



Sudan PBN Implementation Plan

PBN SG/3

- **Cairo, Egypt, 11-13 February 2018**

Outline

- Brief of the State of SUDAN's PBN Implementation Plan
- Status of Implementation
- Sudan ATS Surveillance System
- Sudan ATM System.
- Lessons Learned
- Challenges
- Thoughts/Recommendations
- Conclusion

SUDAN PBN Implementation Plan



- SCAA established IFPD section in 2011 by a signing contract with ENAC/CGX Aero (French company).
- Four ATCOs trained in ENAC in:
 - Non precision App.
 - Precision App.
 - RNP APCH.

SUDAN PBN

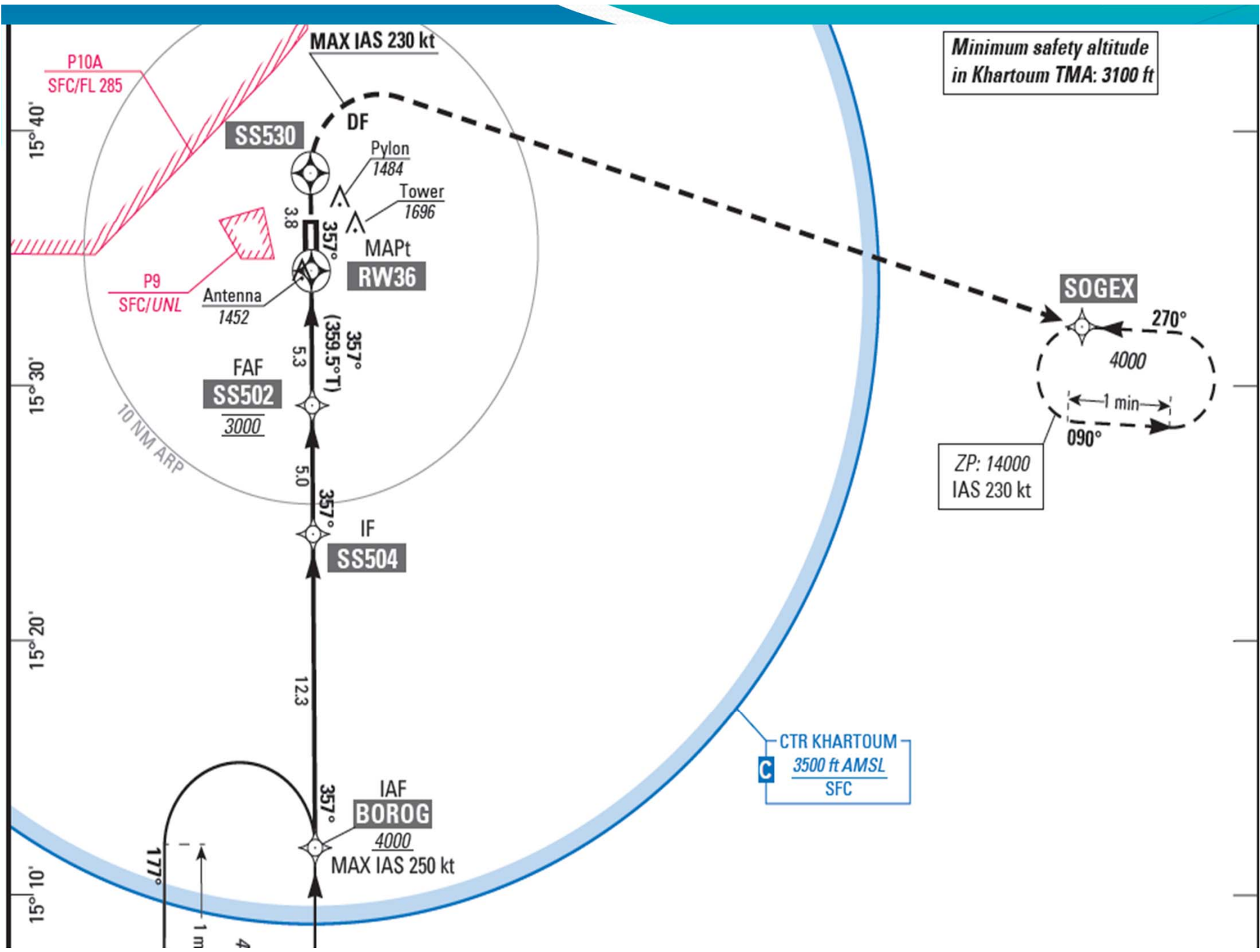
Implementation Plan



- IFPD section with the help of CGX designed procedures for 11 airports :
- RNAV SIDs and STARs for 4 airports.
- RNP APCH for 4 airports.
- Precision and Non precision procedures for 4 airports.

