MIDANPIRG PBN SG/2 Meeting
Sharm El Sheikh, 22-25 February 2016

Egypt

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Status of PBN implementation plan at Egypt

Presentation Outline

- **National PBN plan**

- **Status of Implementation**

- **Lessons Learned**

- **Future Trend**

- **Challenges**

- **Our Goals**

National PBN Implementation Plan

- **Egyptian airspace concept**

| Communication | Navigation | Surveillance | ATM |

National PBN Implementation Plan

- ## Communication:

❑ Develop VCCS at Cairo ACC
❑ 5 new VCCS (hurghada, Sharam, Borg Alarab, Luxor and Aswan Int. airports by 2019)
❑ Automation system based on OLDI & AIDC between those airports and Cairo Centre

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• Surveillance:

❑ New Mode S Radar will cover all Cairo FIR by 2019 (full implementation)
❑ Back system ADS-B by 2019 (whole Cairo FIR)
❑ Develop Radar systems in 5 int. airports (hurghada, Sharam, Borg Alarab, Luxor and Aswan Int. airports by 2019) with Primary, secondary MODE S and 4 of them Backup ADS-B

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• **ATM: starting from 2016 till 2019**

❑ Vey enhanced and integrated ATM Systems in 5 int. airports (hurghada, Sharam, Borg Alarab, Luxor and Aswan Int. airports by 2019)

❑ Arrival and departure manager at 4 int. airports (Sharam, Borg Alarab, Luxor and Aswan)

❑ 2 backup system to Cairo ACC with same configuration

National PBN Implementation Plan

- **Navigation**:

❑ Egyptian Navigation Capabilities: based on PBN Implementation plan

| NAV. aids infrastructure | NAV. Specifications | NAV. applications |

National PBN Implementation Plan

- **Navigation:**

1.2.1 NAV. aids infrastructure:

★ ground based:

- VOR/DME
- ILS

★ Satellite based:

- GNSS (depend on national fleet equipments)
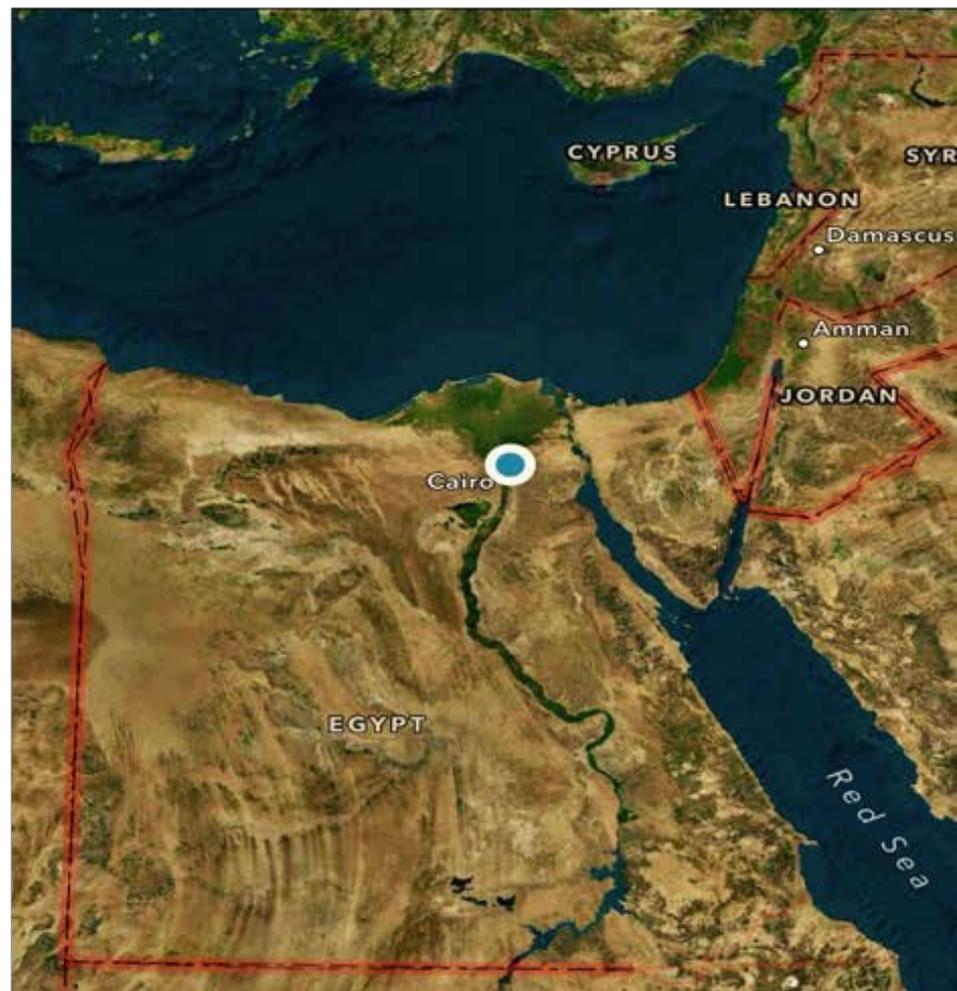
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- **Navigation**:

