



وزارة المواصلات والاتصالات
Ministry of Transportation
and Telecommunications

Second Meeting of the Air Navigation System Implementation Group (ANSIG/2) Cairo, Egypt, 6-8 December 2016

Kingdom Of Bahrain

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Outline

- **Brief on Bahrain National ASBU Implementation Plan**
- **Status of ASBU Implementation**
- **Lessons Learned**
- **Challenges**
- **Recommendations**
- **Outlook 2020**



Status of ASBU Implementation



Status of ASBU Implementation



B0-APTA: Optimization of Approach Procedures including vertical guidance

Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
States' PBN Implementation Plans	All	Indicator: 100% OBBI provided updated PBN implementation Plan Supporting metric: OBBI provided updated PBN implementation Plan on annual basis	Plan was completed on November 2009, and getting updated on annual basis	As part of the PBN implementation plan for precision approaches	
LNAV	All Instrument RWYs ends	Indicator: 100 % of runway ends at OBBI aerodromes with RNAV(GNSS) Approach Procedures (LNAV) Supporting metric: OBBI is recognized as the main and only international airport in Kingdom of Bahrain	All instrument runway ends, for precision approaches were implemented by DEC 2013		
LNAV/VNAV	All Instrument RWYs ends	Indicator: Implementation is considered as 90 % of PBN LNAV/VNAV within the respective OBBI TMA Supporting metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain	All instrument runway ends, for precision approaches by DEC 2016		



Status of ASBU Implementation



Module B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)					
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
A-SMGCS Level 1	Any aerodrome/all classes of aircraft/vehicles.	Indicator: Implementation is considered as 100% of the A-SMGCS Level 1 Supporting Metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain	Implement Advanced Surface Movement Guidance and Control System (A-SMGCS) Level1 by DEC 2015	Develop procedures and conduct training for staff, and users. (completed)	
A-SMGCS Level 2	Any aerodrome/all classes of aircraft/vehicles.	Indicator: Implementation is considered as 100% of the A-SMGCS Level 2 Supporting Metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain	Implement Advanced Surface Movement Guidance and Control System (A-SMGCS) Level 2 by DEC 2015		



Status of ASBU Implementation



Module B0 – ACDM: Improved Airport Operations through Airport-CDM					
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
A-CDM	For Local for equipped/capable fleets & for established airport surface infrastructure.	Indicator: Implementation is considered as 0 % of airport operations through airport-CDM Supporting metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain	Implement Airport Collaborative Decision Making (CDM) by DEC 2020	Training in the operational standards and procedures are required for this module	Steering committee has been formulated between different stakeholders



Status of ASBU Implementation



Module B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration					
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
AMHS implementation	All States	Indicator: Implementation is 100 % of AMHS Supporting metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain	Air Traffic Services Message Handling System Fully Implemented		
AMHS interconnection	All States	Indicator: Implementation is 11% of AMHS interconnected with other States AMHS Supporting metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain	Interconnection Air Traffic Services Message Handling System by March 2017	Implementation with: Doha, Jeddah, Abu Dhabi, Muscat, Kuwait, Singapore, Tehran, Beirut, and Nicosia.	Implementation with Doha completed
Implementation of AIDC/OLDI between adjacent ACCs	All ACCs	Indicator: Implementation is 10 % of AIDC/OLDI systems between adjacent ACCs Supporting metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain	Implement On-Line Data Interchange by March 2017	Implementation with: Doha, Jeddah, Abu Dhabi, Muscat, Kuwait, and (Tehran by 2019).	Implementation with Abu Dhabi, under test



Status of ASBU Implementation



Module B0 – DATM: Service Improvement through Digital Aeronautical Information Management					
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
AIXM	Bahrain AIS database	Indicator: implementation is 100 % of AIXM-based AIS database at OBBI Supporting Metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain	Fully Implemented on version 4.5 Plan to upgrade to Version 5.1 by 2016		Awaiting Eucontr ol action plan with regards to MIDAD project.
eAIP	Bahrain AIP	Indicator: implementation is 100 % an IAID driven AIP Production (eAIP) at OBBI Supporting Metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain	eAIP Fully Implemented		
QMS	Bahrain AIM system	Indicator: Implementation is 100 % for the QMS at OBBI AIM Supporting Metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain	QMS Fully Implemented		



