



AGENCE POUR LA SÉCURITÉ DE LA NAVIGATION  
AÉRIENNE EN AFRIQUE ET À MADAGASCAR

*Les routes du ciel, notre métier...*

# Implementation of Advanced Surveillance Enhanced Procedural Separations (ASEPS)

# INTRODUCTION

- ASECNA intends to implement Advanced Surveillance Enhanced Procedural Separation (ASEPS) in its airspaces;
- Objective: increase operations efficiency and capacity in oceanic and remote continental airspaces:
  - ✓ Using till now Automatic Dependent Surveillance in Contract mode (ADS-C, update intervals of 15 minutes) with minimums of 80NM or 50NM;
  - ✓ By applying reduced separation minimums: 20NM up to 15 NM.

# INTRODUCTION

## Definition:

- ASEPS (Advanced Surveillance Enhanced Procedural Separations): reduced procedural separations applied with advanced ATS surveillance systems such as ADS-B or Multilateration;
- These kind of separations are applied in environment without VHF Controller-Pilot voice communications under following conditions:
  - ✓ Navigation performance RNP 4 or RNP 2 prescribed;
  - ✓ Communication system must satisfy to RCP 240;
  - ✓ Existence of another means of communication available to allow the controller to intervene and resolve a conflict within a total of nine minutes or in the event of normal means of communication failure;
  - ✓ Route compliance monitoring by lateral deviation alerts, alert threshold normally set at a maximum of 3.0 NM (Doc 4444).

# CURRENT OCEANIC AND REMOTE CONTINENTAL AREAS OPERATIONS

- Control with procedural separations :
  - Without ADS-C:
    - traffic monitoring based on position reports: longitudinal separations in time of 10 minutes (80NM);
    - traffic monitoring based on use of extrapolated positions from the FDPS;
  - With ADS-C:
    - using ADS-C positions to separate aircraft
    - Longitudinal and lateral separation minimums: 50NM.
- Variable aircraft equipment leads to variable separation minima (RVSM, RNP, RCP, RSP capabilities);
- Current standards result in acceptable probabilities to obtain preferred routes and altitudes but expected traffic increase in the future will have an impact on this.

