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African Flight Procedure Programme  
**PBN Implementation status: WACAF-ESAF**



# outlines

African Flight Procedure Programme (AFPP)

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# Background

African Flight Procedure Programme (AFPP)

## Background:

- Resolution A37-11: reaffirmed the global commitment for PBN implementation ( 37<sup>th</sup> Session of ICAO Assembly in 2010)
- Resolution A38-7: urged African States to support the implementation of AFPP( 38<sup>th</sup> Session of ICAO Assembly in 2013)
- 2014 : start of the first phase of the program



# Background

African Flight Procedure Programme (AFPP)

- ❑ PBN concept is now mature;
- ❑ PBN the highest priority of the Global Air Navigation Plan 2013 - 2028;
- ❑ PBN is a great chance for Africa but many challenges still remain;
- ❑ PBN essential Airspace Concept enabler;
- ❑ PBN is an important component of ASBU.



# AFI roadmap for PBN implementation: Near term (2008-2012)

African Flight Procedure Programme (AFPP)

Airspace	Nav. Specifications	Nav. Specifications where Operationally Required
En-Route Oceanic	✓ RNAV 10	RNP 4
En-Route Remote/Continental	✓ RNAV 10	RNP 4
En-Route Continental	✓ RNAV 5	RNAV 1/2
TMA-Arrival/Departure	✓ RNAV 1 in a surveillance environment	
	✓ Basic RNP 1 in non-surveillance	
Approach	<ul style="list-style-type: none"> <li>✓ RNP APCH (with Baro-VNAV) or RNP APCH (LNAV only).</li> <li>✓ RNP AR APCH if required</li> </ul>	

Note: Where altimeter setting does not exist or aircraft of maximum certificated take-off mass of 5700kg or more, using an aerodrome are not suitably equipped for APV operations.



# AFI roadmap for PBN implementation: Near term targets

African Flight Procedure Programme (AFPP)

- RNP APCH (with Baro-VNAV) in **30%** of instrument runways by **2010** and **50% by 2012** and priority given to airports with operational benefits. Each instrument runway will have an associated RNP APCH (LNAV only).
- Straight-in **LNAV only** procedures for instrument runways **where there is no local altimeter setting available & where aircraft MTOM 5 700 kg or more are not suitably equipped for APV operations.**
- RNAV 1 or RNP 1 SID/STAR for **30%** of international airports by 2010 and **50%** by 2012 and priority given to airports with RNP Approach.
- Review existing conventional and RNAV routes to transition to PBN RNAV 5 or where operationally required RNAV 2/1 by 2012.



# AFI roadmap for PBN implementation: Mid Term (2013-2016)

African Flight Procedure Programme (AFPP)

Airspace	Nav. Specifications	Nav. Specifications where Operationally Required
En-Route Oceanic	✓ RNAV 10	RNP 4
En-Route Remote/Continental	✓ RNAV 10	RNP 4
En-Route Continental	✓ RNAV 2, RNAV 5	RNAV 1
TMA-Arrival/Departure	<ul style="list-style-type: none"> <li>✓ Expand RNAV 1, or RNP-1 application</li> <li>✓ High density TMAs mandate RNAV1, or RNP-1</li> </ul>	
Approach	<ul style="list-style-type: none"> <li>✓ Expand RNP APCH (with Baro-VNAV) or Augmented GNSS), Supplemented with LNAV only procedures ( <b>see note</b> )</li> <li>✓ Implement RNP AR APCH where there are operational benefits</li> </ul>	

Note: In addition, where altimeter setting does not exist or aircraft of maximum certificated take-off mass of 5700kg or more, using an aerodrome are not suitably equipped for APV.



# AFI roadmap for PBN implementation: Mid Term (2013-2016) targets

African Flight Procedure Programme (AFPP)

- RNP APCH (APV) (Baro-VNAV or **Augmented GNSS**) in 100% of instrument runways where practical, by 2016.
- RNP APCH (**LNAV only minima**) in **70%** of instrument runways by 2014, **100% by 2016**.
- **Straight-in LNAV only** procedures for instrument runways where there is no local altimeter setting available & where aircraft **MTOM 5 700 kg** or more are not suitably equipped for APV operations.
- RNAV 1 or RNP 1 SID/STAR for 100% of international airports by 2016.
- RNAV 1 or RNP 1 SID/STAR for 70% of busy domestic airports where there are operational benefits.
- Implementation of additional RNAV/RNP Routes as required.



# AFI roadmap for PBN implementation: Long Term strategies (2016+)

African Flight Procedure Programme (AFPP)

- ❑ Key strategies for introducing PBN operations use an integrated set of solutions:
  - ✓ Airspace operations will make maximum use of advanced flight deck automation that integrates CNS capabilities.
  - ✓ Lowered workload due to reduced communications between controllers and pilots
  - ✓ Possibility to delegate separation tasks to pilots and to flight deck systems
  - ✓ FMS capabilities required to enable the future concepts and applications



# PBN implementation status : **PBN plans**

African Flight Procedure Programme (AFPP)

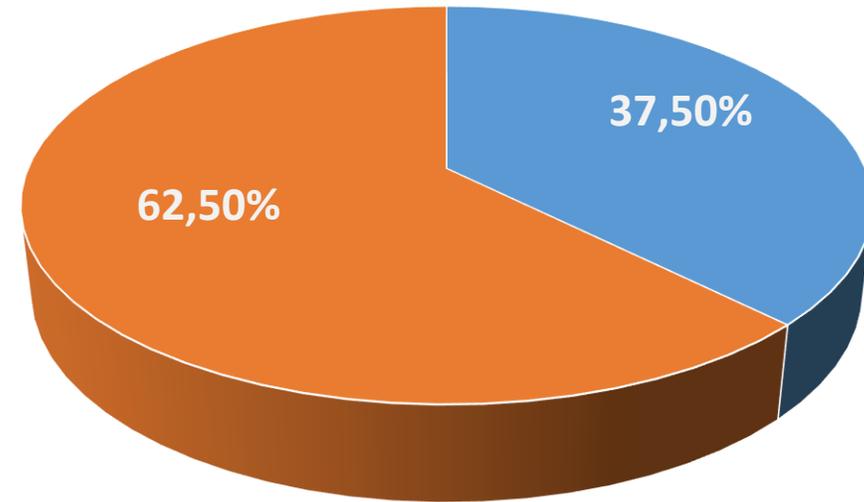
## ESAF REGION

State	24
Country	Status
ANGOLA	Not completed
BOTSWANA	completed
BURUNDI	Not completed
COMOROS	Not completed
DJIBOUTI	Not completed
ERITREA	Not completed
ETHIOPIA	completed
KENYA	completed
LESOTHO	Not completed
MADAGASCAR	completed
MALAWI	completed
MAURITUS	completed
MOZAMBIQUE	completed
NAMIBIA	completed
RWANDA	completed
SEYCHELLES	completed
SOMALIA	Not completed
SOUTH AFRICA	completed
SOUTH SUDAN	Not completed
SWAZILAND	completed
UGANDA	completed
TANZANIA	completed
ZAMBIA	Not completed
ZIMBABWE	completed



