ARAB REPUBLIC OF EGYPT

MIDANPIRG CNS SG/7 Meeting
Cairo, Egypt, 31May - 2June 2016
EGYPT– CNS Implementation

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Outline

- Egypt Strategy
- Current CNS Implementations in Egypt
- Update of the CNS tables in e-ANP
- Update on B0-FICE and B0-ACAS
- General update on supporting implementation of

  B0-APTA, B0-SURF, B0-ACDM
- Challenges and Ideas

Egypt Strategy

- **Develop the strategic plan and investment decisions with a goal of global aviation system interoperability.**

- **Implement priority 1 ASBU modules according to MID air navigation strategy to be in line with global air navigation objectives.**

Egypt Strategy

- **Near Term CNS Strategy (2013-2018) includes:**
  1. **Improving coordination with the remaining neighboring ACCs by establishing AIDC/OLDI connections with these ACCs if applicable.**
  2. **Implementing collaborative applications (A-CDM) at Cairo Airport.**
  3. **Upgrading Surveillance radar systems and ATM systems at the International airports.**
  4. **Implementing new radars stations (Mode-S) and ADS-B sensors to avoid single surveillance coverage in the ATS routes.**
  5. **Establishing a new Satellite communication link between CANC and airports as a backup link for the current GSI links.**

Current Implementations

Current implementation of CNS infrastructure aligning with MID air navigation Strategy:-

1. Cairo Air Navigation Center (CANC)

- **Managing the air traffic in Egypt FIR by utilizing THALES TOPSKY Automation system since 2013, which has AIDC/OLDI connection capability up to seven interfaces with the adjacent ACCs.**

Current Implementations

- **Enhancing the exchange of ATS messages with the states COM centres (AFTN/AMHS) by implementing COMSOFT AMHS System since 2010, by which the ATS message can be provided through the ATN based on Internet Protocol (IP) to support AFS Communication requirements.**

2. International Cairo Airport

- **Fully Implementing A-SMGCS level 1-2 system at 2013 which provides surveillance and alerting of movements of both aircraft and vehicles at the aerodrome and enhance capacity and safety by making use of modern technologies such as cooperative surveillance systems (MLAT).**

e-ANP : Table CNS II-1

❑ Update of the CNS tables in e-ANP – Volume II

- **TABLE CNS II-1 – (AFTN) PLAN**
- **TABLE CNS II-2 – Required ATN Infrastructure Routing Plan**
- **TABLE CNS II-3 – ATS Direct Speech Circuits Plan**
- **TABLE CNS II-4 – HF Network Designations**

e-ANP : Table CNS II-1

State/Station	Category	Requirement				Remarks
		Type	Signalling Speed	Protocol	Code	
1	2	3	4	5	6	
EGYPT						
CAIRO	M					
AMMAN	M		64-9.6Kbps	AMHS		
ATHENS	M		64-9.6Kbps	CIDIN	IA-5	
BEN GURION	M		64-9.6Kbps	None	IA-5	
BEIRUT	M		9.6 Kbps	CIDIN	IA-5	
JEDDAH	M		128-9.6Kbps	AMHS		
KHARTOUM	T		9.6Kbps	None	IA-5	
NAIROBI	M		9.6Kbps	None	IA-5	
TUNIS	M		64-9.6Kbps	None	IA-5	**AMHS is under Oper. Test**
TRIPOLI	T		64-9.6Kbps	None	IA-5	
TRIPOLI	T		9.6Kbps	None	IA-5	STNDBY
DAMASCUS	T		64-9.6Kbps	None	IA-5	
ASMRA	T		9.6Kbps	None	IA-5	