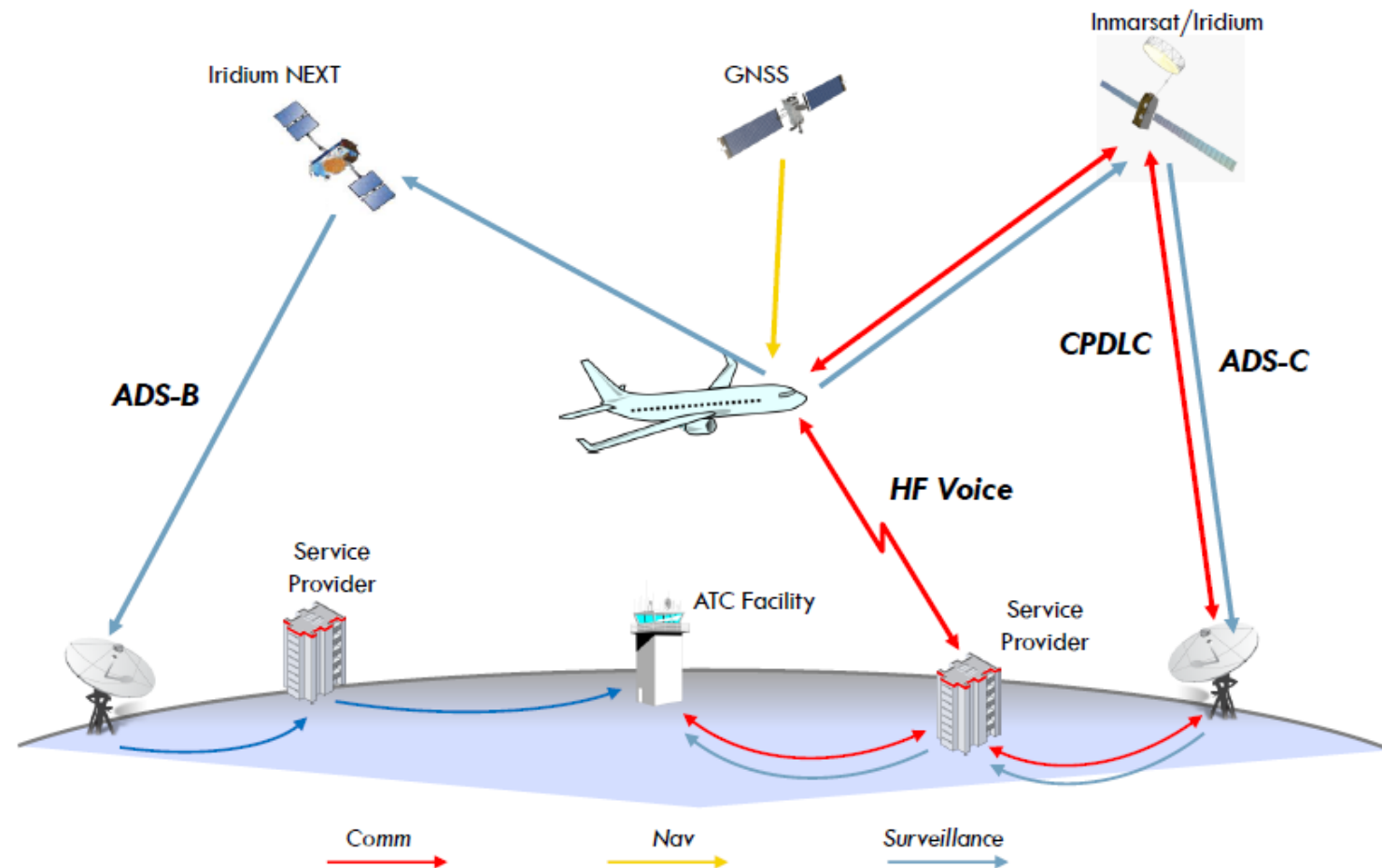
# KEY ENABLERS

- ADS-B data used by more and more African ANSPs for surveillance;
- Wide area visualization;
- ADS-B mandate;
- Good ADS-B carriage in RVSM airspace;
- Good PBN equipment of aircraft in RVSM airspace;
- Good CPDLC communications.

# OCEANIC AND REMOTE CONTINENTAL AREAS OPERATIONS

## View of Operational Communications and Surveillance in Remote Ocean and Continental Regions

- Wide areas without VHF communications;
- High use of HF communications;
- CPDLC communications often available.