Status	Number
Non completed	9
completed	15
Total	24

PERCENTAGE OF PBN IMPLEMENTATION PLAN



■ Not completed ■ completed



# PBN implementation status : PBN plans

African Flight Procedure Programme (AFPP)

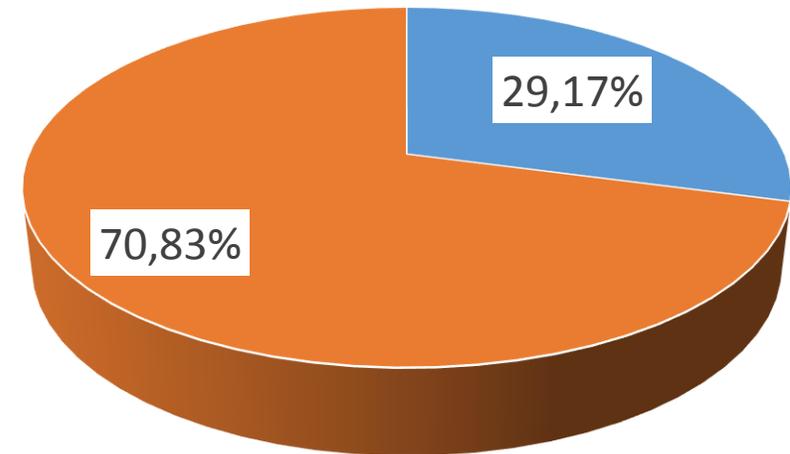
## WACAF REGION

States	24
Country	Status
BENIN	Completed
BURKINA FASO	Completed
CAMEROON	Completed
CAPE VERDE	Completed
CENTRAL AFRICAN REPUBLIC	Not completed
CHAD	Not completed
CONGO	Not completed
COTE D'IVOIRE	Completed
DEM. REP OF CONGO	Completed
EQUATORIAL GUINEA	Completed
GABON	Completed
GAMBIA	Completed
GHANA	Completed
GUINEA	Completed
GUINEA-BISSAU	Not completed
LIBERIA	Not completed
MALI	Not completed
MAURITANIA	Completed
NIGER	Completed
NIGERIA	Completed
SAO TOME & PRINCIPE	Not completed
SENEGAL	Completed
SIERRA LEONE	Completed
TOGO	Completed

Status	Number
Non completed	7
completed	17
Total	24



## PERCENTAGE OF PBN IMPLEMENTATION PLAN



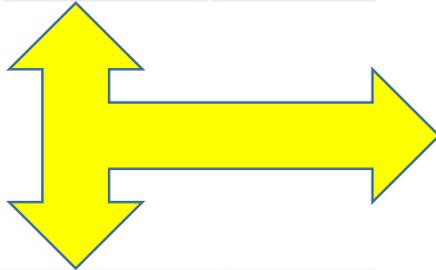
■ Not completed ■ completed



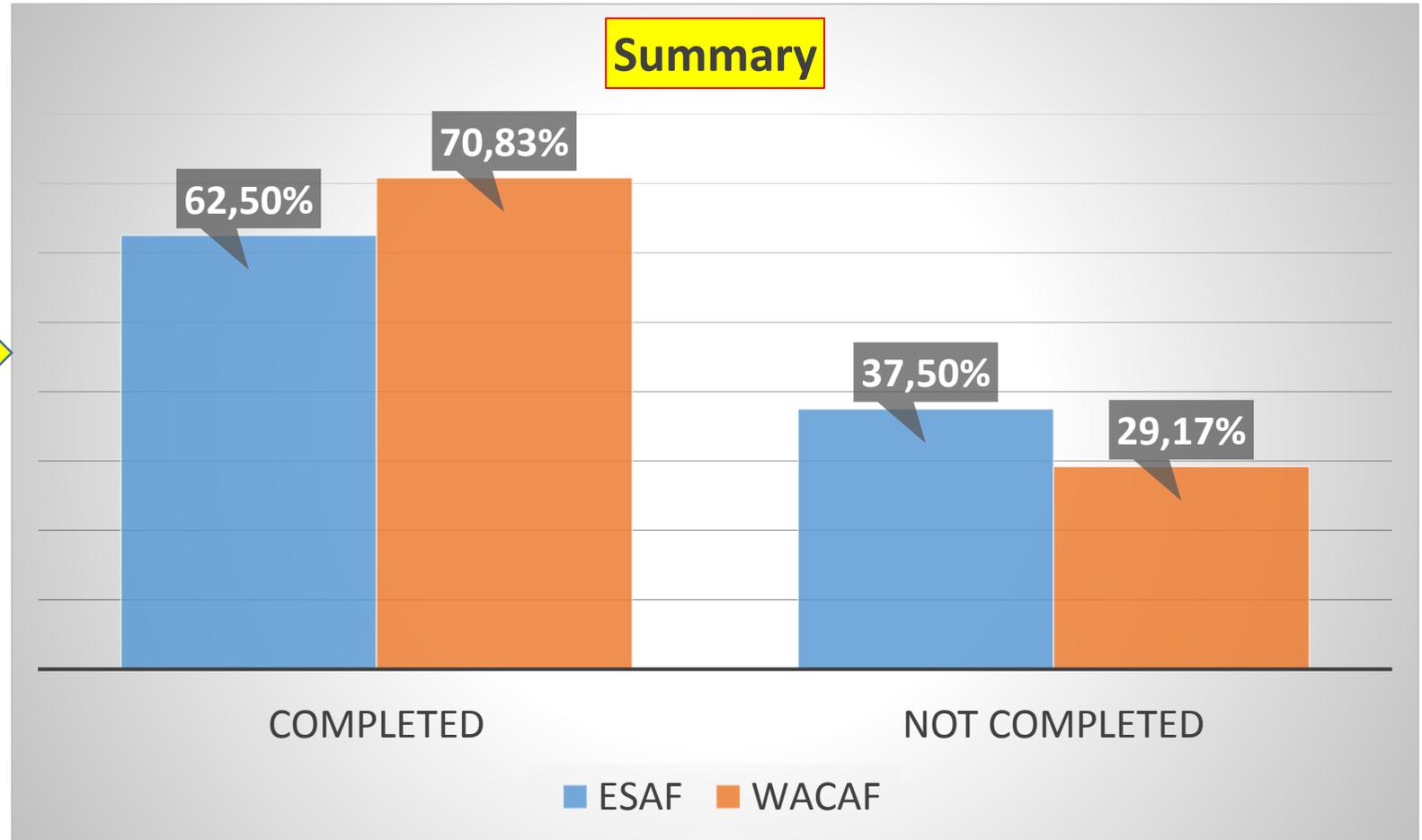
# PBN implementation status : **PBN plans**