Ground based infrastructure: ILS

7 international airport :

- 12 runways
- 22 threshold are there
- 12 ILS approaches (year 2015 Egypt upgraded 4 thresholds at Cairo int. to ILS CAT II)

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- ## Navigation:

NAVIGATION SPECIFICATION	FLIGHT PHASE							NAVAIDS/SENSORS				
	En-route continental	Arrival	Approach				DEP	GNSS	IRU	DME/ DME	DME/ DME/ IRU	VOR/ DME
			Initial	Intermediate	Final	Missed[4]						
RNAV5[5]	5	5	N/A				N/A	O	O	O	N/A	O
RNAV1	1	1	1	1	N/A	1	1	O		O	O	
RNP1[6]	N/A	1	1	1	N/A	1	1	M				
Advanced RNP (A-RNP)[7]	2 or 1	1	1	1	0.3	1	1	M	N/A			N/A
RNP APCH[8]	N/A		1	1	0.3[9]	1	N/A	M		N/A		
RNP APCH APV			1	1	0.3	1		M				
RNP 0.3[10]	N/A	0.3	0.3	0.3	0.3	0.3	0.3	M				

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[4] Only applies once 50 m (40 m, Cat H) obstacle clearance has been achieved after the start of climb.

[5] RNAV 5 is an en-route navigation specification, which may be used for the initial part of a STAR outside 30 NM and above MSA.

[6] The RNP 1 specification is limited to use on STARs, SIDs, the initial and intermediate segments of IAPs and the missed approach after the initial climb phase. Beyond 30 NM from the ARP, the accuracy value for alerting becomes 2 NM.

[7] A-RNP also permits a range of scalable RNP lateral navigation accuracies.

[8] PBN manual contains two sections related to the RNP APCH specification: Section A is enabled by GNSS and Baro-VNAV, Section B is enabled by SBAS.

[9] RNP 0.3 is applicable to RNP APCH Section A. Different angular performance requirements are applicable to RNP APCH Section B only.

[10] The RNP 0.3 specification is primarily intended for helicopter operations.

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- ## Navigation:

Airspace	Short term 2014-2017		Medium term 2018-2022	
	Navigation Specification Preferred	Target	Navigation Specification Acceptable	Target
En-route Continental	RNAV5 RNAV1	100% by 2017	RNP 2* Defined airspace (A-RNP)	TBD
En-route Local/domestic	RNAV5 RNAV1	100% by 2017	RNP 2* Defined airspace (A-RNP)	TBD
TMA - Arrival	RNAV 1 in surveillance environment and with adequate navigation infrastructure. (All 7 int. airports are served by terminal Radar)	50% by December 2015 100% by 2017	RNP 1 and RNP 2 beyond 30 NM from ARP (A-RNP)	TBD
TMA – Departure	RNAV 1 in surveillance environment and with adequate navigation infrastructure. Basic RNP 1 in non- surveillance environment	50% by 2015 100% by 2017	RNP 1 and RNP 2 beyond 30 NM from ARP (A-RNP)	TBD
Approach	LNAV: for all RWY Ends at International Airports LNAV/VNAV (Baro Nav.) : for all RWY Ends at International Airports	80% by 2014 & 100% by 2016 20% by 2015 60% by 2016 100% by 2017	GLS (GBAS) or SBAS approach For the defined RWY Ends depend on Egyptian GNSS plan	TBD
CCO and CDO	W/A	TBD	W/A	TBD