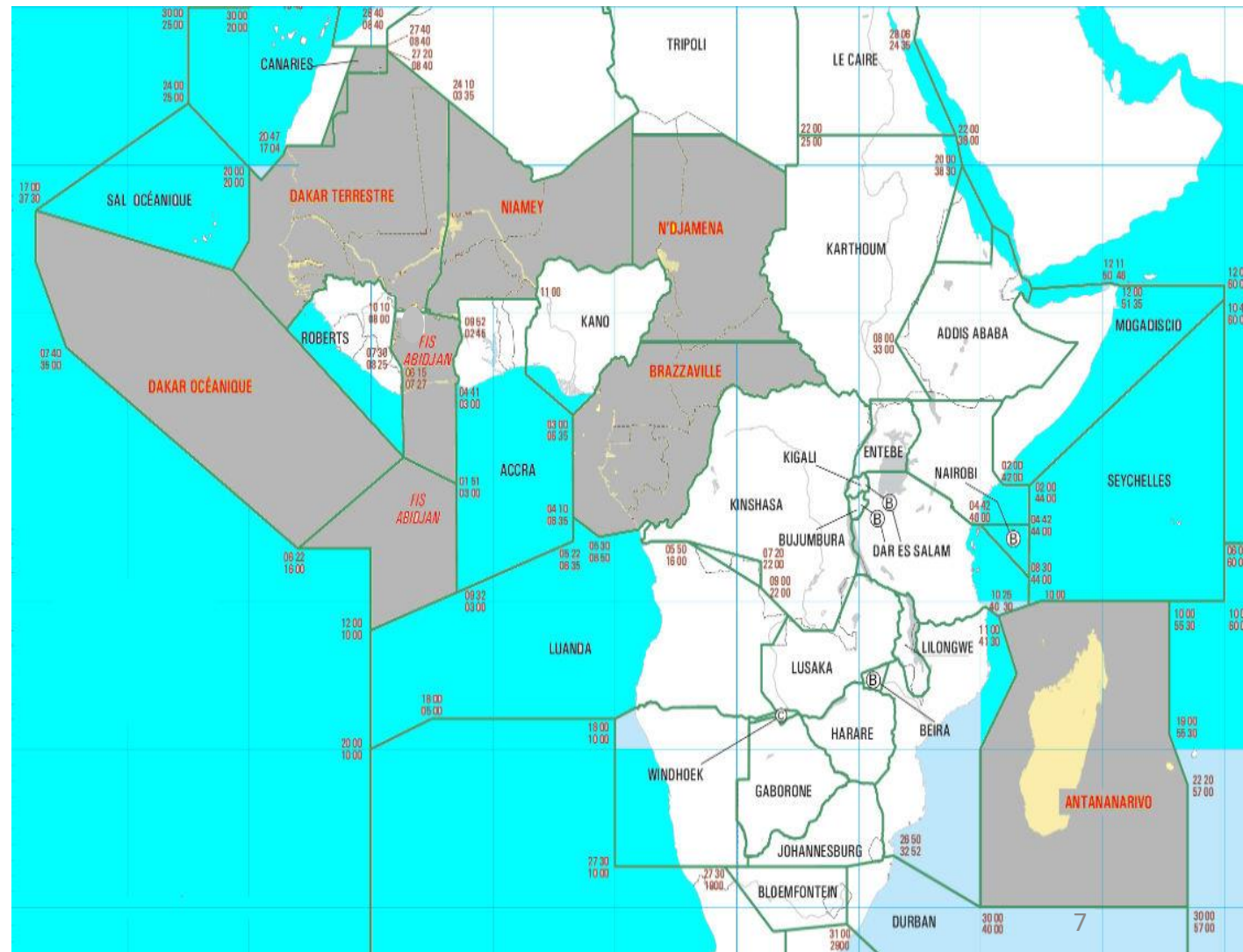
# ASEPS IMPLEMENTATION: CONCERNED AIRSPACES

## ■ Concerned airspaces:

- ✓ Oceanic RVSM airspaces: Oceanic Dakar (including FIS Abidjan), Antananarivo;
- ✓ Remote continental RVSM airspaces where VHF voice communications are not available:
  - ✓ UIR Niamey outside UTAs;
  - ✓ UIR Ndjamena outside UTAs;
  - ✓ UIR Brazzaville outside UTAs.

*RVSM spaces at first.*

*Possibility to create slices of spaces from FLXXX to FLYYY where this type of separation will be applied*



# SERVICES

- Procedural air traffic control service ;
- Flight information service;
- Alert service.

Air traffic control service will consist in applying reduced procedural separations, called ASEPS separations.



# SEPARATIONS TO APPLY

- Separations intended to be applied under satellite ADS-B:
  - ✓ Longitudinal separations between aircraft following the same route or converging routes under less than 90° angle: 20NM;
  - ✓ Longitudinal separation of aircraft flying in opposite directions on oncoming routes: 5NM between the two crossed aircraft observed by ADS-B positions;
  - ✓ Lateral separation between parallel or non-secant routes: 20NM;
  - ✓ Lateral separation between aircraft following intersecting routes: 20NM.