Table CNS II-2: Required ATN Infrastructure Routing Plan

Admin. and Location	Type of Router	Type of Interconnection	Connected Router	Bandwidth	Network Protocol	Via	Remarks
1	2	3	4	5	6	7	8
EGYPT, Cairo	BIS	Inter-Regional Intra Regional	AFI, EUR Israel, Jordan, Lebanon, Athena Saudi Arabia		IPv4		

e-ANP : Table CNS II-3

Table CNS II-3: ATS DIRECT SPEECH CIRCUITS PLAN

ATS REQUIREMENTS FOR SPEECH COMMUNICATIONS			CIRCUIT			Remarks
TERMINAL I	TERMINAL II	TYPE	SERVICE	DIR/SW	TO BE SWITCHED	
1	2	3	4	5	6	8
EGYPT Cairo	Amman	A	LTF	DIR		1LINE
	Athens	A	LTF	DIR		2LINES
	Jeddah	A	LTF	DIR		2LINES
	Khartoum	A	LTF	DIR		1LINE
	Nicosia	A	LTF	DIR		1LINE
	Tel Aviv	A	LTF	DIR		1LINE
	Tripoli	A	LTF	DIR		1LINE

Table CNS II-4: HF Network Designators

Location Indicator and Name of location	HF en-route family
1	2
Cairo	AFI-3

Frequency (kHz)	ITU allotment area	AFI-3	MID-1	MID-2	MID-3	V MID	Remarks
1	2	3	4	5	6	7	8
3467	MID, AFI	X		X			
5517	AFI	X					
10018	MID, AFI	X		X			
11300	AFI	X					
13288	MID, AFI	X		X			
17961	AFI, MID	X			X		

ASBU Block 0 - Modules

Performance Improvement Area (PIA)	Module	Module Name	Priority	Egypt Status
PIA 1: Airport Operations	APTA	Optimization of Approach Procedures including vertical guidance	1	In-Progress
	SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	1	
	ACDM	Improved Airport Operations through Airport-CDM	1	In-Progress
PIA 2: Globally Interoperable Systems and Data	FICE	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	1	
PIA 3: Optimum Capacity and Flexible Flights	ACAS	ACAS Improvements	1	
PIA 4: Efficient Flight Path	TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	2	Not Implemented

ASBU Module B0-APTA

- **B0-APTA : Optimization of Approach Procedures including vertical guidance**

State/Aerodrome Location Indicator	RWY	Conventional Approaches			APTA		
		Precision		VOR or NDB	PBN PLAN	LNAV	LNAV / VNAV
		ILS	CAT		Update date		
HEBA	14	NIL	NIL	NIL	2014	N	N
	32	ILS	I	NIL	2014	Y	N
HESN	17	NIL	NIL	VOR/DME	2014	Y	N
	35	ILS	I	VOR/DME	2014	Y	N
HECA	05L	ILS	I	DVOR/DME	2014	Y	N
	05C	ILS	II	DVOR/DME	2014	Y	N
	05R	ILS	II	NIL	2014	N	N
	23L	ILS	II	DVOR/DME	2014	N	N
	23C	ILS	II	DVOR/DME	2014	Y	N
	23R	ILS	I	DVOR/DME	2014	Y	N

ASBU Module B0-APTA

- **B0-APTA : Optimization of Approach Procedures including vertical guidance**

State/Aerodrome Location Indicator	RWY	Conventional Approaches			APTA Implementation		
		Precision		VOR or NDB	PBN PLAN	LNAV	LNAV / VNAV
		ILS	CAT		Update date		
HEGN	16	NIL	NIL	VOR/DME	2014	Y	N
	34	ILS	I	VOR/DME	2014	Y	N
HELX	02	ILS	I	VOR/DME	2014	Y	N
	20	ILS	I	VOR/DME	2014	Y	N
HEMA	15	NIL	NIL	DVOR/DME	2014	Y	N
	33	NIL	NIL	DVOR/DME	2014	Y	N
HESH	04L	ILS	I	DVOR/DME	2014	Y	N
	04R	NIL	NIL	DVOR/DME	2014	Y	N
	22L	NIL	NIL	NIL	2014	Y	N
	22R	NIL	NIL	NIL	2014	Y	N