Status of ASBU Implementation



WGS-84	Bahrain Aeronautical Charts	<p>Indicator: Implementation is 100 % of WGS-84 for horizontal plan (ENR, Terminal, AD) at OBBI</p> <p>Supporting Metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain</p> <p>Indicator: Implementation is 100 % of WGS-84 Geoid Undulation at OBBI</p> <p>Supporting Metric: OBBI is recognized as the main and only international airport in</p>	WGS-84 Fully Implemented		
eTOD	Bahrain in all four areas	<p>Indicator: Implementation is 100 % of required Terrain datasets at OBBI</p> <p>Supporting Metric: OBBI is recognized as the main and only international airport in Kingdom Bahrain</p> <p>Indicator: Implementation is 100 % of required Obstacle datasets at OBBI</p> <p>Supporting Metric: OBBI is recognized as the main and only international airport of Bahrain Kingdom</p>	eTOD Fully Implemented		



Status of ASBU Implementation



Digital NOTAM*	Bahrain Briefing Office	Indicator: Implementation is 100 % of Digital NOTAM into Bahrain National Plan for the transition from AIS to AIM Supporting Metric: OBBI is recognized as the main and only international airport of Bahrain Kingdom
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Status of ASBU Implementation



Module B0 – AMET: Meteorological information supporting enhanced operational efficiency and safety					
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
SADIS 2G and Secure SADIS FTP	All States	Indicator: Implementation is 100 % of SADIS 2G satellite Broadcast and Secure SADIS FTP Supporting metric: OBBI is recognized as the main and only international airport of Bahrain Kingdom	SADIS 2G satellite broadcast Fully Implemented		
QMS	All States	Indicator: 100 % implemented of QMS at OBBI Supporting metric: OBBI is recognized as the main and only international airport of Bahrain	QMS Fully Implemented		



Status of ASBU Implementation



Module B0 – FRT0: Improved Operations through Enhanced En-Route Trajectories

Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
Flexible use of Airspace (FUA)	Within Bahrain FIR	Indicator: Implementation of Flexible Use of Airspace is 100 % within OBBS airspace Supporting Metric: OBBI is recognized as the main and only international airport of Bahrain Kingdom	Flexible use of Airspace (FUA) is Fully Implemented		
Flexible routing	Within Bahrain FIR	Indicator: Implementation is 100 % of Flexible Use of Airspace within OBBS airspace Supporting Metric: OBBI is recognized as the main and only international airport of Bahrain Kingdom	Flexible routing is Fully Implemented		



Status of ASBU Implementation



Module B0 – NOPS: Improved Flow Performance through Planning based on a Network-Wide view					
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
ATFM Measures implemented in collaborative manner	All States	<p>Indicator: Implementation is 100 % of establishing a mechanism for the implementation of ATFM Measures based on collaborative decision</p> <p>Supporting metric: OBBI is recognized as the main and only international airport of Bahrain Kingdom</p>	Mechanism for the implementation of ATFM Measures based on collaborative decision		



Status of ASBU Implementation



Module B0 – ACAS: ACAS Improvements					
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
Avionics	All aircraft with a max certificated take-off mass greater than 5.7 tons	Indicator: 100% of aircraft equipped with TCAS v 7.1 as applicable Supporting metric: 14 aircraft equipped with TCAS v 7.1 as applicable	Fully Implementation of TCAS v 7.1		



Status of ASBU Implementation



Module B0 – CDO: Improved Flexibility and Efficiency in Descent Profiles (CDO)

Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
PBN STARS	Within Bahrain TMA	Indicator: Implemented at 100 % of PBN STARS at OBBI respective TMA Supporting Metric: OBBI is recognized as the main and only international airport of Bahrain Kingdom	Implement Performance-Based Navigation fully implemented		
International aerodromes/TM As with CDO	Within designated routes and/or airspace	Indicator: Implementation 70 % of CDO Techniques within OBBI FIR Supporting Metric: OBBI is recognized as the main and only international airport of Bahrain Kingdom	Implement partial Continuous Descent Operations (CDO) by Feb 2017		Redesign and amendment of approach procedures project is ongoing for further improvement with considering to airspace limitation difficulties



Status of ASBU Implementation



Module B0 -TBO: Improved Safety and Efficiency through the initial application of Data Link En-Route

Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
ADS-C and CPDLC	Within Bahrain FIR	Indicator: 0 % of OBBB FIR implemented data link en-route Supporting Metric: 0 of FIR implemented data link en-route	Not required for Bahrain As agree in ATM SG/1 meeting, Cairo, 9-12 June 2014	ADS-C (capable by 2019)	<ul style="list-style-type: none"> • CPDLC system (capable) • As agree in ATM SG/1 meeting, Cairo, 9-12 June 2014. That only Oman, and Yemen will implement ADS-C and CPDLC, to cover Indian Ocean.