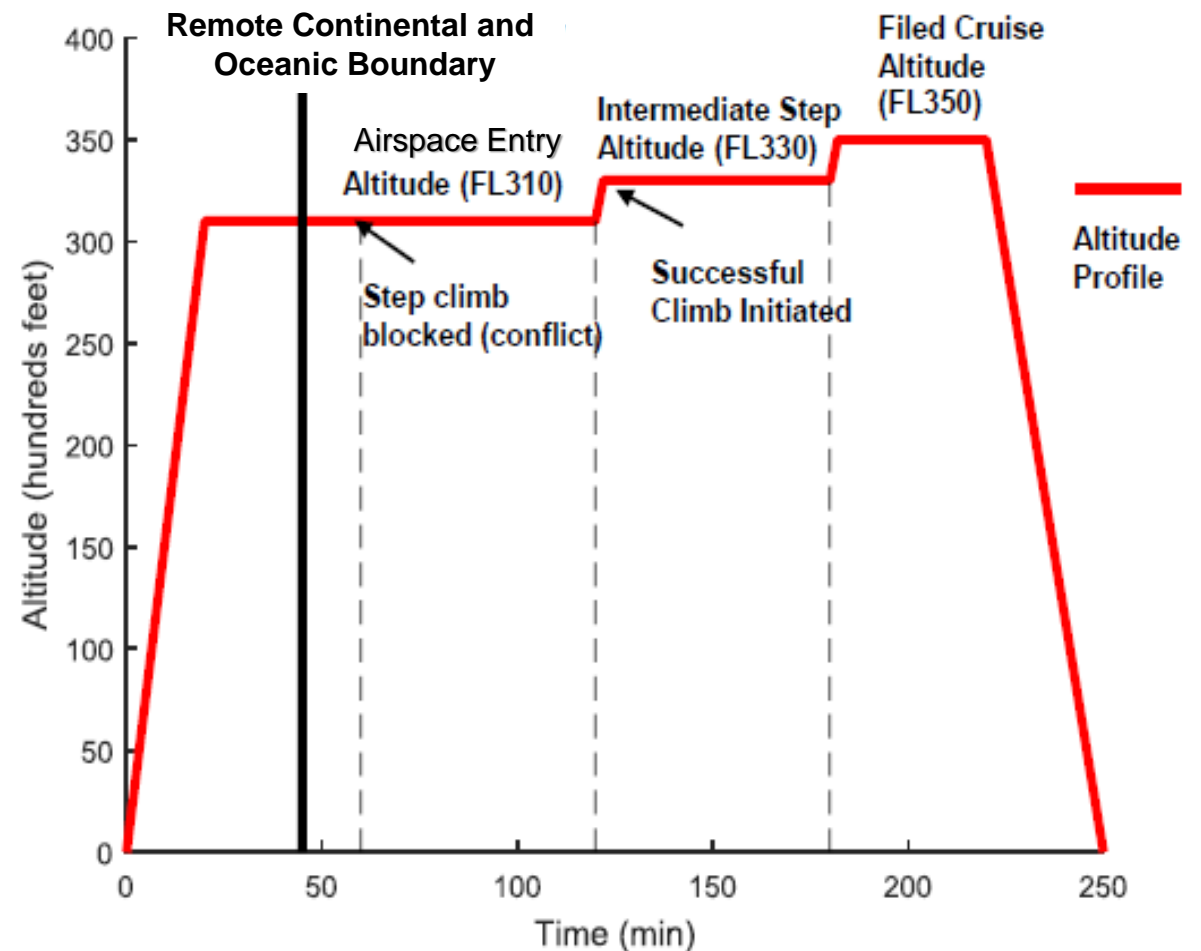
**No vectoring under ASEPS separations!!!**

# BENEFITS

- Improved situational awareness of the controller;
- Improved adaptation of descents, routes and speed demands;
- Improved accommodation (conciliation) of altitude requests;
- Improved arrival and departure services at non-radar airports;
- Reduction of the impact of bad weather en route;
- Reduced risk of vertical collision;
- Accurate and timely information for search and rescue.

# Improved accommodation of altitude demands

- Oceanic and continental flights often long;
- Strong desire to minimize fuel;
- Higher altitudes usually result in higher fuel efficiency;
- Aircraft often take off very heavy and cannot reach an optimal altitude until some of the fuel is burned;
- Once aircraft are light enough, they often want to climb to a more fuel-efficient altitude;
- Competition for optimal altitudes occurs frequently.