African Flight Procedure Programme (AFPP)

ESAF		
Status	Percentage	Number
Not completed	37.50%	9
completed	62.50%	15
Total	100.00%	24



WACAF		
Status	Percentage	Number
Not completed	29.17%	7
completed	70.83%	17
Total	100.00%	24

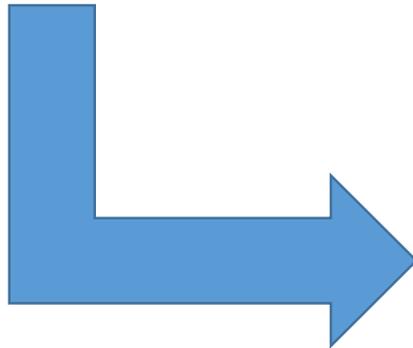




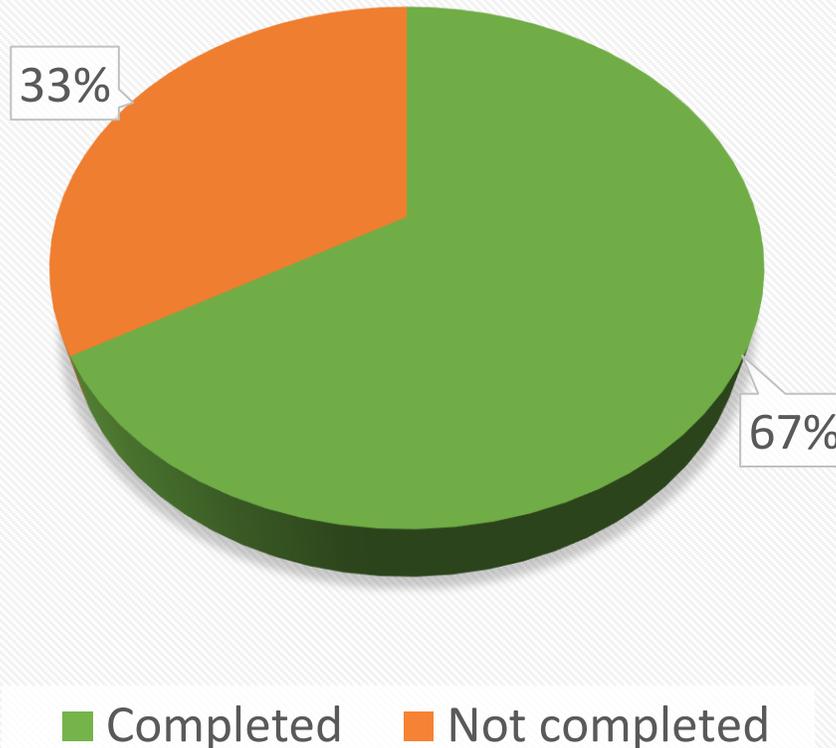
# PBN implementation status : **PBN plans**

African Flight Procedure Programme (AFPP)

Actual status	Completed	Not completed	Nb of states
ESAF/WACAF	32	16	48



## PBN national Plans: ESAF/WACAF Satus

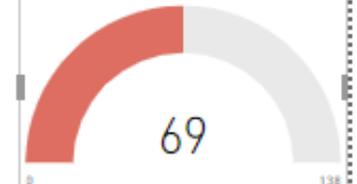
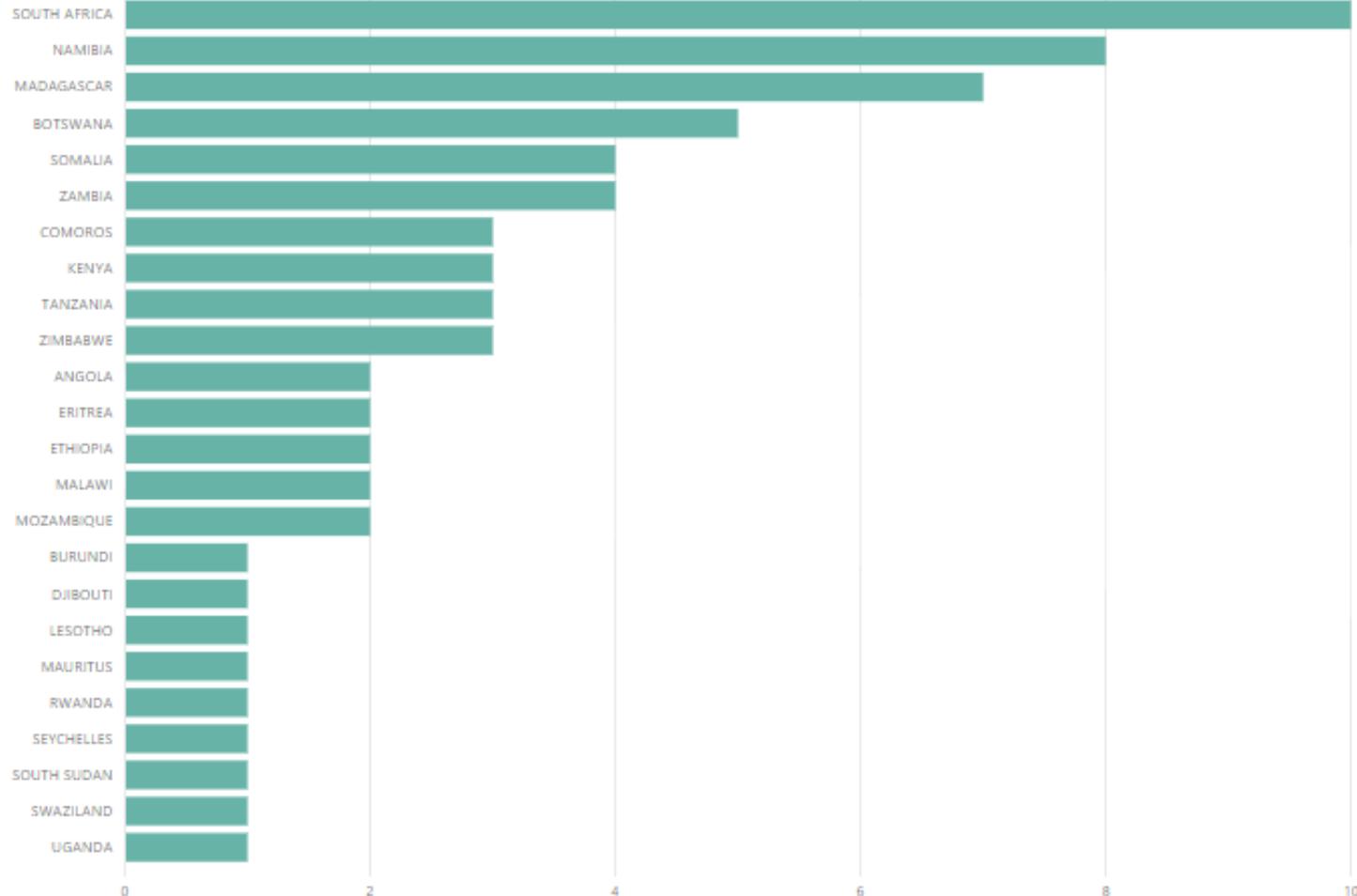




