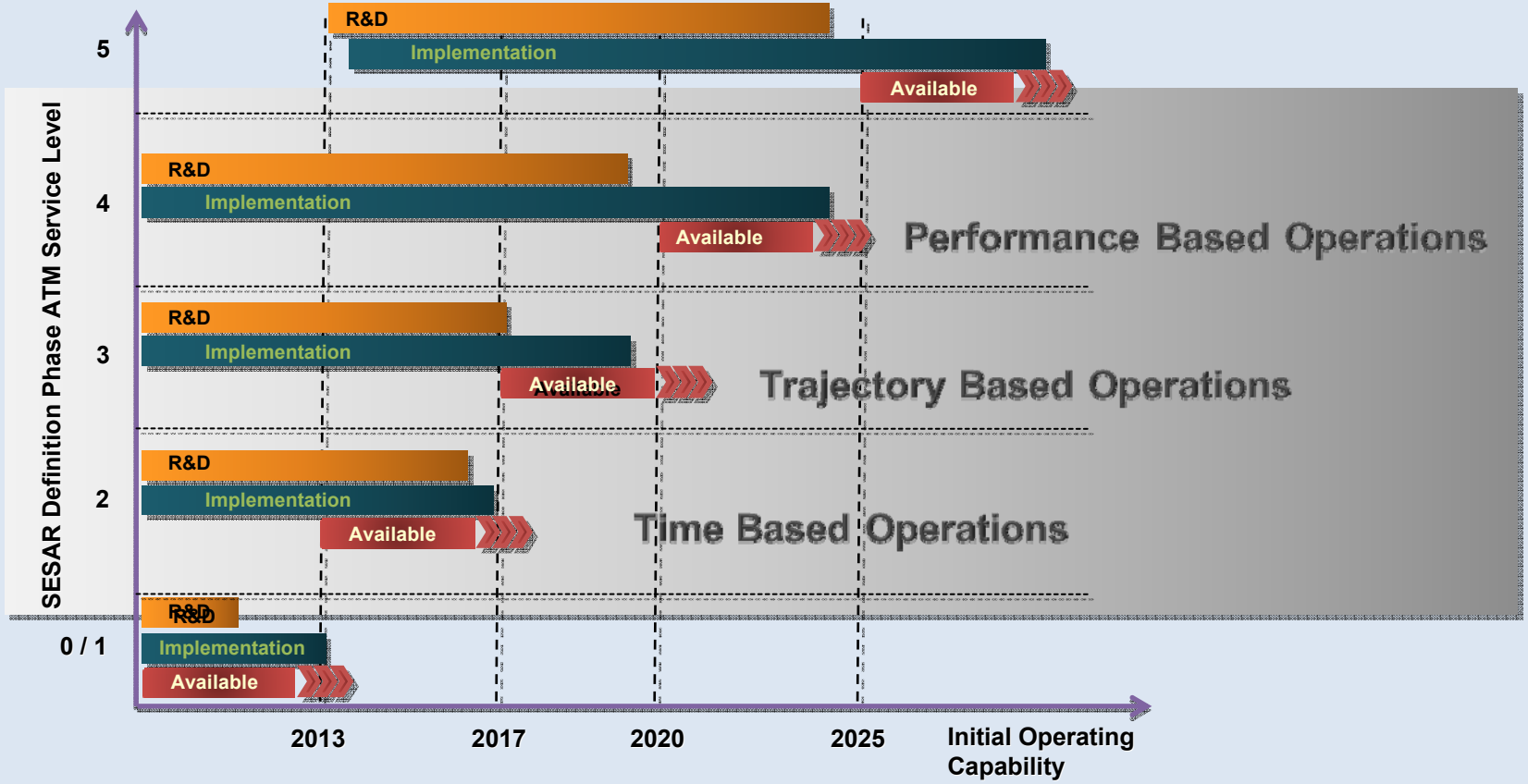
Key Topics - draft



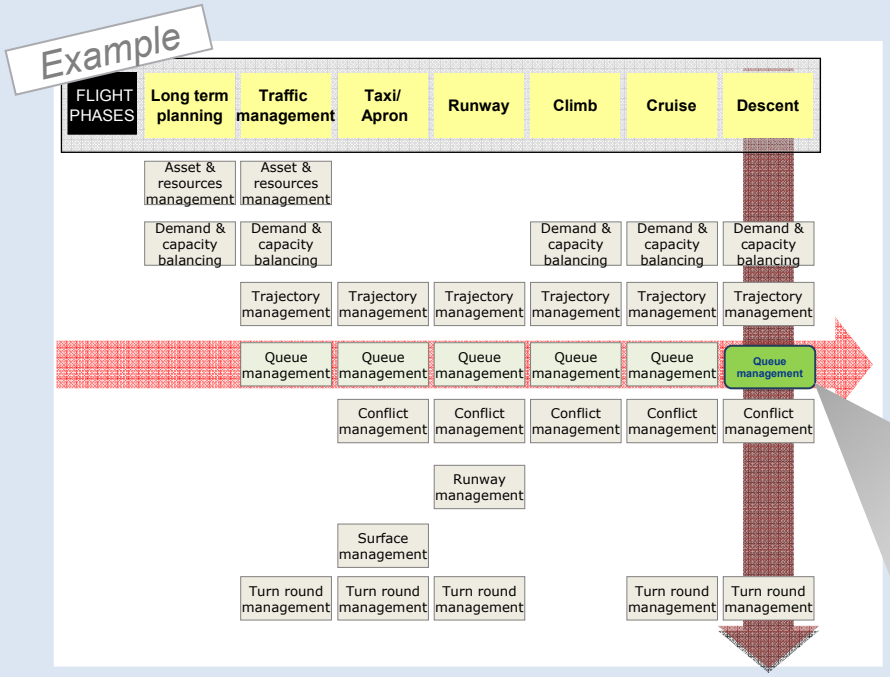
Concept and Validation

Main Concept Elements

ATM Operational Roadmap

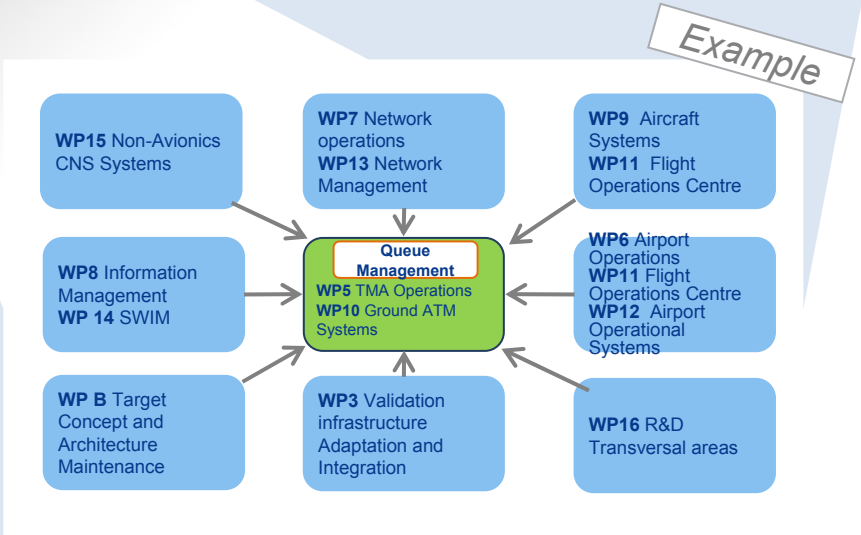


ATM Operational Services

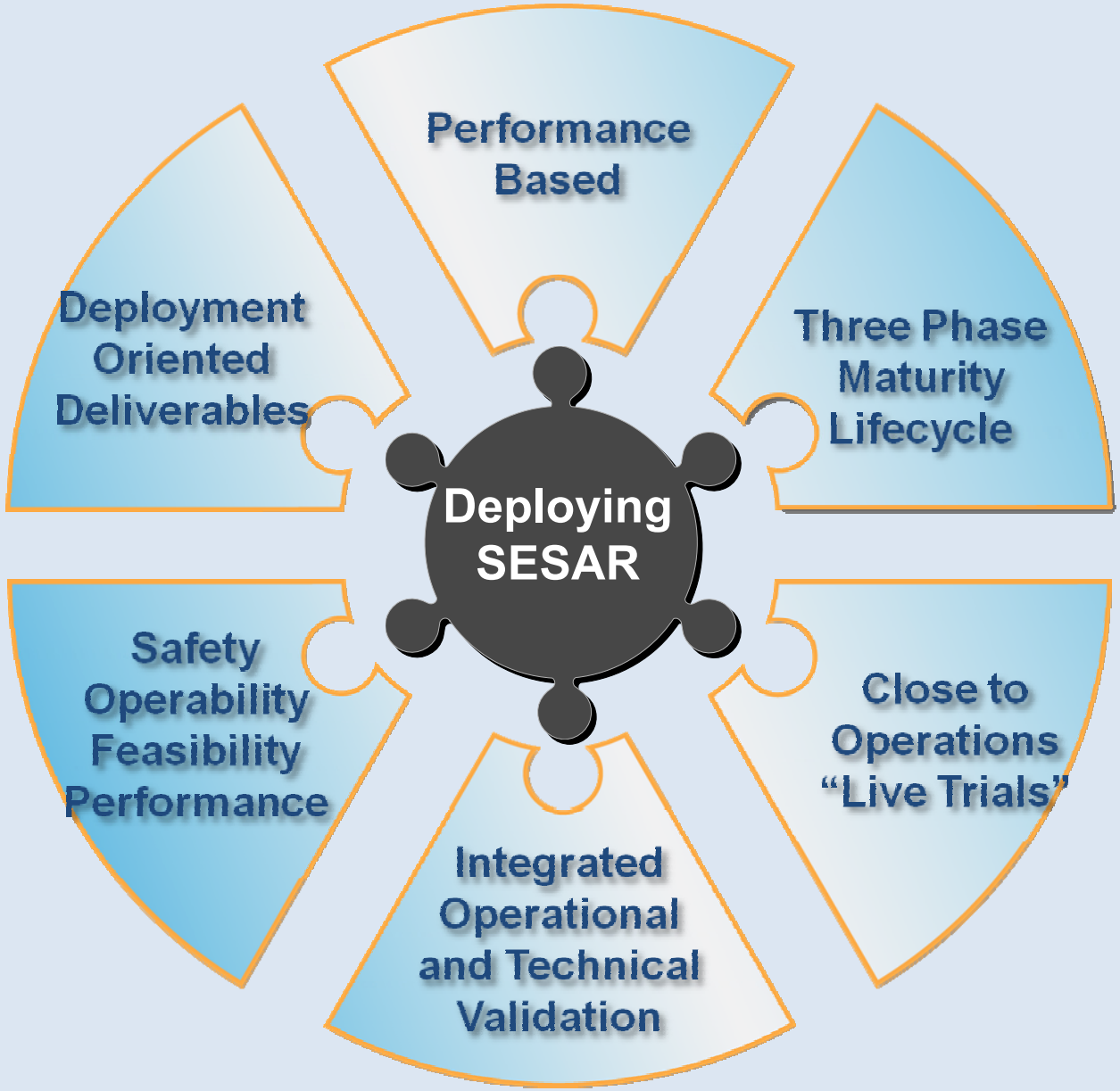


- **There is a need to identify all the Projects** that contribute to the design, validation and verification of a same common ATM theme
- In this illustration, **the ATM Operational Service "Queue Management" for the Flight Phase "Descent" is isolated** by linking the ATM Operational Service with the Flight Phase

- The ATM Operational Service "Queue Management" for the Flight Phase "Descent" has **contributions from various Projects under different WPs** (Operational and System)
- **These interdependencies must be identified** to ensure coherent design, validation and verification, and to manage scheduling, changes, and defaults