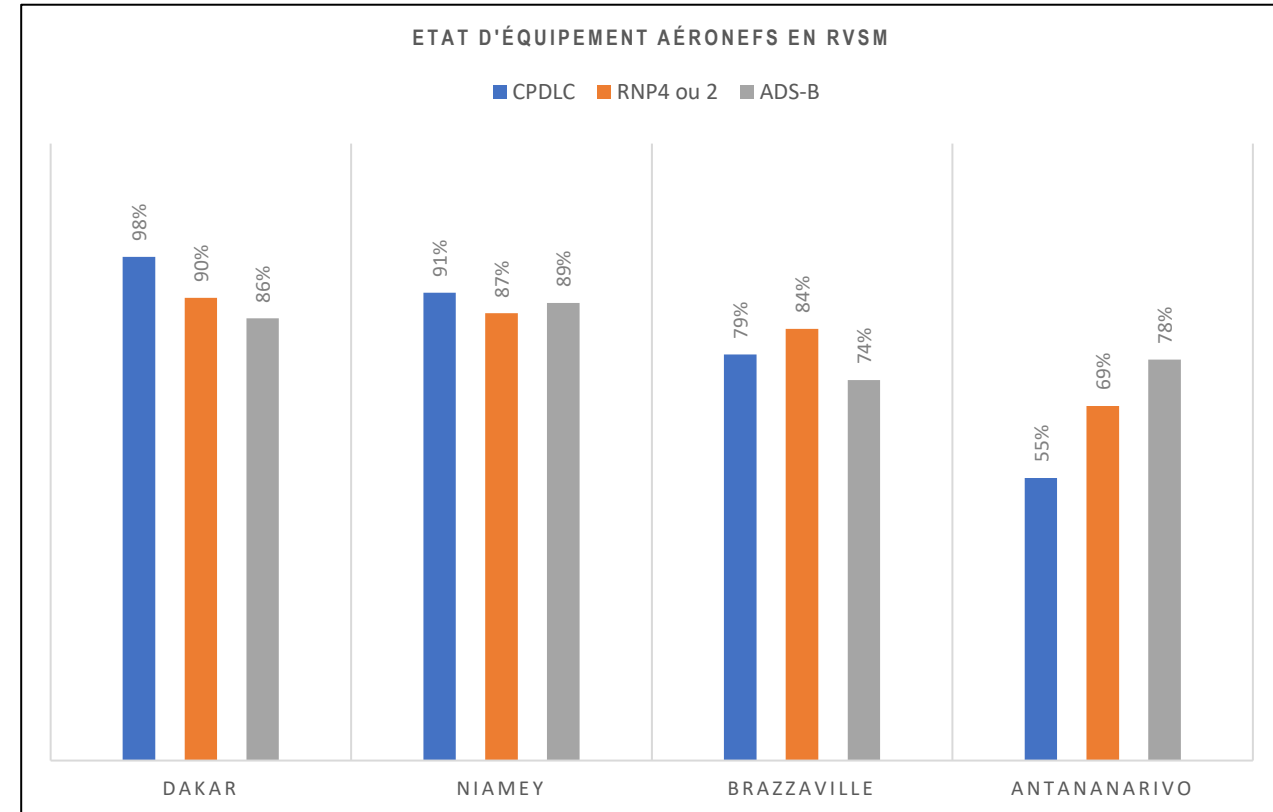
# CONDITIONS TO APPLY ASEPS SEPARATION

- How we intend to meet conditions:
  - Position accuracy and integrity requirements:  
Conditions already met by the technical characteristics of satellite ADS-B data. Also, TPMs show that technical parameters are over targets;
  - Navigation performance RNP 4 or RNP 2 prescribed:  
A survey showed that 69 to 90 per cent of aircraft are RNP4 or RNP2 capable;
  - Communication system meeting RCP 240:  
CPDLC: 98% of aircraft are equipped and study conducted on the CPDLC by Dakar shows RCP240 satisfaction at 100%);
  - Existence of another mean of communication to allow ATC to face to situations requesting quick reaction :  
HF available;
  - Route compliance monitoring by lateral deviation alerts of the ATS monitoring system:  
Setting the RAM to 3NM on the TopSky.

*Note: Aircraft that do not meet the RNP, CPDLC and ADS-B transponder equipment requirements will not be able to benefit this type of separation. Procedures will describe how to separate them.*

