ATM in the AFI region

Point of the view of an industrial

21st IFATCA REGIONAL MEETING

Nairobi, October 2010

MEMBER OF SESAR

THALES

Summary

- Thales : Supplier of ATM, Avionics and Simulators systems
- The ATM evolution
- The ATM evolutions in the AFI Region seen from the industry
- Conclusions

Thales Aeronautical and Aerospace Systems

- Air traffic management systems
- Avionic systems
- Aircraft simulators
- Satellite systems

Our mission is to ensure complete airspace security and provide complete airborne solutions for all types of aircraft with interoperable and performing systems.

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Thales ATMS : worldwide leader

- Thales ATM is trusted by **170 nations**.
- **270 EUROCAT** ATM systems in operation worldwide.
- **1 in every 2 airplanes** is brought to the ground safely thanks to Thales' ATM systems or equipment.
- Thales install **1 new ATM radar per week.**
- More than **100 Thales secondary radars Mode S** are in service worldwide.
- Thales just completed the development of **the most advanced L-Band radar**
- Thales **world leader in ADS-B** (Australia and USA)
- Thales has installed local bases in **4 out of the TOP 5 countries** listed for their traffic growth in both passengers and freight (2005-09)

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Intelligence onboard the A380

Aeronautical equipment and functions

Cockpit

CDS Control & display system (1)

HUD Head-up display

OANS Onboard airport navigation system (1)

BPI Brake pressure indicator

Navigation

SFCS Slats & flaps control system (4)

FCU Flight control unit (1)

SNS Standby navigation system

DRA Digital radio altimeter

AU Accelerometer units

Cabin systems

TopSeries i-5000 in-flight entertainment system

Cabin lighting (4)

Mood lighting (4)

Avionics

IMA Integrated modular avionics (1)

AFDX E/S Aircraft full duplex end-system (1)

Utilities

DSMS Doors & slides management system (4)

BSCF Braking & steering control function (3)

Electrical systems

EPGS Electrical power generation system (2)

Starter

Training & simulation

Innovative technological solutions, including many world firsts

(1) In partnership with **Diehl Aerospace**
(2) Developed by **Aerolec**, a joint venture with Goodrich
(3) Supplied to Messier Bugatti
(4) Developed and supplied by **Diehl Aerospace**

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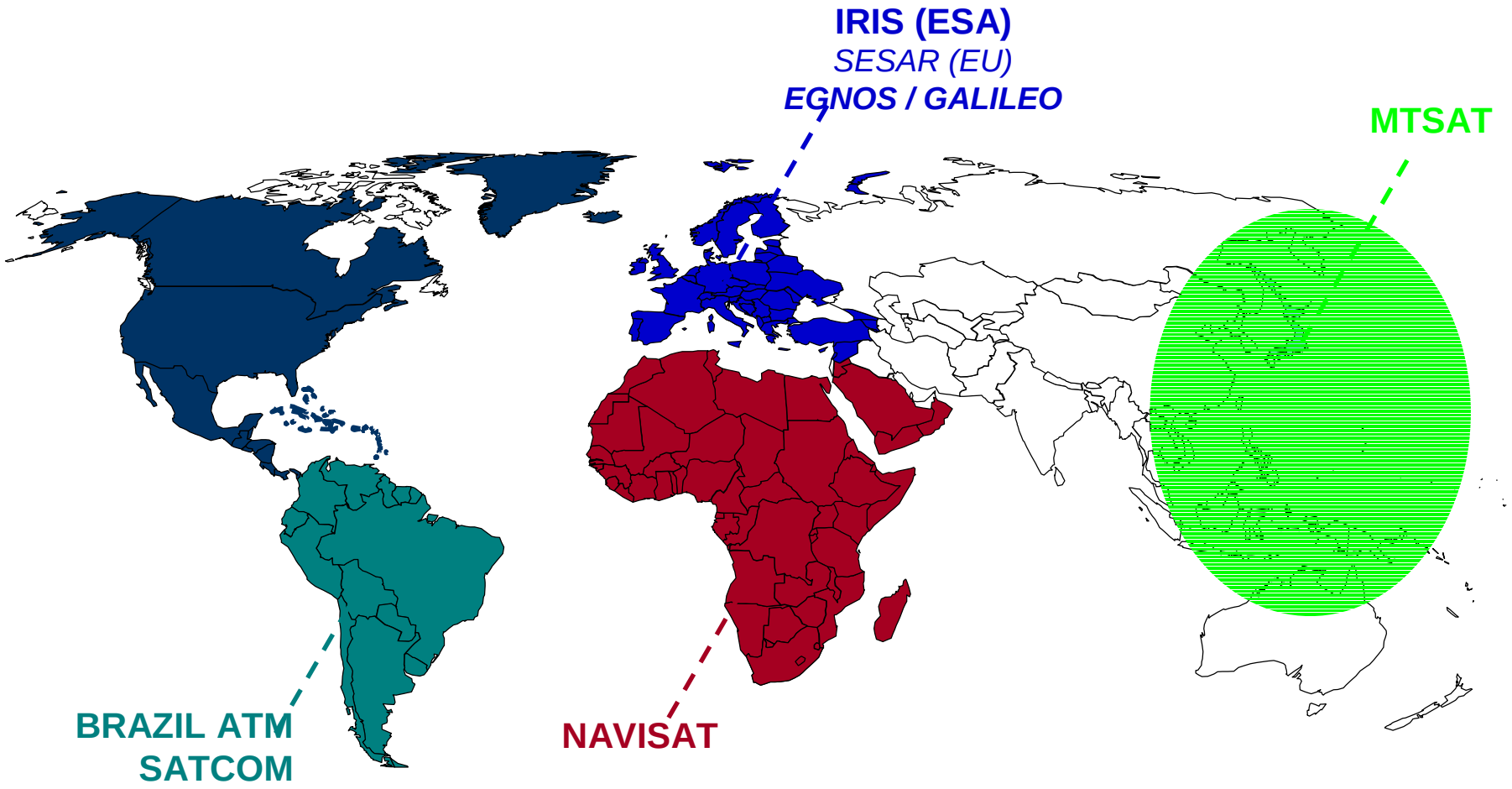
A global leader for satellite solutions