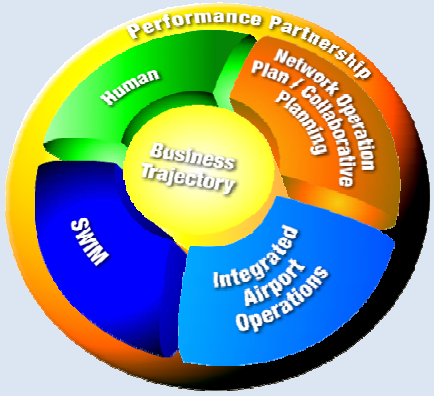
Validation and Verification



Keys to Validation and Verification

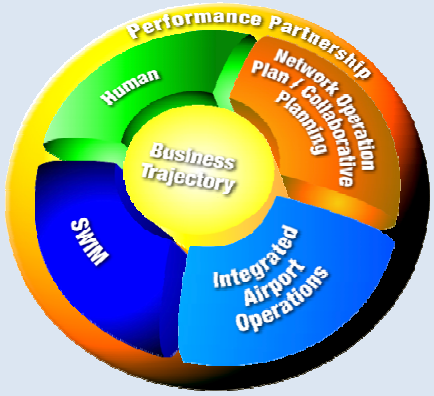
- ATM Community Participation (Users, Providers, Staff ..)
- Focus:
  - Time to Market
  - Close-to-Market --Target Operational Deployment Environment (Live Trials)
  - Early Benefit (mature concepts, procedures and products)
- Coherent Validation and Verification
  - Top Down, Incremental & Structured Approach;
  - Supported by WPB, WP3 & WP16 (i.e. Transversal WP)
  - Designed and Executed by Projects
- Continuous Maturity Assessment

TECHNOLOGY EXAMPLES
Airborne CNS



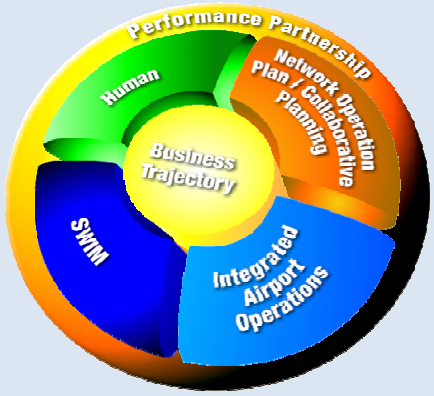
- **Communications Systems**
  - Flexible communication for voice and datalink
  - Future ATS Datalink with civil-military interoperability
  - SWIM - a/c on the network with seamless and secure operation
- **Navigation Systems**
  - Optimised arrival and approach for emissions & noise
  - Support RNP to Precision Approach transitions
  - Multi-constellation GNSS, transition to future GNSS based systems
  - Systems suitability for Approach with Vertical Guidance
- **Surveillance Systems**
  - ADS-B 1090 higher performance
  - ADS-B In/Out for Military transport aircraft
  - ADS-B and other surveillance data fusion for enhanced operations

TECHNOLOGY EXAMPLES
Airborne Flight Management



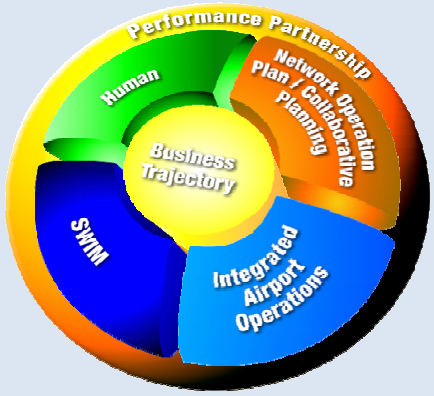
- **Flight Management Avionics**
  - Initial and full 4-D Trajectory management and data exchange with ground systems
  - Architecture evolution and roadmap with International agreement
  - Continuous cruise climb support
- **Safety Nets and protection systems**
  - TCAS evolution for all a/c types and multi-threat
  - ASAS Self Separation technical feasibility
  - Weather hazards and Wake Vortex detection systems
  - Flight control and separation optimisation in wake encounter
  - Enhanced and Synthetic Vision systems