ASBU Module B0-SURF

- **B0-SURF : Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)**

State	City/ Aerodrome Location Indicator	Level 1	Level 2	Action Plan	Remarks
1	2	3	4	5	6
EGYPT	Cairo/Cairo Intl (HECA)	Implemented	Implemented		Completed since 2013

- **B0-SURF : Monitoring of A-SMGCS Elements Implementation**

State	City/Aerodrome Location Indicator	NCSS	CSS	DF	Alert	Action Plan
1	2	3	4	5	6	7
EGYPT	Cairo/Cairo Intl (HECA)	Y Two SMR	Y MLAT	Y	Y	

ASBU Module B0-FICE

- **B0-FICE : Increased interoperability, efficiency and capacity through G/G**

State	AMHS Capability	AMHS Interconnection	AIDC/OLDI Capability	AIDC/OLDI Implementation	Action Plan
1	2	3	4	5	6
EGYPT	Y	Y	Y	Y	

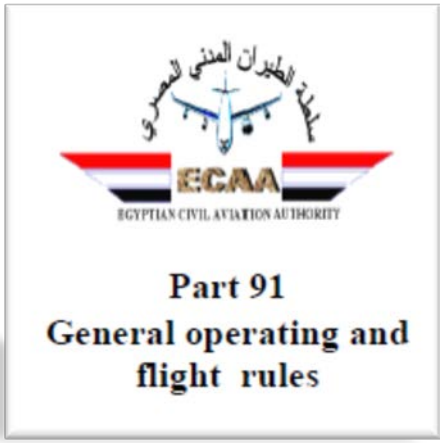
- **B0-FICE : The status of Implementation of AIDC/OLDI between Adjacent ACCs**

State	Location of AIDC/OLDI end sys.	Adjacent ACCs	Implementation Status	Report for MID AN Strategy	Action Plan
EGYPT	Cairo ACC	Athens ACC	Y	Y	
		Jeddah ACC	Y		
		Khartoum ACC	N		
		Tripoli ACC	N		
		Nicosia ACC	N		
		Amman ACC	N		

ASBU Module B0-ACAS

- **B0-ACAS : Airborne Collision Avoidance Systems (ACAS) Improvements**

State	TCAS V7.1 requirement	Regulation Reference	Action Plan	Remarks
EGYPT	Y	ECAR Part 121.356 & ECAR Part 91.221		ECAA will ensure the conformity through its surveillance program starting from Jan 2017



ASBU Module B0-ACAS

- **B0-ACAS : Airborne Collision Avoidance Systems (ACAS) Improvements**

Part 121
CERTIFICATION AND OPERATIONS: AIR CARRIERS and AIR TAXI

121.356 Airborne Collision Avoidance System (ACAS II)

(a) All turbine powered aircraft of a maximum certificated takeoff weight of 5700 kg or more or authorized to carry 19 passengers or more, shall be equipped with an approved ACAS II system and the appropriate class of mode "S" transponder, unless required sooner by a country in which the aircraft will operate;

Recommendation.— *All aeroplanes should be equipped with an airborne collision avoidance system (ACAS II).*

(b) An ACAS II system shall satisfy the minimum performance level , be installed and operate in accordance with the relevant provisions of ICAO Annex 10, Volume IV, Ch.4 as amended; and

(c) The appropriate manuals required by this Part shall contain the following information on the ACAS II system, as required by this section:

(1) Appropriate procedures for:

(i) The operation of the equipment; and

(ii) Proper cockpit crew action with respect to the equipment.

(2) An outline of all input sources that must be operative for the ACAS II system to function properly.

(d) All new ACAS installation shall monitor own aircraft's vertical rate to verify compliance with RA sense. If non-compliance is detected, ACAS shall stop assuming compliance, and instead shall assume the observed vertical rate . Compliance with this requirment can be achieved through the implementation of TCAS version 7.1; previous versions do not comply with this requirement .

(e) After 1 January 2017, All ACAS units shall comply with the requirements stated in (d) above.