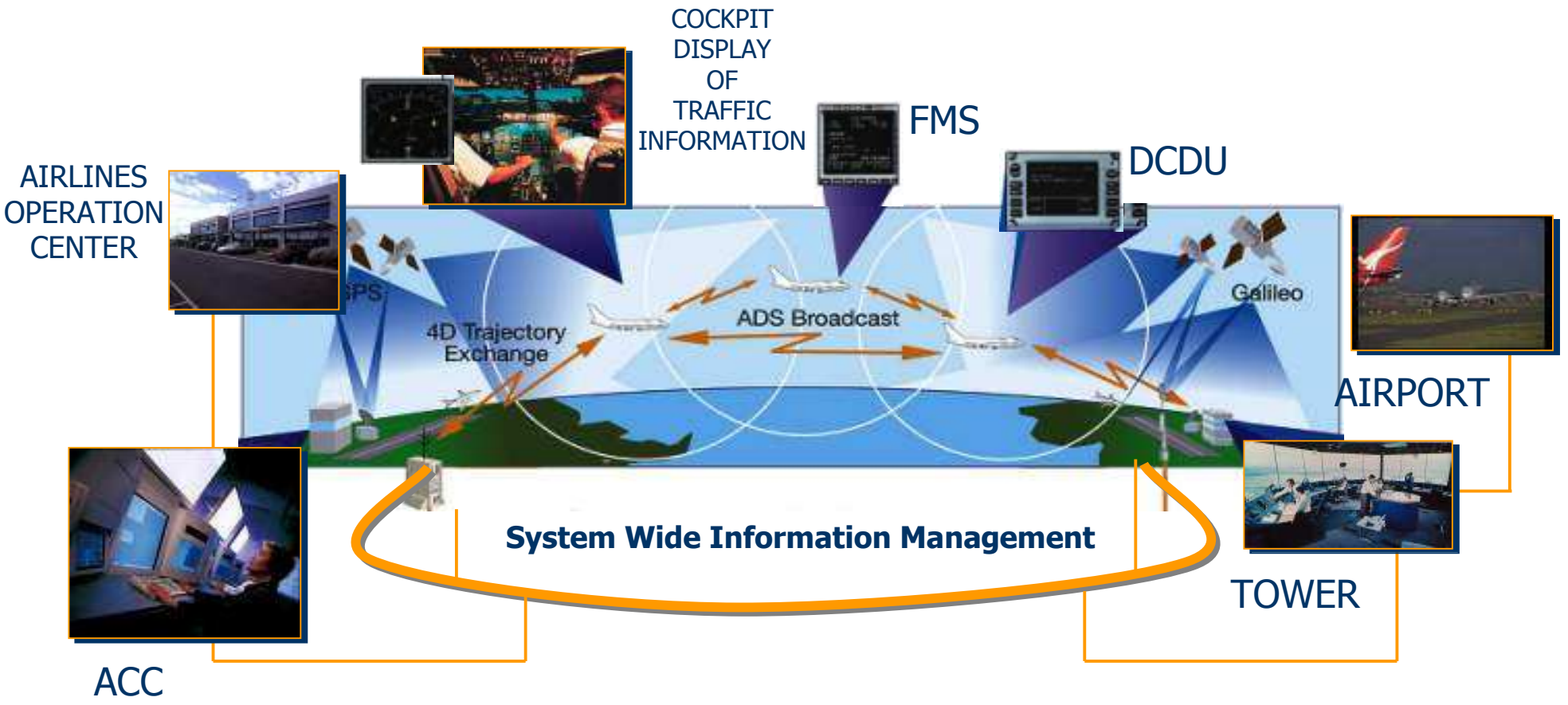
TAS Is involved in all ATM / Satellite Aerocom initiatives worldwide