# PBN implementation status: **Flight Procedures**

ESAF REGION

Number of Airport





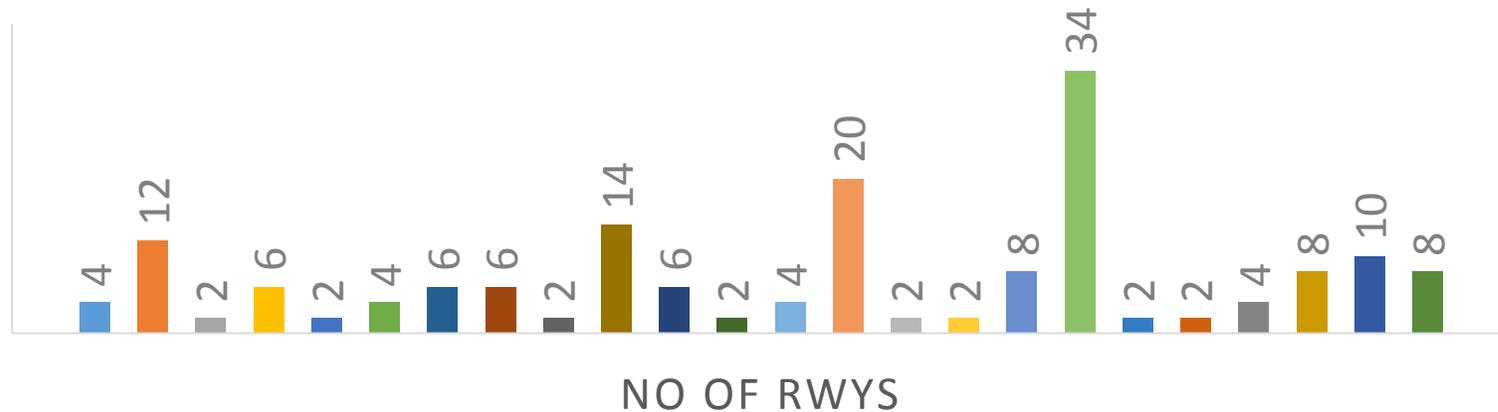
# PBN implementation status: **Flight Procedures**

African Flight Procedure Programme (AFPP)

**ESAF REGION**

**TOTAL NUMBER OF RWY: 170**

- ANGOLA      ■ BOTSWANA      ■ BURUNDI      ■ COMOROS
- DJIBOUTI      ■ ERITREA      ■ ETHIOPIA      ■ KENYA
- LESOTHO      ■ MADAGASCAR      ■ MALAWI      ■ MAURITUS
- MOZAMBIQUE      ■ NAMIBIA      ■ RWANDA      ■ SEYCHELLES
- SOMALIA      ■ SOUTH AFRICA      ■ SOUTH SUDAN      ■ SWAZILAND
- UGANDA      ■ TANZANIA      ■ ZAMBIA      ■ ZIMBABWE