Recommendation. — All ACAS should be compliant with the requirements stated in (d) above

Challenges and Ideas

❑ Challenge: B0 – APTA

Performance Indicator of APTA depends mainly on GNSS application

Performance Improvement Area (PIA)	Module	Module Name	Elements
PIA 1: Airport Operations	APTA	Optimization of Approach Procedures including vertical guidance	• States PBN Plan • LNAV procedures • LNAV/VNAV procedures

- The main challenges are:

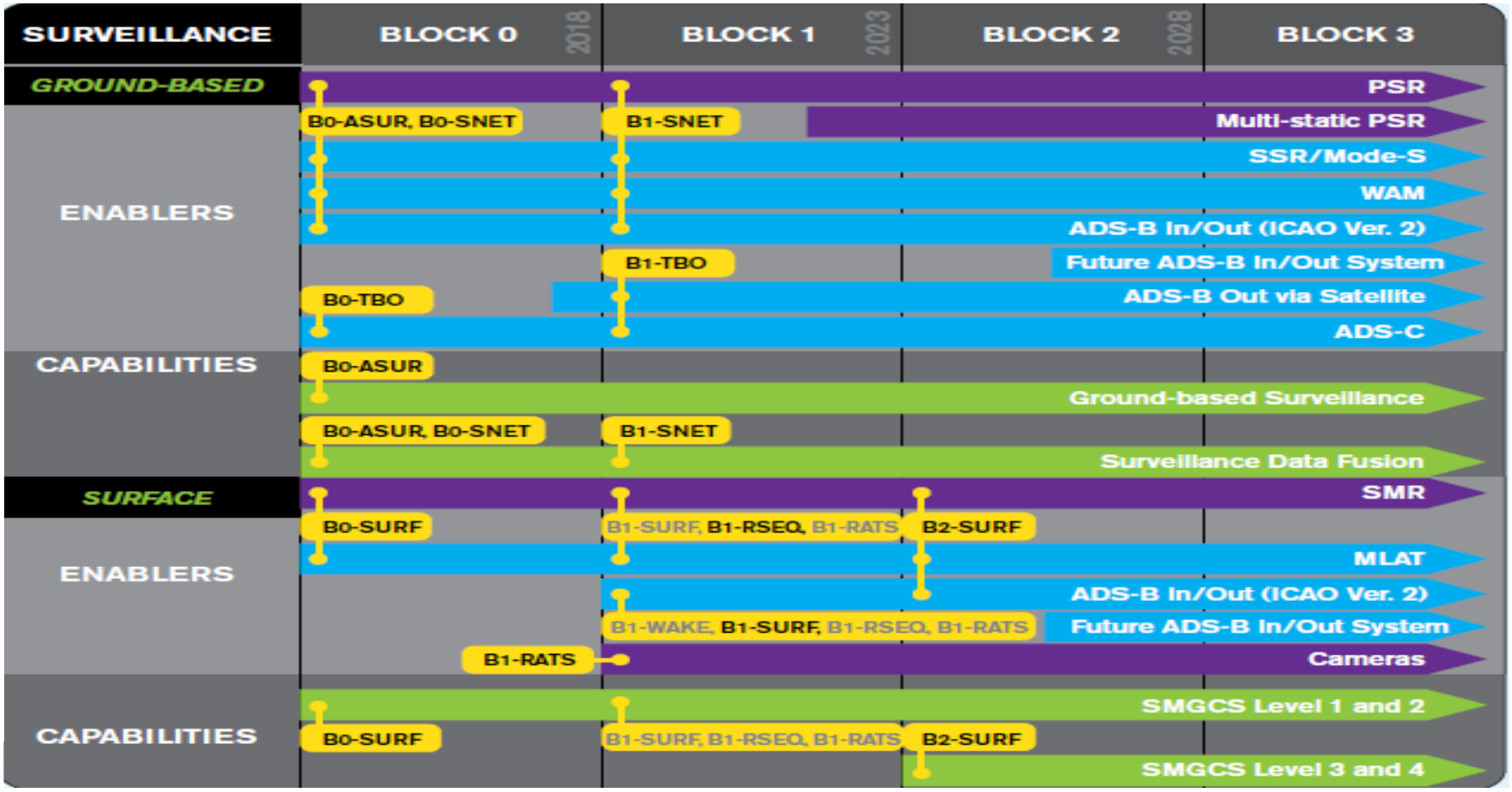
  - GNSS Vulnerabilities
  - GNSS RAIM Outage