ATM evolution and Thales's activities

Industry Vision for a new CNS/ATM infrastructure

Air and ground integration for improved automation



Cooperative Flight Data Processing System and traffic flow management

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Key Concepts for the future ATM

- ATM exists in a collaborative environment with real-time information sharing between all participants (CDM, SWIM).
- Optimised airspace structure based upon advanced navigational and approach capabilities (PBN, RNP, RNAV, GLS, …)
- Flexible and dynamic allocation of airspace with minimal traffic constraints allows optimised trajectories while meeting the “realised needs” of all users (FUA, UPT).
- Precision planning of 4D trajectories based on air-ground data exchange and supported by advanced automation
- Advanced separation management tools and shared (air and ground) responsibility for separation tasks ensure efficient tactical traffic control (ASAS, FPCP, MTCD, CORA).
- Performance based service provision dictates the airspace architecture.

Future ATM Concepts - Priorities for IATA & CANSO

- Rationalised infrastructure
- Better use of the existing avionics capacities
- Common procurement based on user needs – COOPANS
- More Ground and Airborne Systems Co-operation/exchange
- Agreement on cost effective, performance driven, harmonisation solutions when moving to another technology – will not pay unless positive CBA

ATM Systems Trends

More and more demanding systems

- Increased Capacity
- Increased Automation
  - ➔ **ATM systems are no longer simple screens displaying radar images**
  - ➔ **First generation of Controller tools : New HMI, Safety nets, MTCD, STCA**
  - ➔ **Future generation of Controller tools : Conflict Resolution Advisory ; Self separation ; Automated coordination**
- Increased Safety :
  - ➔ **Increasing impact of safety requirements**
  - ➔ **Increasing role of safety authorities**
- Increased interoperability
  - ➔ **ATC / ATC**
  - ➔ **ATC / Airport**

Consequences :

- Significant investments ahead
- Standardized specifications are needed
- Most ANSPs purchase integrated systems and either :
  - ➔ buy “off the shelf” products
  - ➔ or organize joint procurement (e.g. COOPANS, NEAP)

The New European Flight Data Processing System :

- Improved flight trajectory prediction with a better accuracy, using advanced aircraft models
- supporting operational improvement and new controller tools
- improving safety in compliance with ESARRs
- enabling European ATM integration
- supporting and enhancing air-ground integration
- route expansion & flexible adaptation for non pre-determined routing
- improving civil-military co-ordination and more dynamic airspace use
- coordinated with EUROCAE Standards Definition Group

Coflight eFDP

Project Partners

dgac DSNA

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

skyguide

THALES

SELEX Sistemi Integrati

…ultimate aim to maximise benefit to all airspace users

COOPANS Initiative

A COOPeration between ANS providers and THALES for harmonised upgrades of existing ATM systems

IRISH AVIATION AUTHORITY
ÚDARÁS EITILÍOCHTA NA hÉIREANN

LUFTFARTSVERKET

NAVIAIR

A common procurement approach for:

- Compliance with Single European Sky implementation rules
- Harmonisation of functionalities
- Commonality of technical solutions

AIRLAB : benefiting of a global expertise

OBJECTIVES

By taking advantage of Thales unique position in:

- ➔ Avionics
- ➔ Air Traffic Management
- ➔ Simulation

- To provide adequate environment for R&D
- To focus on Technology Readiness Level of innovation
- To install simulation facility to evaluate new operation concepts

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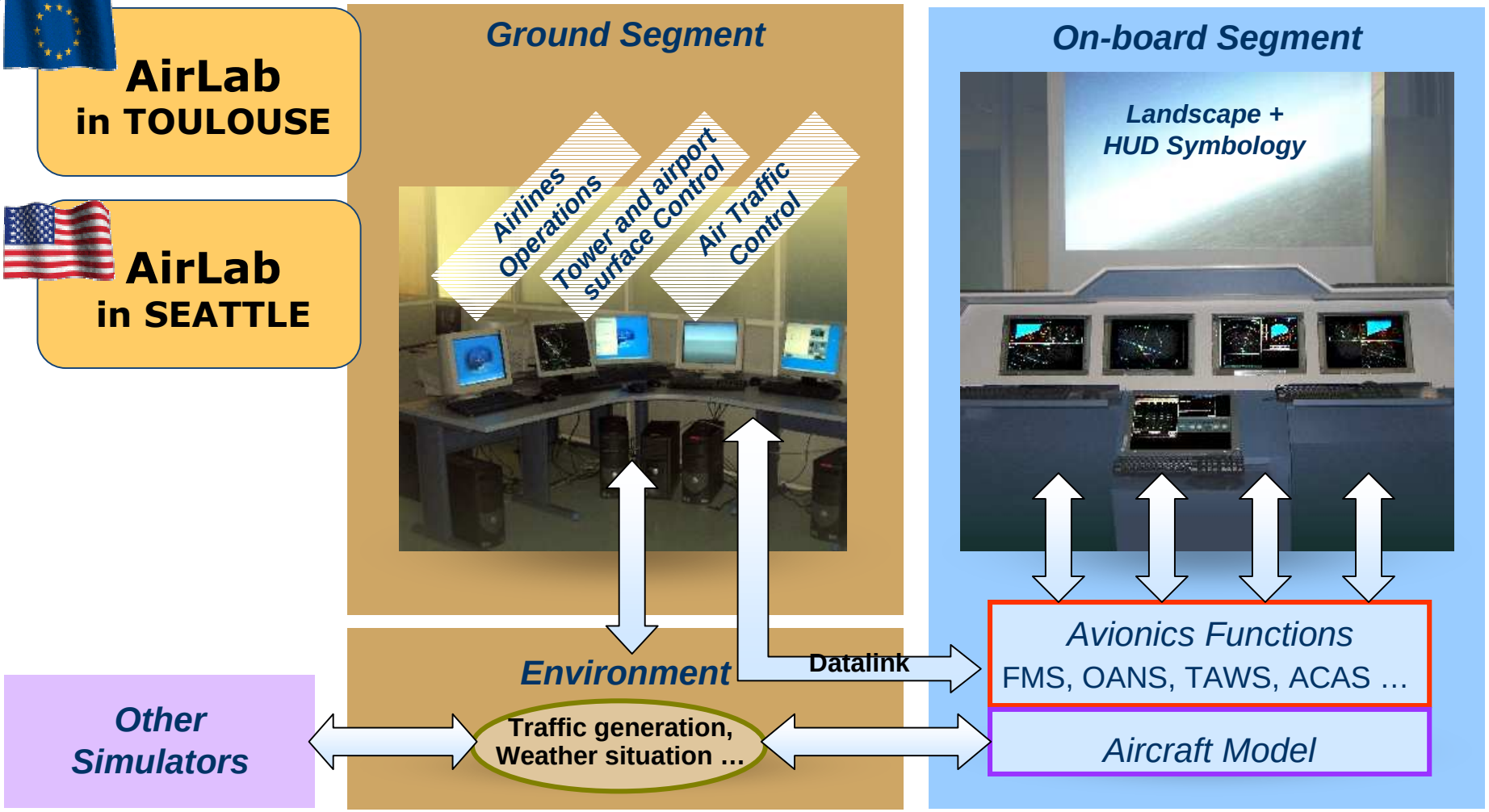
AirLab Implementations