TECHNOLOGY EXAMPLES
Non Avionic CNS



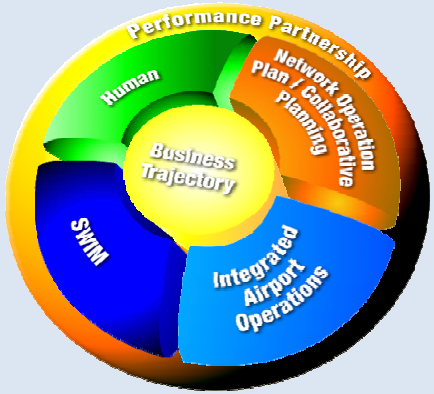
- **Communications Systems**
  - Wireless Communication Infrastructure over ground, satellite and airport segments interoperable between Civil & Military
  - Ground Communication Infrastructure supporting SWIM
- **Navigation Systems**
  - GNSS positioning and timing enhancements in support of civil and military operations
  - GBAS for Cat II/III operations
  - Multi-constellation GNSS for Cat II/III operations
- **Surveillance Systems**
  - ACAS Monitoring without radar
  - Enhancements for ADS-B in support of new ATM applications
  - ADS-B ground station development in support of ASAS applications
  - Weather sensing, monitoring and infrastructure technology updates

TECHNOLOGY EXAMPLES
En-Route & Approach ATM



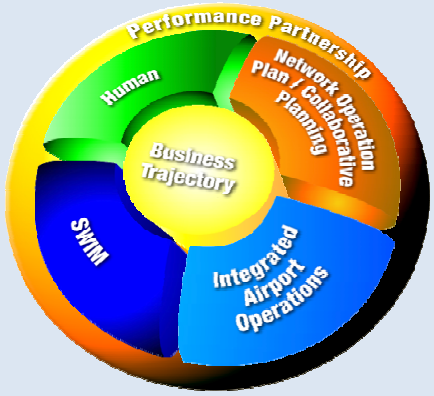
- **Data Processing**
  - ACAS information integration into ATM Surveillance
  - Enhanced Air-Ground Datalink routing and information processing
  - Flight Object handling and advanced Interoperability
- **Separation & Airspace Management**
  - Precision Trajectory clearances and ASAS procedure support
  - System support for flexible use of airspace
- **Controller Tools**
  - Sequence and Queue Management, Route Optimisation
  - Advanced Conflict Detection & Resolution tools
  - Precision Conformance Monitoring
- **Safety Nets**
  - ACAS information integration into ATM Safety Nets

TECHNOLOGY EXAMPLES
Airport



- **Runway Management**
  - Wake Vortex & Wind Shear detection, prediction and decision support
  - Foreign object detection
- **Surface Management**
  - Improved surveillance for enhanced safety and capacity
  - Sequencing, Routing & Guidance tools including Safety Nets
- **Tower Management**
  - Integrated data processing & tools for improved Flight Management
  - Remotely operated towers, including multiple controlled airports
  - Augmented dynamic vision for local and/or remote towers
- **Airport CDM & Collaborative Planning**
  - AMAN, SMAN, DMAN & MET integrated with decision support tools

TECHNOLOGY EXAMPLES
Network Management



- **Network Planning**
  - Airspace design & optimisation tools
  - Capacity and airspace long-term organisational planning tools
  - Scenario Management (Flow, Capacity & Dynamic Airspace) tools
  - Demand data forecasts, logic and management tools
- **Aeronautical Information**
  - Model extension (AIXM 5), harmonisation, access, dynamic updates
  - Migrate from a Message-centric to Data-centric approach
  - Context-aware briefing tools for information management
- **Network Operations**
  - Network performance optimisation tools
  - Optimum 4-D route determination and flight planning support tools
  - SWIM enabled network demand and capacity balancing tools

Finally, some Key facts

- 250 projects
- 16 work packages
- Initiation phase 3-6 months starting in June 09
- 63 Projects launched to date
- Consistent engineering methodology applied
- Validation ‘close to market’
- Performance partnership

CONCLUSION

1. **Public Private Partnership**
2. **Addresses all flight phases**
3. **Key components:**
   - Performance based
   - Automated support to human
   - Collaborative environment using SWIM
   - Interoperability
4. **Coordination with FAA/NextGen**


Thank you …
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