SUDAN PBN Implementation Plan

- SUDAN apply RNAV₁ for SIDs and STARs for the international airports.
- Basic RNP₁ for the other airports
- The upper routes network will be RNAV₅.
- SUDAN will apply free routes airspace above flight level 390 in the second step for implementation of the new structure.
- LOA assigned between SCAA and Military Authority contains the application of FUA.



SUDAN PBN

Implementation Plan

- Khartoum (HSSS) airport
 - ILS approach R/W 36 CAT 1
 - ILS approach R/W 18 Cat 1
 - RNAV approach (LNAV only) for R/W₃₆ &18
 - SIDs & STARs RNAV 1



Status of Implementation

RWY Ends	ILS / CAT	LNAV	LNAV / VNAV	LPV	RNP AR	RNAV SID	RNAV STAR
18/36 HSSS	1	YES	NO	NO	NO	YES	YES
17/35 HSPN	1	YES	NO	NO	NO	YES	YES
19/01 HSOB	-	YES	NO	NO	NO	YES	YES
04/22 HSNN	-	YES	NO	NO	NO	YES	YES

Tools & Facilities



- To reduce errors in the procedure design process, as well as to standardize the application of the PANS-OPS criteria SCAA supply the IFPD section with very efficient software's
 - ❖ Geotitan
 - ❖ D4F
 - ❖ C4F
 - ❖ OLS

Sudan ATS Surveillance System

- The Surveillance System in Sudan include the following:
- 6 MSSR antennas
- *PORT SUDAN*
- *DONGOLA*
- *KHARTOUM*
- *EL OBEID*
- *AL FASHER*
- *AD-DAMAZIN*

Sudan ATS Surveillance System

- SCAA has 16 ADS-B stations:
 - 4 integrated with the system.
 - 4 waiting for integration.
 - 8 stations under installation.

Sites



ATM System



- Sudan signed new contract with Thales company for 10 years to upgrade the hardware and Software of the ATM system (TOPSKY)

ATM System



- SCAA ATM system is supported by :
 - ✓ ADS-C
 - ✓ CPDLC
 - ✓ AIDC
 - ✓ OLDI
 - ✓ Safety net and monitoring function
 - ✓ Recording system

Sudan Current Situation

- **RNAV Current status in Sudan (routes)**
 - The following RNV routes are established within Khartoum Airspace:
 - Route UM863 as RNAV route linking the Gulf states with West Africa
 - Route UT124 as RNAV route linking East Africa with Europe