AirLab in TOULOUSE

AirLab in SEATTLE



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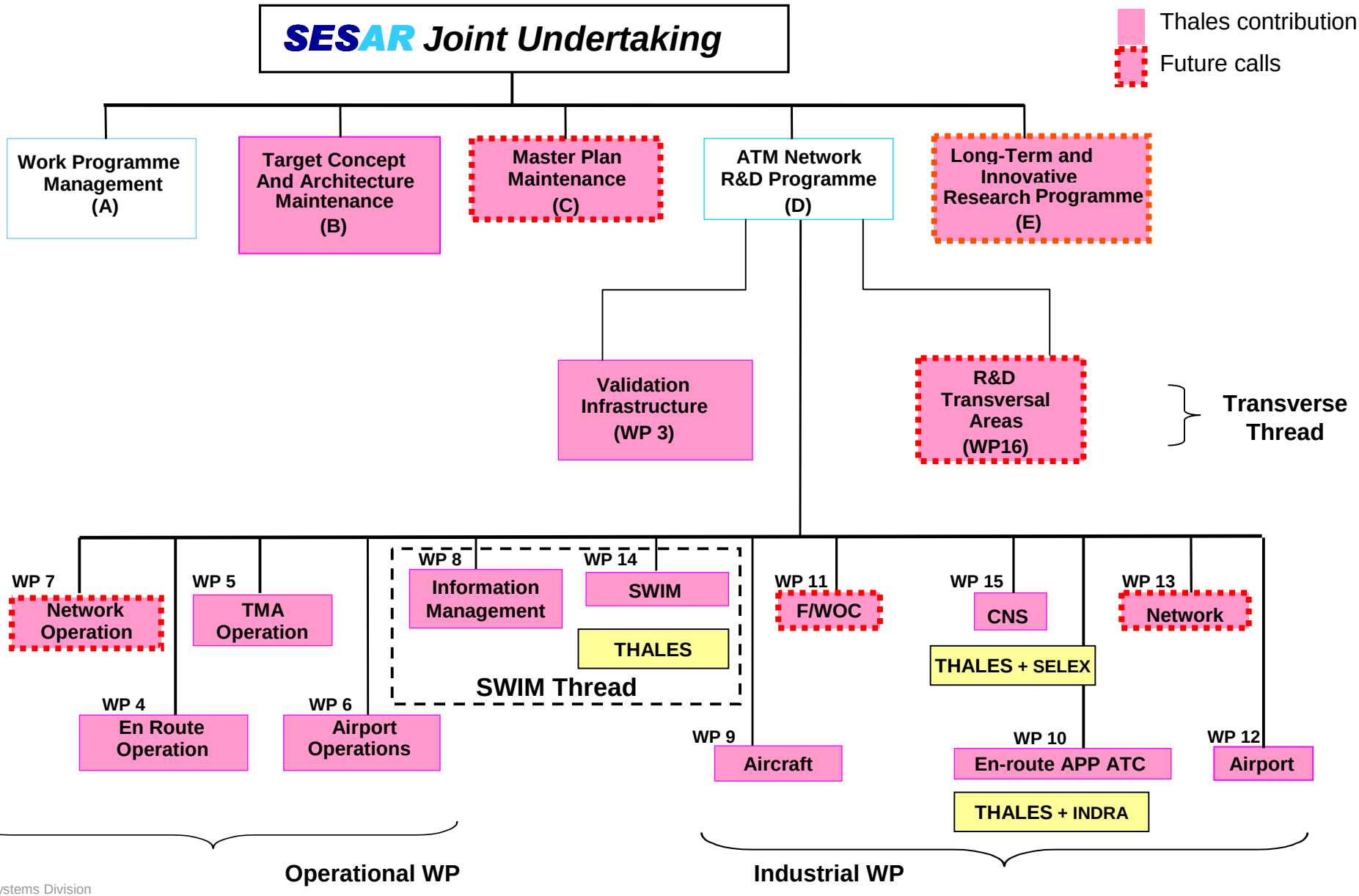
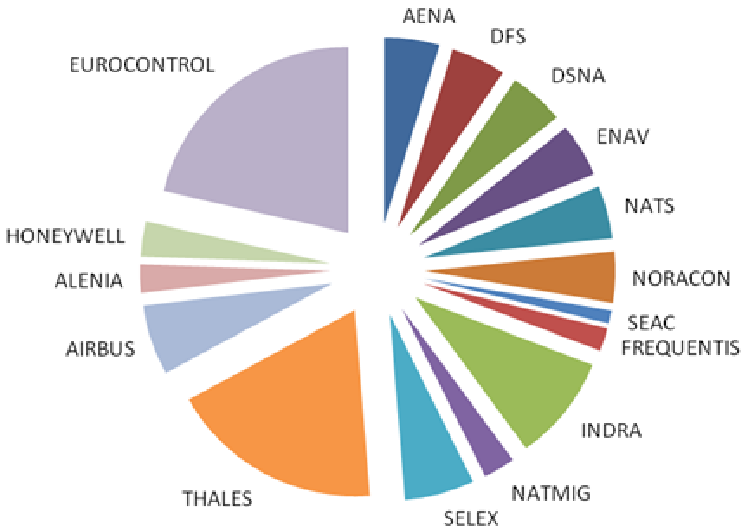
THALES Contribution in SESAR