Challenges B0-APTA

	Challenge	Ideas
GNSS Vulnerabilities	❑ The low power signal received from GNSS core satellite constellations can be easily interfered by low power transmitters (Unintentional interference) or spoofed by Intentional Interference.	❑ Utilizing terrestrial aids as part of a mitigation strategy, Through reliance on stand alone systems such as Instrument landing system at selected runways and Issuance RNAV (GNSS) Approach NOTAM.
GNSS RAIM Outage	❑ Unpredicted outages of GNSS services can cause undesired interruptions on aircraft operations. Safety impacts may become more severe during approach phase of flights.	❑ A common, regional RAIM prediction service for MID region can prove to be effective solution to unpredicted outages of GNSS services, since RAIM prediction results are needed daily by pilots, flight dispatchers, ATC….etc

Challenges and Ideas

❑ Challenges: B0 – Surf



Challenges B0-SURF

Challenge	Ideas
❑ Lack of experts in the beginning stage of A-SMGCS implementation.	❑ Providing specific training for CNS Engineers during implementation of A-SMGCS project.
❑ As a result of the ongoing development works at Cairo International Airport over the last ten years, either by building the new control tower or the new Terminal 3 that led to existence of non-covered areas by SMR.	❑ Installing new SMR 2 on the top of the new ATC tower and MLAT system to overcome non-covered areas issues.

Challenges B0-SURF

Challenge	Ideas
❑Difficulty to dig under runways to extend fiber cable to connect MLAT Transmitters and Receivers with the processing unit.	❑Usage of Microwave links to connect between MLAT transmitters and receivers with the processing unit.
❑The need for coordination with various suppliers due to nature of A-SMGCS (system of systems), as no single company can supply all its systems.	❑Ensuring that all systems (SMR – SSR – PSR - MLAT) can be integrated with surveillance data fusing (SDF) to combine A-SMGCS before contracting on the system.

Challenges and Ideas

❑ Challenge: B0 – FICE

Performance Improvement Area (PIA)	Module	Module Name	Elements
PIA 2: Globally Interoperable Systems and Data	**FICE**	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	• **AMHS Capability** • **AMHS Implementation** • **Implementation of AIDC/OLDI between adjacent ACCs**

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Challenges B0-FICE

Challenge	Ideas
❑ Limitations of the old AFTN system and lack of the AMHS Capability (Element 1).	❑ Upgrading AFS system by COMSOFT AFTN/AMHS System since 2010, which support AMHS Capability.
❑ Limitations of the old Automation system which was responsible for Managing the air traffic in Egypt FIR and not supporting AIDC/OLDI connections with the adjacent ACCs (Element 3). ❑ Difficulty of coordination with the remaining neighboring ACCs by establishing AIDC/OLDI connections with these ACCs due to compatibility issues of their systems.	❑ Upgrading Area Automation System by THALES TOPSKY Automation system since 2013, which support AIDC/OLDI Capability.

Challenges and Ideas

❑ Challenge: B0 – ACDM

Performance Improvement Area (PIA)	Module	Module Name	Elements
PIA 1: Airport Operations	**ACDM**	Improved Airport Operations through Airport-CDM	• **ACDM at HECA**

Challenge	Idea
❑ **Difficulty of coordination between all stakeholders of airport, and convincing them about importance of implementing ACDM applications at HECA.**	❑ **Inviting all stakeholders for conducting various awareness meetings about ACDM applications and its impact for improving surface traffic management at movement and maneuvering areas.**

Thank You !