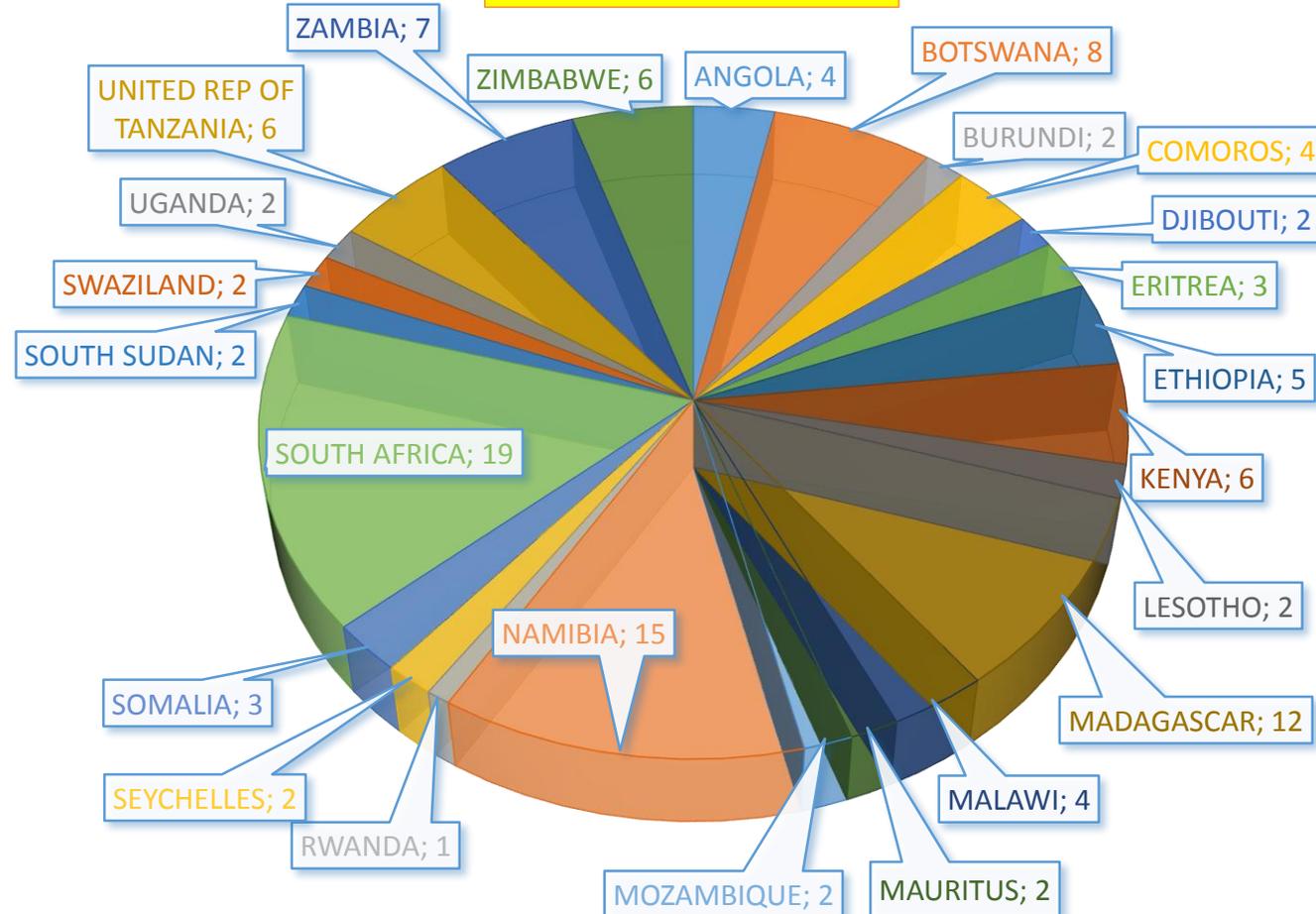


# PBN implementation status: **Flight Procedures**

African Flight Procedure Programme (AFPP)

ESAF REGION

NO OF INST. RWYS:121



Instrument RWYS

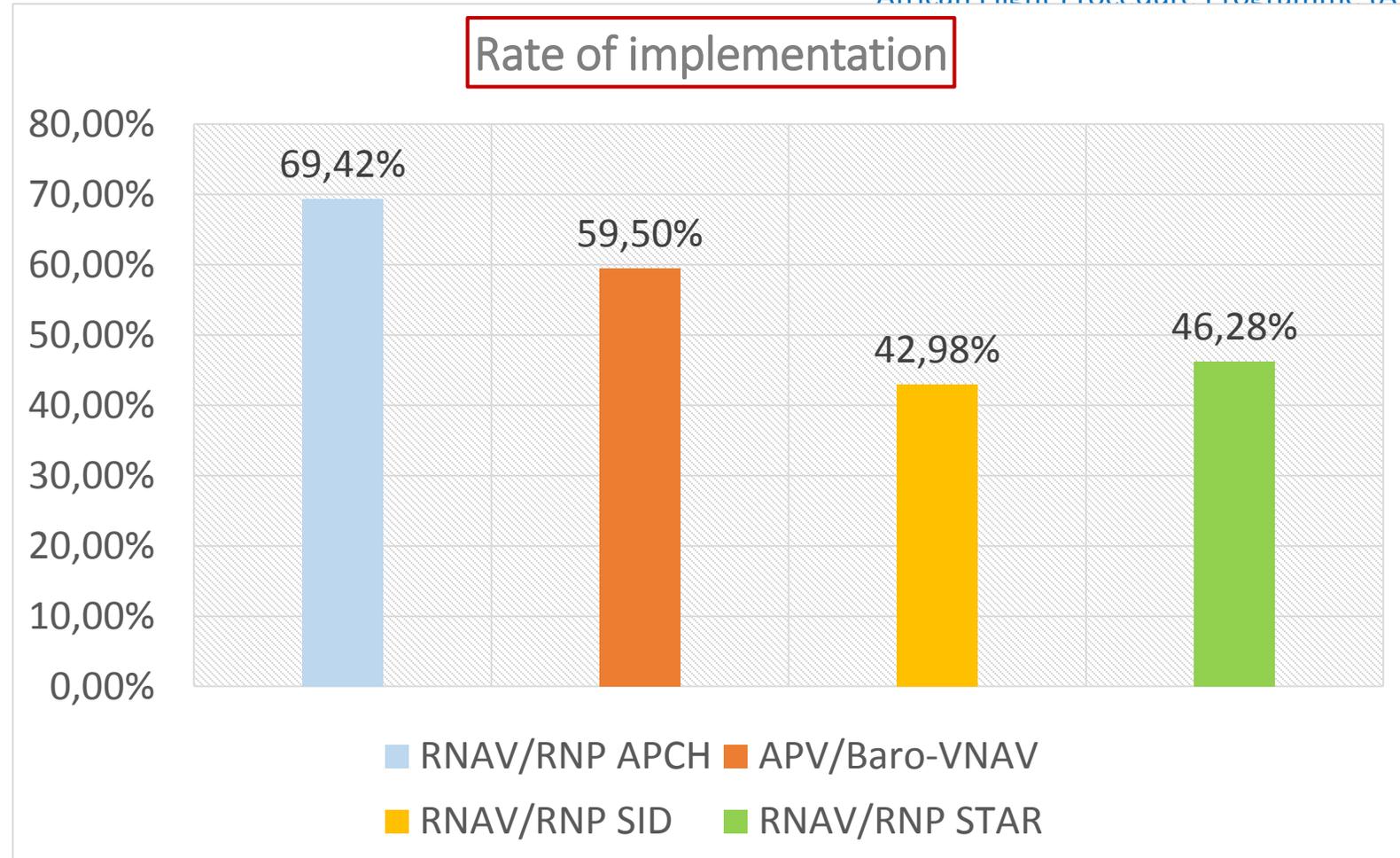


# PBN implementation status: **Flight Procedures**

African Flight Procedure Programme (AFPP)