THALES results in SESAR BAFO 1



Total of activity awarded: **237.3 M€**

Success rate: **93.4% (average: 88%)**

Average Technical score: **85/100**

Largest contributor (after Eurocontrol)

Candidate member	Offer submitted		Award		
	Nb projects	M€	Nb projects	M€	
AIRBUS	70	92,4	51	79,4	-14%
ALENIA	65	70,4	30	32,1	-54%
FREQUENTIS	33	28,8	30	26,3	-9%
HONEYWELL	32	51,8	24	39,7	-23%
INDRA	103	123,1	99	119,3	-3%
NATMIG	33	43,0	29	35,3	-18%
SELEX	104	131,1	64	77,3	-41%
THALES	**137**	**244,7**	**128**	**237,3**	**-3%**

Thales # 1 industry shareholder of SESAR Joint Undertaking

3. ATM in AFI region, seen from the industry

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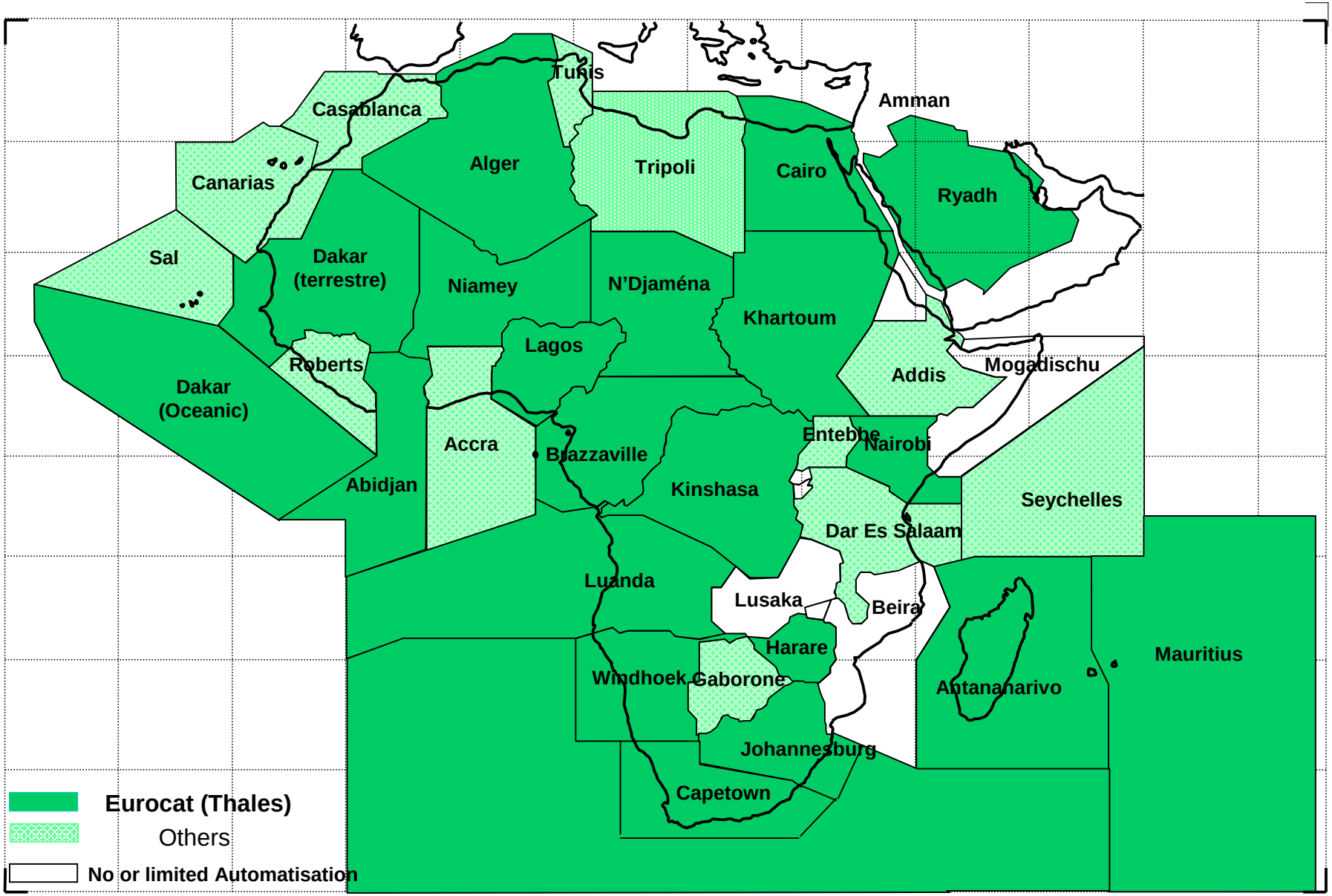
ATM systems in the AFI Region