W/A: where applicable/defined Airspace, in accordance with Egyptian PBN implementation Plan, the MID Region Air navigation Strategy and the MID ANP.
* Would be considered for implementation at the identified Airspace/TMAs

National PBN Implementation Plan

- **Navigation:**

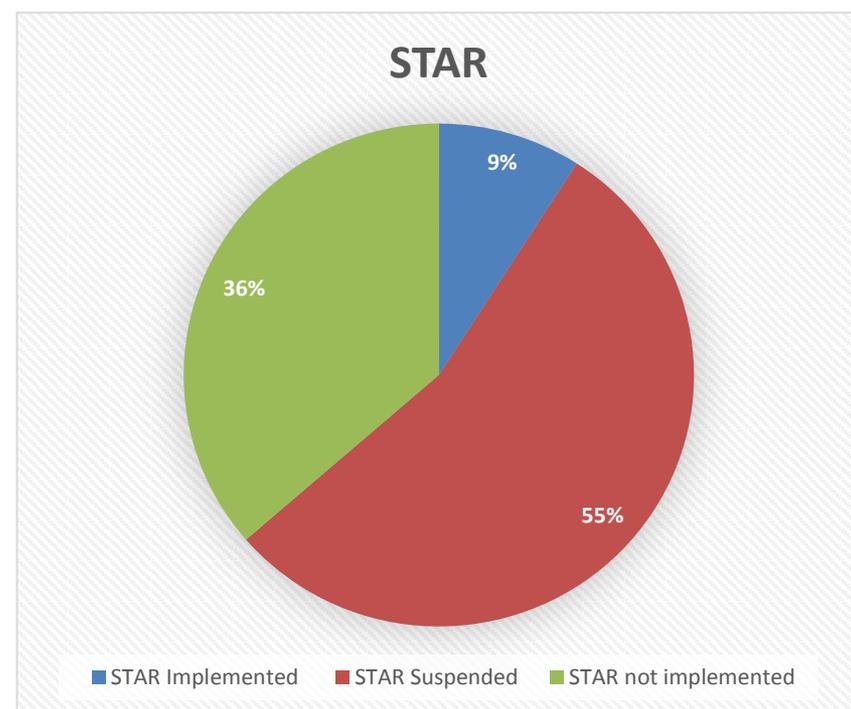1.2.2 NAV. specification & application:
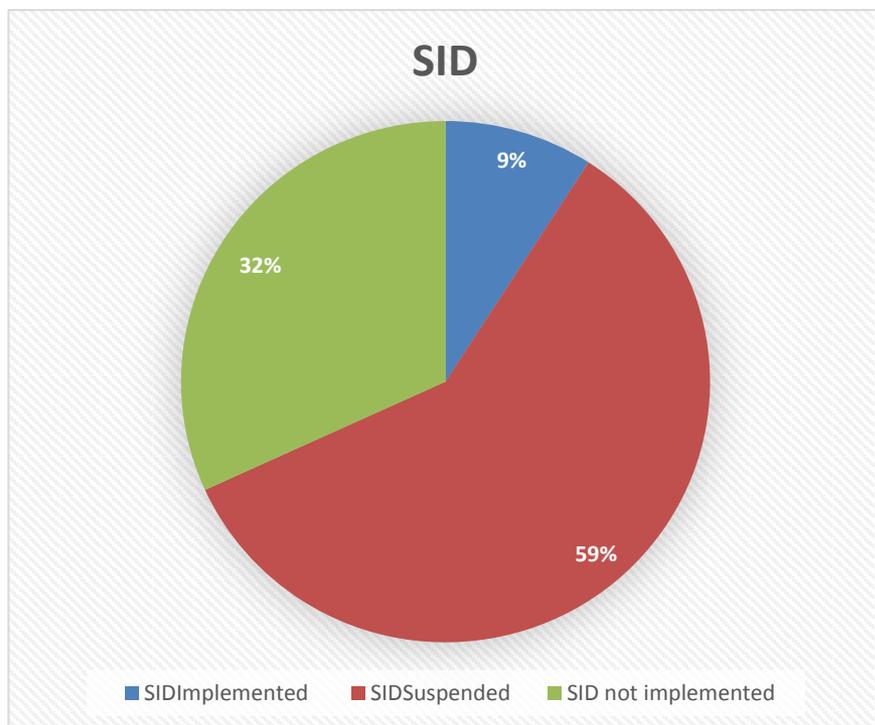
1.2.2.1 EN-ROUTE:

RNAV 5 100% implemented by 2015 with plan to implement RNAV1 in some airways by 2016.

implementation date by ICAO 2017 100%

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- ## Navigation:

15/22 SIDs procedures are implemented

14/22 STARs procedures are implemented

SID

9%

32%

59%

■ SIDImplemented ■ SIDSuspended ■ SID not implemented

STAR

9%

36%

55%

■ STAR Implemented ■ STAR Suspended ■ STAR not implemented

National PBN Implementation Plan

- ## Navigation:

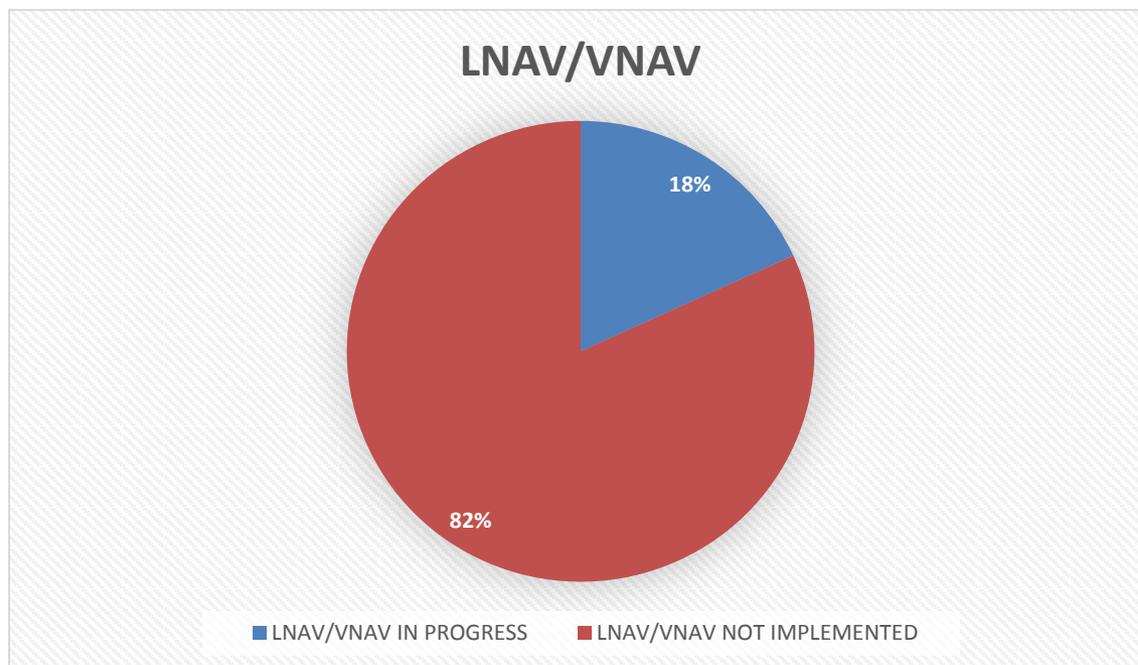❑ Approach: 21/22 LNAV Approaches implemented

LNAV

95%

5%

■ LNAV IMPLEMENTED   ■ LNAV PLANNED
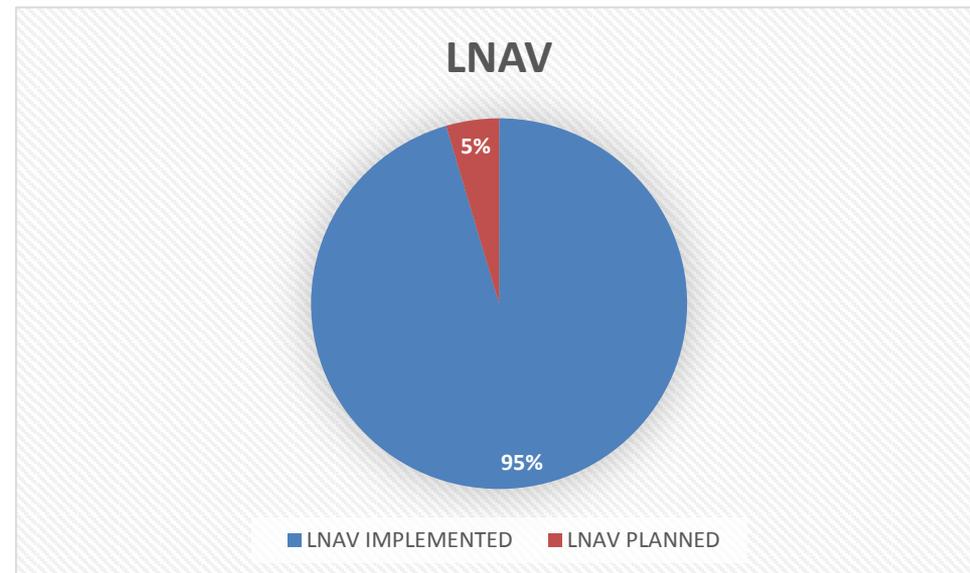
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- ## Navigation:

❑ Approach: 4/22 LNAV/ VNAV Approaches in progress

LNAV/VNAV

18%

82%

■ LNAV/VNAV IN PROGRESS   ■ LNAV/VNAV NOT IMPLEMENTED

- ## Navigation:

National fleet equipage

Egyptair Airlines Fleet PBN Status

Nav Spec Type	RNAV 10	RNAV 5	RNAV 1	RNAV 2	RNP 4	RNP 2	RNP 1	RNP APCH	RNP AR	A-RNP RF Leg
B777	•	•	•	•	•			•		
A330	•	•	•	•	•			•		
										☆
A320 (231)	☆	•	•		☆		☆	•		
										☆
A320 (232)	☆	•	•	•	☆		☆	•		
										☆
A321	☆	•	•	•	☆		☆	•		
										☆
B737 (800)		•	•	•	•			•		
B737 (500)		•								

• : Approved   ☆ : Capability

National PBN Implementation Plan

• **Navigation:**

establish PBN implementation team not limited to NANSC but include: Egypt air (main fleet)ECAA airport authority, Military side and other entities may needed from time to time (met, etc…..)

National PBN Implementation Plan

- **Navigation:**
- organize national Seminars on monthly basis:

National PBN Implementation Plan

- ## **Navigation:**

❑ Manpower 8 procedure designers

❑ Qualify 5 PANS-OPS specialist on Baro - NAV procedures design as first Group.

❑ upgrading NANSC PANS-OPS software with recent updates criteria of DOC. 8168 and including RF turned criteria.

❑ issue PBN regulation circular by ECAA (full regulation under preparation to include GNSS signal vulnerabilities)

❑ close civil/military cooperation to enhance PBN implementation in all phases of flight

❑ Started Airspace CDM

Lessons Learned

❏ RNAV SID & STAR not efficient without arrival and departure management
❏ Direct relation between PBN implementation plan and Civil military cooperation
❏ Lack of man power training (controllers, pilots, flight ops, airspace planning & PD) delay PBN implementation plan
❏ Considering of AIRAC cycle is must (minimum 42 days (14 days post delivery + 28 AIRAC cycle) but sometimes is not enough
❏ Considering 70 days for effective date is the best
❏ No efficient PBN plan without get Airspace stakeholders are involved
❏ PBN TO DO WHAT?????????

Future trends

❑ A new maga project to redevelop whole Egyptian airspace, TMAs and procedures which is new National airspace management Centre (NASMC)

❑ WHAT NASMC WILL DO????

➢ A very integrated civil military coordination Centre fully operation by year 2019

➢ Run FUA with CDR1, CDR2

➢ CDR3 by 2020

➢ Airspace experimental Centre supported with FTS and ATC Simulator

➢ A very dynamic ASM software with full integration with major int. airports and Cairo APP & ACC

➢ 5 PANS-OPS new licenses

➢ Supportive ATFM unit

OUR Goals

a) Access and Equity: Increased Egyptian aerodrome accessibility.
b) increase airspace capacity
c) Cost savings
d) environment
e) Safety: Stabilized approach paths.
f) Ensure that implementation of the navigation element of the Egyptian CNS/ATM system is based on clearly established operational requirements

Challenges

a) CBA to differentiate between augmentations systems in near future
b) Spell out clear rights and responsibilities of GNSS signal vulnerabilities
c) PBN operational approvals
d) extend RNAV approaches to all other Egyptian Airports
e) a qualified procedures designers (minimum 2 years to qualify procedures designer)
f) PANS-OPS software availability and PANS-OPS updates
g) ATFM system (efficient SID & STAR)

Thank you

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