## ESAF REGION

Number of RWYs	170
Instrument RWYs	121
RNAV/RNP APCH	84
APV/Baro-VNAV	72
RNAV/RNP SID	52
RNAV/RNP STAR	56



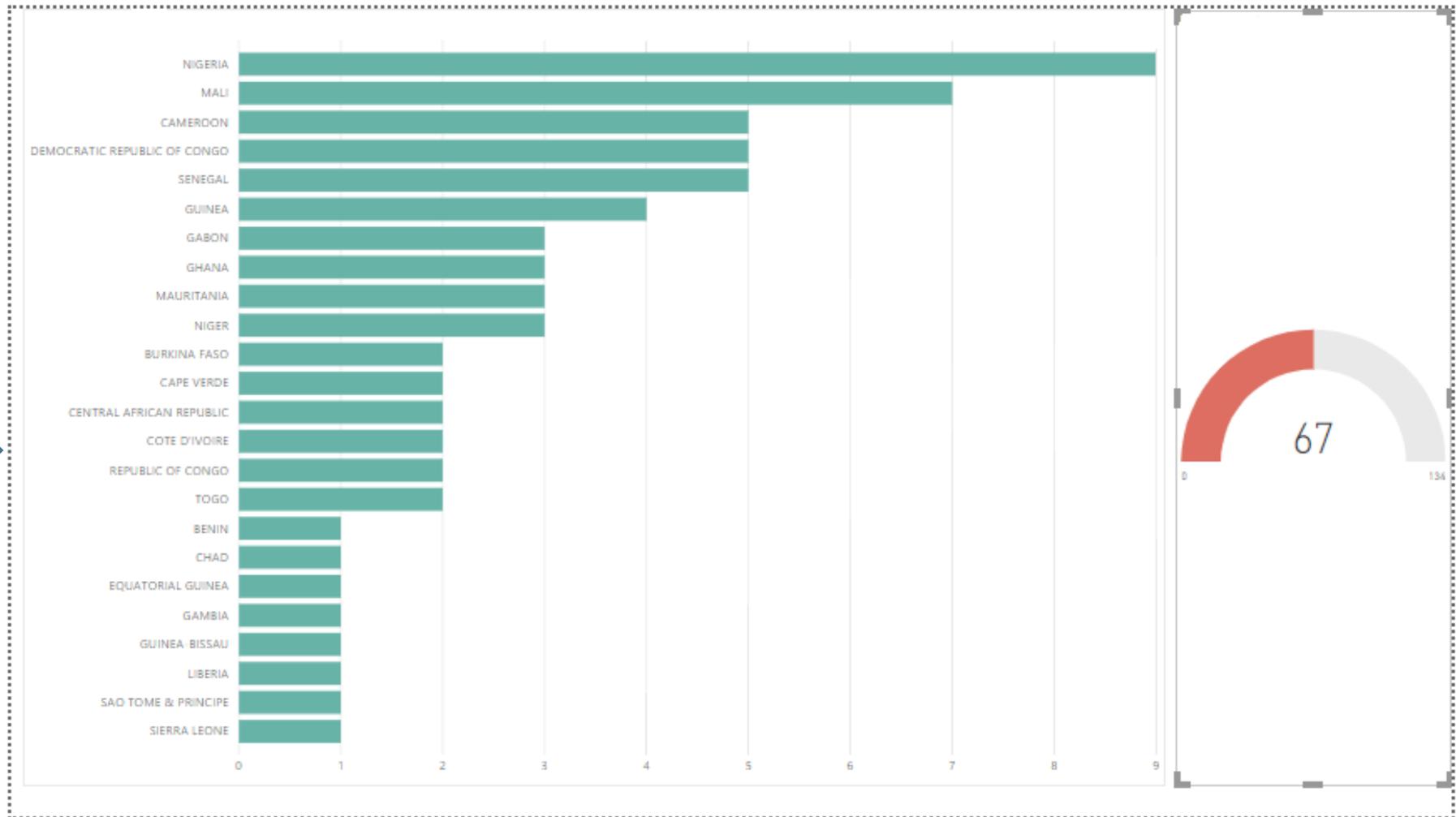


# PBN implementation status: Flight Procedures

African Flight Procedure Programme (AFPP)

WACAF REGION

Number of Airport





# PBN implementation status: **Flight Procedures**

WACAF REGION

Number of RWY

Total number of rwy:142



- BENIN
- CAPE VERDE
- CONGO
- EQUATORIAL GUINEA
- GHANA
- LIBERIA
- NIGER
- SENEGAL
- BURKINA FASO
- CENTRAL AFRICAN REPUBLIC
- COTE D'IVOIRE
- GABON
- GUINEA
- MALI
- NIGERIA
- SIERRA LEONE
- CAMEROON
- CHAD
- DEM. REP OF CONGO
- GAMBIA
- GUINEA-BISSAU
- MAURITANIA
- SAO TOME & PRINCIPE
- TOGO