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Feed-backs from our projects

- New ATM systems are not necessarily based on a top/down analysis
- Airlines, aircraft operators are not often in the loop,
- Shortage of qualified and trained people
- ATCOs are rarely in the specifications process
- Avionics capacities are not enough taken into account
- Controllers, maintenance staff training/qualification could be better scheduled
- Limited System Safety Analysis

ATM improvement/evolutions

1st and most important : Human Resources

Then

- Flight data creation, distribution & processing,
- ATS/DS
- Surveillance capability
- Aeronautical data management
- Interfaces between airport systems and ATC

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ATM - functional evolutions of ATM systems

Flight plan Processing

- New FPL format
- Trajectory management, use of ADD (Aircraft Derived Data)
- Constraints manager, Arrival/departure manager

Surveillance

- Multiple Sensor Tracking and Server (radar, ADS-B, WAM, ADD..) for surveillance data fusion & distribution
- Surveillance data exchange between ANSP

Communications

- Data-link / CPDLC, AMHS, Ground-Ground ATN, Network Security

Controller tools

- IHM, weather data display
- New ADS-B, STCA, MTCD (Short & Medium Term Conflict Detection)

Interfaces with the airport systems

- Co-ordination between TWR & APP with the ATC system to provide a gate-to-gate coverage and uniqueness of data

- Safety Improvement – prevention of runway intrusion
- Reduction of controller workload
- Interfaces airport databases (AODB)
- More efficient Routing and Guidance on Apron and taxiways
- Improved coordination between ATC and TWR/APP
- Optimisation of arrival and departure traffic flows

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- Communications networks evolutions to support;
  - Increasing data exchanges between main ACCs (AFTN/AMHS, AIDC, OLDI, Contingency/back-up functionalities)
  - Increasing data exchanges between main ACC, remote ATS units and airports
  - Increasing data exchanges between main ACC and peripherical applications les Aeronautical data management systems, billing systems, ATFM, Safety Management systems
  - Surveillance (radar, ADS-B, WAM, …) data flows (within FIRs and between FIRS)
- Implementation of new communication systems
  - VDL2 (AOC & CPDLC on ATN)
  - Dual stack ACARS/ATN Air Server
  - ACARS data communication server