Status of ASBU Implementation



Module B0 – CCO: Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)					
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Action Plan	Remarks
PBN SIDs	Within Bahrain TMA	Indicator: Implementation is considered as 0 % of PBN SIDs at OBBI respective TMA Supporting Metric: OBBI is recognized as the main and only international airport of Bahrain Kingdom	Implement Performance-Based Navigation SIDs by Feb 2017		At the final stages of designing/implementing RNP SIDs (Ongoing Project)
International aerodromes/TMAs with CCO	Within designated routes and/or airspace	Indicator: Implementation 60 % of CCO Techniques within OBBI FIR Supporting Metric: Doha as part of OBBI FIR, it will be implementing CCO at their TMA by end of June 2014	Implement TMAs with partial CCO by Feb 2017		Ongoing project and efforts to implement the RNP SIDs with consideration to CCO in the TMA



Other ASBU Block 0 Modules (priority 2) Implemented by the State



Module	Module Title	Status		Remarks
		Yes	No	
B0-WAKE	Increased Runway Throughput through Optimized Wake Turbulence Separation		No	N/A due to current arrival sequence spacing
B0-RSEQ	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	Yes for AMAN	No for DMAN	
B0-ASUR	Initial capability for ground surveillance	Yes		
B0-ASEP	Air Traffic Situational Awareness (ATSA)	Yes		Partial
B0-OPFL	Improved access to optimum flight levels through climb/descent procedures using ADS-B		No	Planned (ADS-B introduction 2019)
B0-SNET	Increased Effectiveness of Ground-Based Safety Nets	YES ASMGCS		RWY incursion warnings
B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route		No	Planned CPDLC implementation



Outlook 2020

(Status of ASBU Block 0 Modules by 2020)



Module	Module Title	Status by 2020				Remarks
		FI	PI	NI	N/A	
B0-APTA	Optimization of Approach Procedures including vertical guidance	X				
B0-WAKE	Increased Runway Throughput through Optimized Wake Turbulence Separation				N/A	
B0-RSEQ	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	X AMAN	X DMAN			2019
B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	X				
B0-ACDM	Improved Airport Operations through Airport-CDM		X			ATM capability 2019
B0-FICE	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	X				



Outlook 2020

(Status of ASBU Block 0 Modules by 2020)



Module	Module Title	Status by 2020				Remarks
		FI	PI	NI	N/A	
B0-DATM	Service Improvement through Digital Aeronautical Information Management	X				
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	X				
B0-FRTO	Improved Operations through Enhanced En-Route Trajectories		X			Introduction of ADS-C by 2019
B0-NOPS	Improved Flow Performance through Planning based on a Network-Wide view		X			2020
B0-ASUR	Initial capability for ground surveillance	X				
B0-ASEP	Air Traffic Situational Awareness (ATSA)	Partial	X			planned for full implementation 2019



Outlook 2020

(Status of ASBU Block 0 Modules by 2020)



Module	Module Title	Status by 2020				Remarks
		FI	PI	NI	N/A	
B0-OPFL	Improved access to optimum flight levels through climb/descent procedures using ADS-B				X	N/A full radar environment (Planned ADS-B introduction 2019)
B0-ACAS	ACAS Improvements	X				
B0-SNET	Increased Effectiveness of Ground-Based Safety Nets	X				
B0-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDO)	Partial	X			2017
B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route		X			2019
B0-CCO	Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)	Partial	X			2017



Lessons Learned

Stakeholder involvement

It is recognized that the involvement of the stakeholders was essential to succeed; Airport Operator, Airport Based & major Airlines, Aviation sectors...etc.

Cautious approach

Existing systems vulnerability, parallel operations for safe transition



Challenges

Procedural changes

Training and Operational difficulties

Time (long process)



Recommendations

As the ASBU should not be limited to system enhancement towards efficient and reliable interoperability, the dimensions of the ASBU should take a culture & methodical path for optimum exchange of aviation information rewards.



Thank you