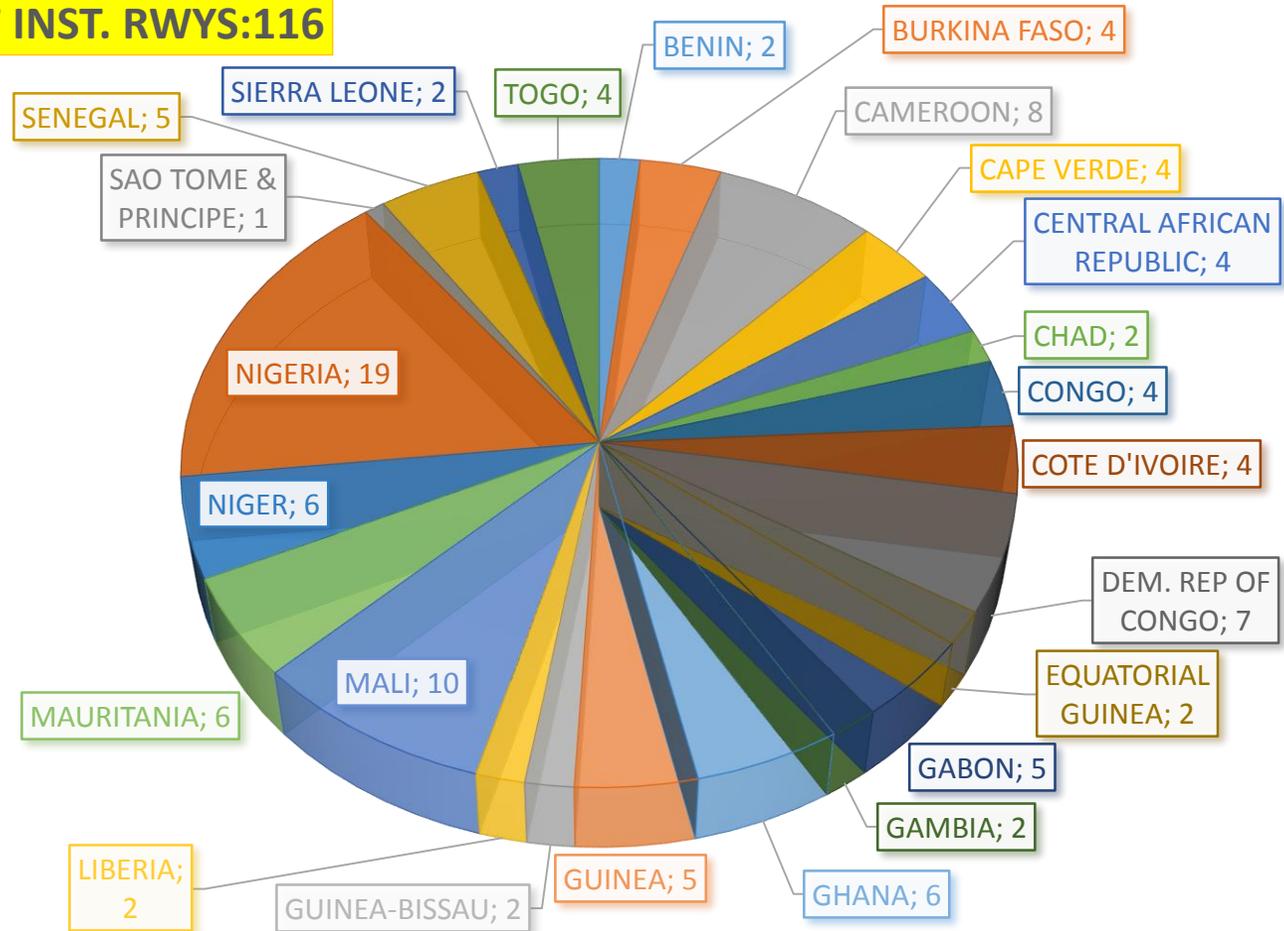


# PBN implementation status: **Flight Procedures**

African Flight Procedure Programme (AFPP)

WACAF REGION

NO OF INST. RWYS:116



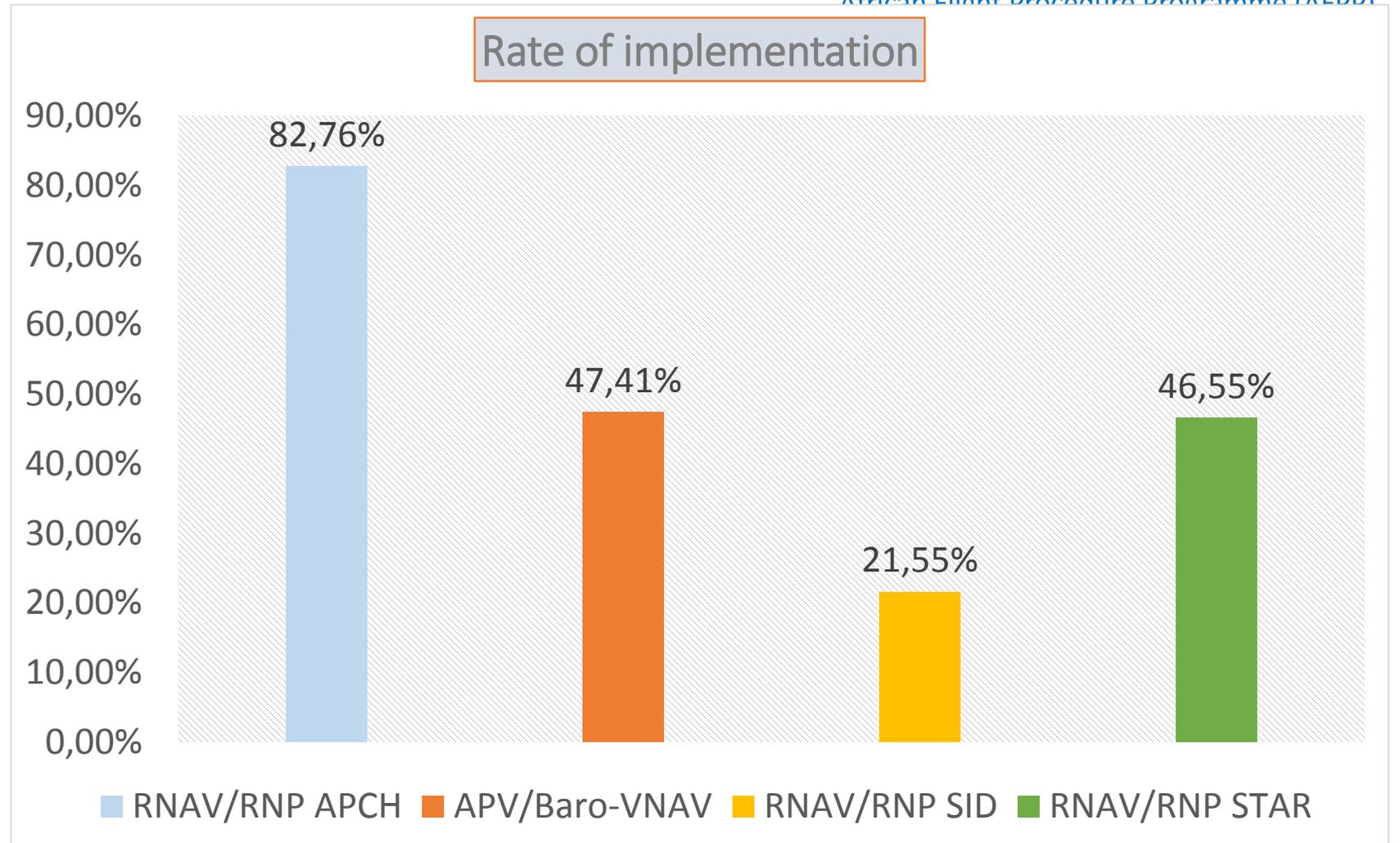


# PBN Implementation status:WACAF-ESAF

African Flight Procedure Programme (AFPP)