Surveillance : IATA's position

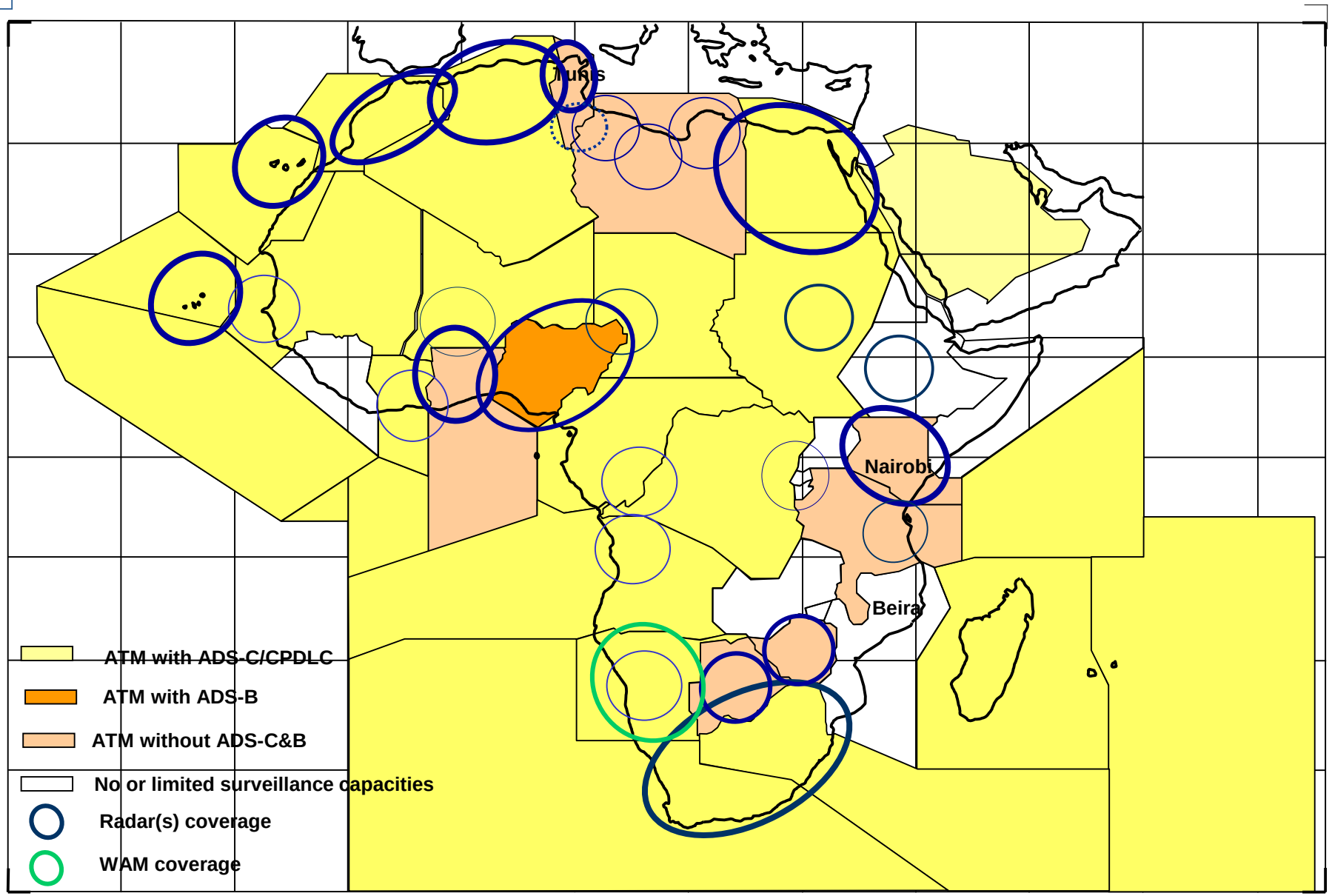
''In many areas of the world, the partial or complete lack of adequate ground based surveillance is a major safety and capacity issue....

Surveillance radar has, to date, proved a valuable tool in expediting traffic while maintaining appropriate safety levels. Mode S Secondary Surveillance Radar is supported where justified.

IATA encourages the development and implementation of automatic air ground position reporting, using inter alia, ADS and ADS-B ...

IATA supports the option of replacing existing en-route surveillance systems with ADS and ADS-B, or where there is no radar, installing ADS and ADS-B surveillance''

Surveillance capacities in the AFI Region



CONCLUSION

Conclusion

In the last 10 years, most of the AFI ANSP carried out tremendous efforts by implementing new ATM/CNS systems and train staff, but;

Availability and sustainability of trained, qualified and motivated human resources are the key issues

Thanks for your attention

Any question ?

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