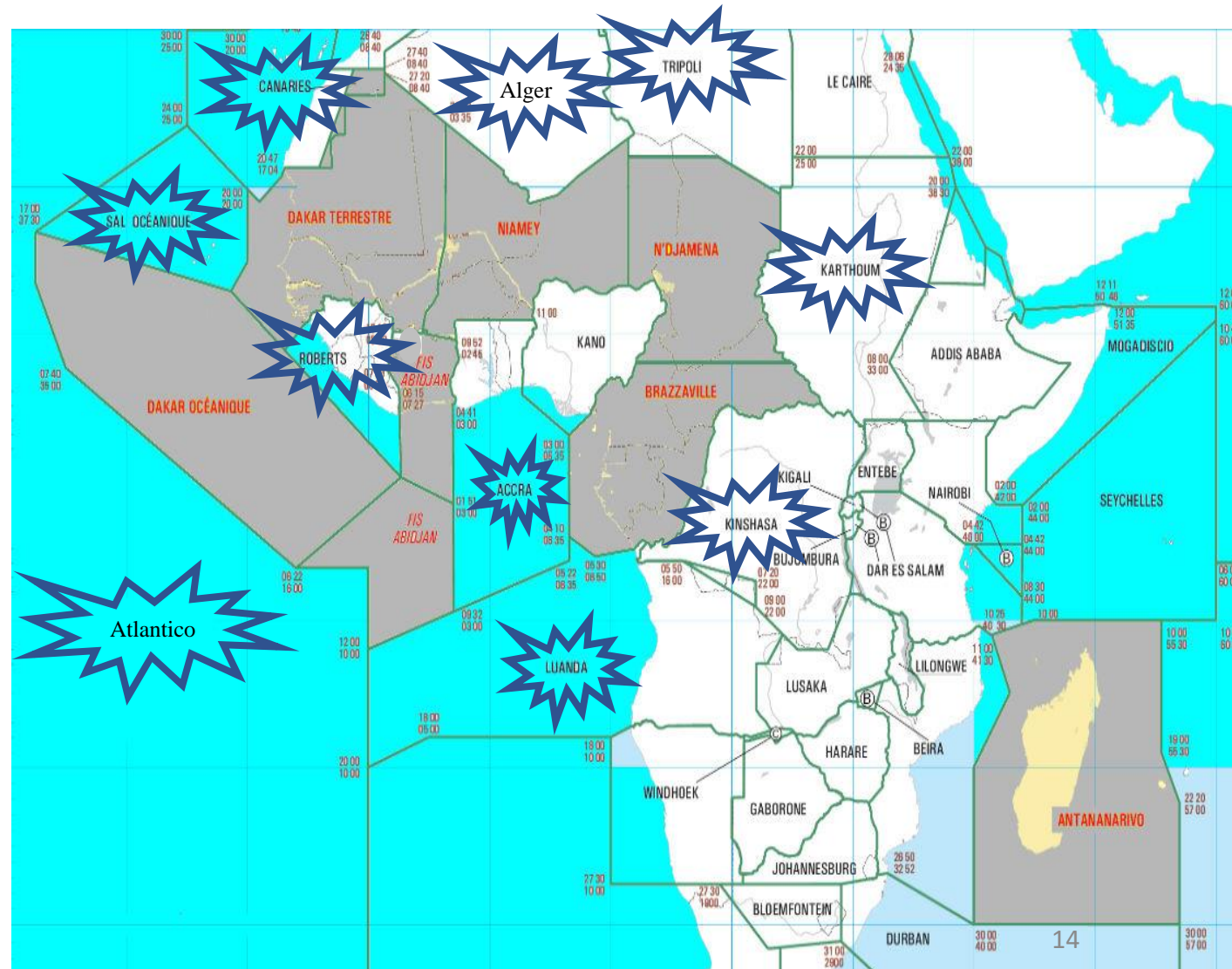
# AIRCRAFT EQUIPMENT

- Aircraft equipment includes avionics supporting PBN, data link COM, ADS-B.
- The current equipment levels of the aircraft in CNS were obtained by an analysis of the flight plans extracted from the TopSky systems and also data provided by AIREON ;
- These diagrams show a situation of aircraft capacity;
- Unequipped flights will be treated differently.



# COORDINATION

- A mandatory coordination with neighbouring ANPS, specially where more than 20NM separations are applied:
  - ✓ Accra and Luanda in the oceanic parts of their FIRs;
  - ✓ Alger, Tripoli, Khartoum, Kinshasa, Atletico, Roberts, Sal, Canarias.



# CONCLUSION

Planned to be implemented by end of Q4 2022 or Q1 2023.

**Very ambitious but strongly expected  
by our Customers!!!**

**Thank You**