## WACAF REGION

Number of RWYs	142
Instrument RWYs	116
RNAV/RNP APCH	96
APV/Baro-VNAV	55
RNAV/RNP SID	25
RNAV/RNP STAR	54





# PBN implementation status: **Flight Procedures**

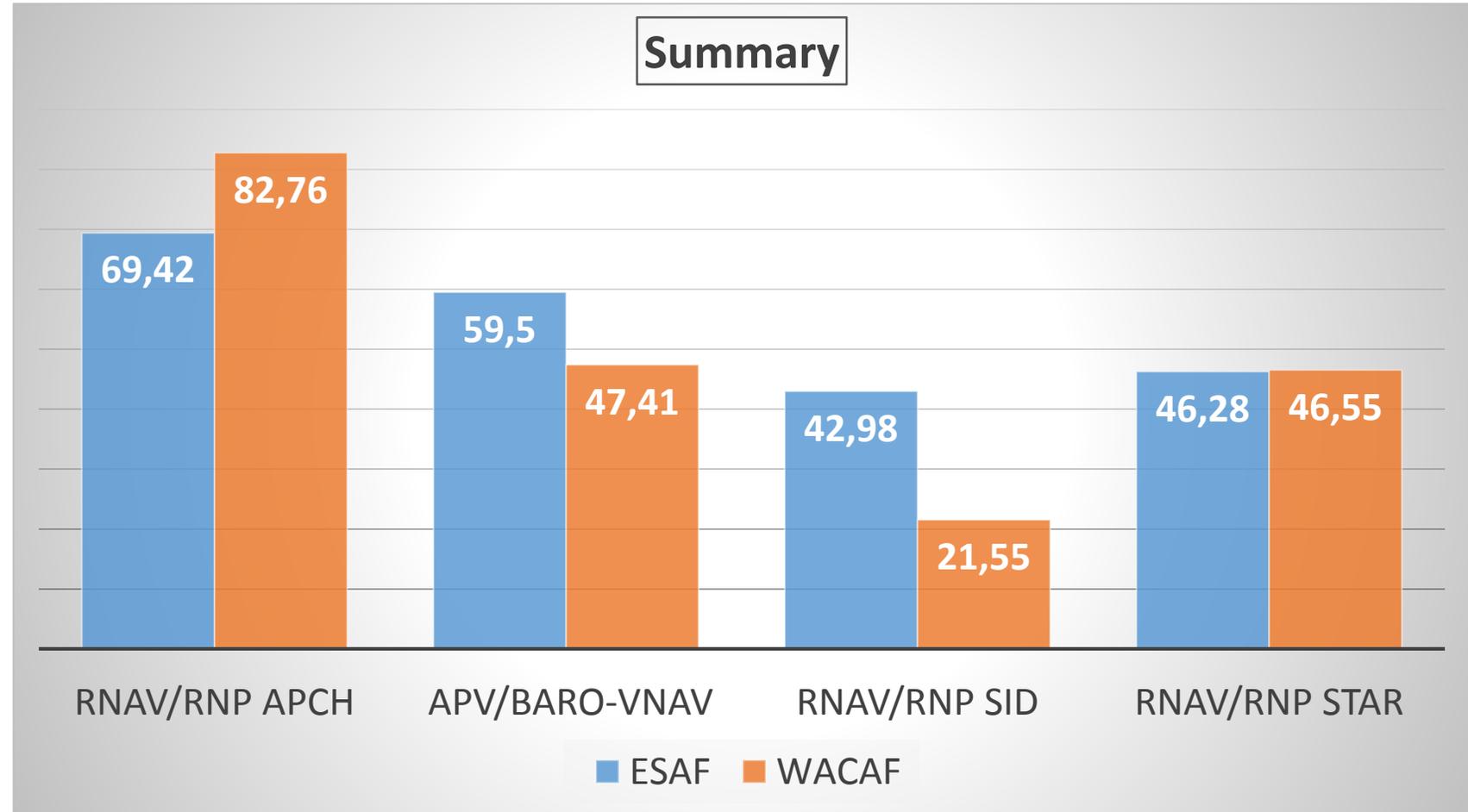
African Flight Procedure Programme (AFPP)

## ESAF REGION

Number of RWYs	170
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## WACAF REGION

Number of RWYs	142
Instrument RWYs	116
RNAV/RNP APCH	96
APV/Baro-VNAV	55
RNAV/RNP SID	25
RNAV/RNP STAR	54





# PBN challenges in Africa

African Flight Procedure Programme (AFPP)

PBN efficient implementation within the continent request the involvement and the commitment of the main stakeholders:

- Civil Aviation Authorities (CAA)
- ANSP (managers, ATCOs, AIM, Trainers, etc.)
- Airlines and Air operators (pilots),

## CAA



- PBN concept awareness: Some CAAs are not enough aware !
- PBN legal instruments:
  - ✓ PBN plans and related regulations not issued.
  - ✓ Expertise on PBN approvals (Operational and Regulatory Approval).
- PBN units not implemented within the CAAs:
  - ✓ Lack of Flight Procedures Designers.
  - ✓ Procedure Design office not implemented.
  - ✓ PBN oversight office not in place.

## ANSP



- Some executives are not enough aware !
- Some ATS and ATCOs are not enough trained; as a result:
  - ✓ ATCOs refuses to clear PBN approaches;
  - ✓ Difficulties to handle mix traffic (conv/PBN).
- Some aviation training schools don't include PBN concept and PBN traffic management (simulators exercises) in their syllabus.
  - ✓ Lack of Flight Procedures Designers & Airspace designers.
  - ✓ PBN separation rules or strategy are not often implemented.

## Pilots



- Many pilots of minor airlines, States airlines and privates pilots are not enough aware and hence not trained.
- Not all aircrafts are equipped with PBN avionics: legacy birds.