Sudan Current Situation

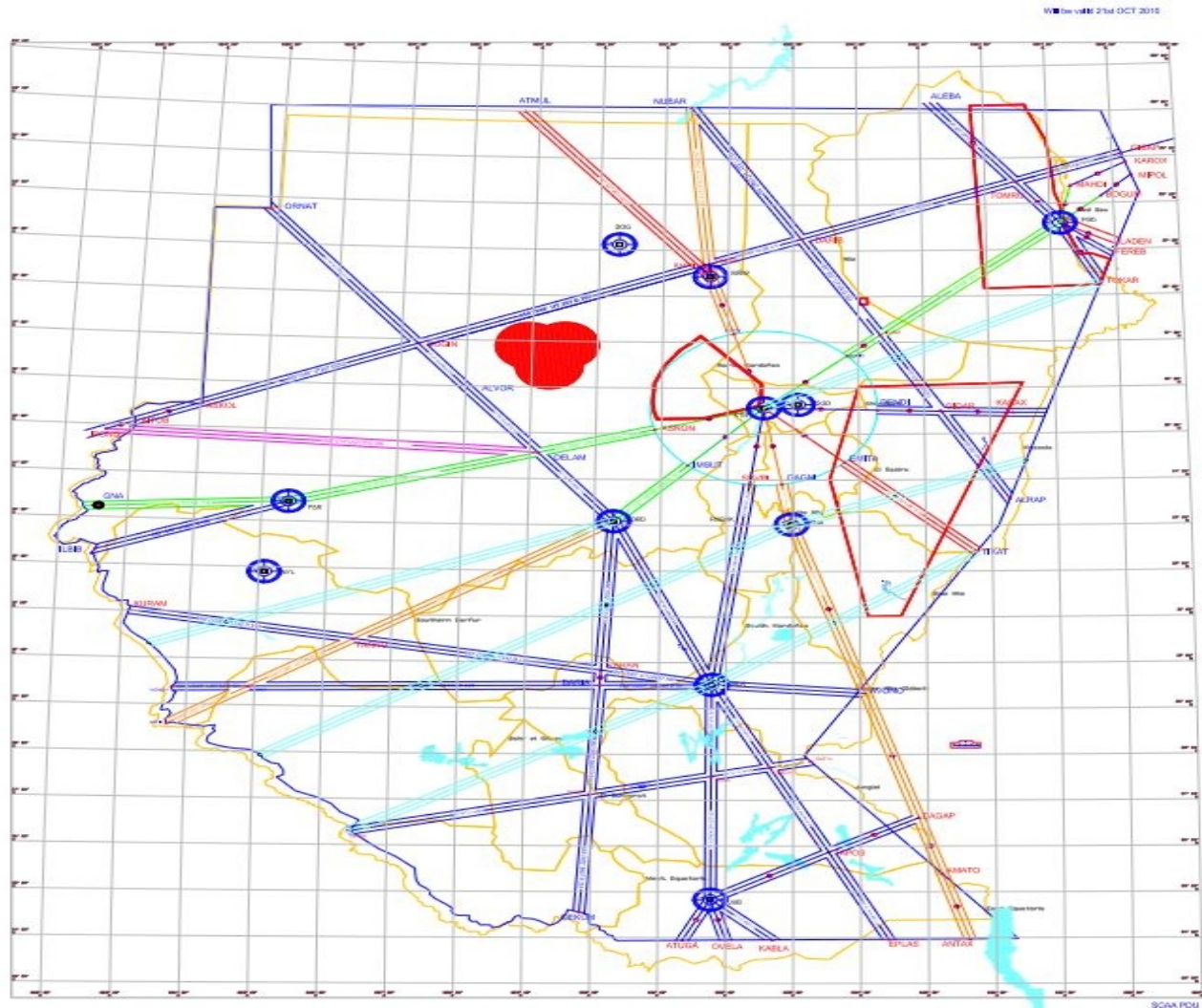
- RNAV Current status in Sudan (routes)
- Routes UQ584 as RNAV route linking the Gulf with West Africa down South America
- Route UT535 linking Juba with East Africa.
- Route UT139 as RNAV 10 linking east Africa with West Africa.
- Route UT142 linking East Africa with the North West Africa.

Sudan current ATS routes

This current situation encourage SCAA to restructure the Sudan airspace to satisfy the National, Regional and Global objectives.

Sudan current ATS route

Khartoum FIR New Routes Network



New RNAV routes network

- Main goals for the airlines:
 - Save flight time and fuel consumption by reducing distance.
 - Have several options for flight planning.
 - Improve flight plan adherence by formalizing direct routes usually cleared by the controllers.
 - Satisfy most of the requests of the airlines.

New RNAV routes network

- Main goals for sudanese ATCOs:
 - Decongest hotspots as much as possible.
 - Split bidirectional routes by creating unidirectional routes as much as possible.
 - Formalize direct routes usually cleared by the controllers.
 - Have a network that can answer almost all requests .

First step of Implementation

- 42 new RNAV routes added to the existing conventional network.
- 12 are unidirectional routes.
- RNAV routes above FL285.

Challenges

- Lack of Training in approval process.
- National Aircraft modification for the PBN application.
- Sudanese pilot training in order to safely conduct an operation.
- Regulations governing the application of PBN.

Conclusion



- The new RNAV Routes network, RNAV SIDs and STARs would have an impact for the national airlines, but it has positive effect for all airlines flying over Khartoum FIR or landing Sudan international airports, so that SCAA request from the national airlines to upgrade their fleets to meet the development in the PBN environment.

Conclusion

- The restructure of SUDAN airspace would have a cross-border impact, but it has positive effect for all airlines flying over Khartoum FIR, so that we appreciate any support from neighboring countries, ICAO MID/AFI offices and ITATA.

Thanks for your attention

