International Civil Aviation Organization

Middle East Air Navigation Planning and Implementation Regional Group

Fifteenth Meeting (MIDANPIRG/15)
(Bahrain, 8 – 11 June 2015)

Agenda Item 5.2.1: **MID Region air navigation priorities and target (ASBU Implementation)**

IMPLEMENTATION OF A-SMGCS LEVEL 1-2 (B0-SURF)

(Presented by the Secretariat)

SUMMARY
This paper presents an overview on B0-SURF which is a priority one ASBU module in the MID Air Navigation Strategy aiming at Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2). Action by the meeting is at paragraph 3.
REFERENCES
- ANSIG/1 Report - Definition of A-SMGCS Implementation Levels (Eurocontrol, 2010) - ICAO A-SMGCS Manual (Doc 9830) - MSG/4 Report

1. INTRODUCTION

1.1 The MID Region Air Navigation Strategy was endorsed by the Fourth meeting of the MIDANPIRG Steering Group (MSG/4, Cairo, Egypt, 24-26 November 2014) as the framework identifying the regional air navigation priorities, performance indicators and targets.

1.2 The Strategy includes Tables for all twelve priorities 1 ASBU Modules along with their associated elements, applicability, performance indicators, supporting metrics and performance targets. B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2) is a priority one ASBU module in the MID Air Navigation Strategy.

1.3 The First Meeting of the Air Navigation Systems Implementation Group (ANSIG/1) (Cairo, Egypt, 10-12 February 2015). The meeting was attended by a total of thirty two (32) participants from seven (7) States (Bahrain, Egypt, Iran, Kuwait, Qatar, Saudi Arabia and United Arab Emirates) and two (2) Organizations/Industries (IATA and MIDRMA).

2. DISCUSSION

2.1 The Advanced Surface Movement Guidance and Control Systems (A-SMGCS) is an expansion of the Surface Movement Guidance and Control Systems (SMGCS) to improve capacity and safety by making use of modern technologies and a higher level of integration between the various functionalities.

2.2   A-SMGCS: improves access to portions of the manoeuvring area obscured from view of the control tower for vehicles and aircraft. Basic A-SMGCS provides surveillance and alerting of movements of both aircraft and vehicles on the aerodrome thus improving runway/aerodrome safety and capacity.

2.3   The following four basic functions are defined for A-SMGCS:

- **Surveillance**
  The main role is to provide ATC with a view of the complete situation of the mobiles on the airport surface. This view should be shared with pilots and vehicles drivers in order to provide them with a better situational awareness. The position and identification of mobiles may be acquired through non-dependent sensors (Surface Movement Radar, Approach radar, Stand information system…) or dependent sensors (Multilateration on Mode S or on VHF, ADS, ADS-B).

- **Routing**
  The role is to designate a route for each aircraft or mobile. In manual mode the A-SMGCS helps the controller to elaborate the route and then the controller transmits it to the mobiles. In automatic mode, it could be automatically elaborated and transmitted to the pilots and drivers, the controller being informed and possibly validating the route.

- **Guidance**
  This function provides directions to the pilots and vehicle drivers to follow the designated route. Pilots can be supported in this task by the usual ground visual aids or by additional equipment (onboard moving map for example).

- **Control**
  It should help ATC to sequence the traffic, ensure separations, predict conflicts and, based on the surveillance function, raise alarms to the controller or directly to the pilots. For example it includes:

  − detection of incursion into the runway and other designated protected areas; and
  − detection of deviations from the assigned route (route conformance monitoring).

Implementation and Monitoring

2.4   The ANSIG/1 meeting agreed that A-SMGCS Levels 1-2 related to B0-SURF are to be implemented by a number of agreed international airports as included in the MID Region Air Navigation Strategy. Name of the applicable airports, implementation status and Targets are included in Volume III of the MID eANP as at **Appendix A**.

2.5   The agreed B0-SURF main implementation elements are: Level 1 and Level 2 where:

- *Level 1*: provides improved surveillance and procedures covering the maneuvering area for ground vehicles and movement area for aircraft. The procedures concern identification and issuance of ATC instructions and clearances. The controllers are given traffic position and identify information which is an important step forward from the traditional Surface Movement Radar (SMR) image.

- *Level 2*: consists of the improvement of Level 1 existing functions and the introduction of the Control and Guidance functions. Several improvements need to be implemented, as surveillance data will be used by the runway safety net, the surveillance infrastructure will not be the same. In comparison to Level 1, the traffic information (position, identity) will be completed with other parameters like speed vector, and the performance will be enhanced, i.e. the position accuracy will be better. In addition, the automated control system shall be robust to failures of other ATC systems (Flight Data Processing System, etc), or other A-SMGCS elements.

2.6   Details on the definition of A-SMGCS implementation levels and an implementation road map are provided in Eurocontrol document titled "Definition of A-SMGCS Implementation Levels" which is available at: https://www.eurocontrol.int/articles/advanced-surface-movement-guidance-and-control-systems-smgcs.

2.7   Information on the B0-SURF implementation needs to be reported by the States to the ICAO MID Regional Office for necessary monitoring and update.

2.8   The meeting may wish to note that the ANSIG/1 meeting noted with appreciation Egypt's experience related to the implementation of A-SMGCS Levels 1 and 2 at Cairo International Airport. The need for coordination with various suppliers was underlined, due to the nature of A-SMGCS (system of systems).

2.9   It was highlighted that in the case of Cairo International Airport, the System Data Fusion (SDF), the Surface Movement Radar (SMR) and the Multilateration System (MLAT) were supplied by different companies. Therefore, integration of the different systems was a challenging task.

2.10   The meeting may wish to note that the following aerodromes have already implemented A-SMGCS Levels 1 & 2: OMDB, OMAA, OMDW, OTBD, OTHH, and HECA. In addition, Bahrain is in the process of implementing A-SMGCS at Bahrain international airport which is expected to be completed by the third quarter of 2015.

2.11   The meeting may wish to note that ANSIG/1 meeting appreciated the progress made in implementation of this module and agreed that the targets are achievable by 2017. It is to be highlighted that some aerodromes in the Region are planning to implement A-SMGCS Level 3 and Level 4, although they are not part of B0-SURF (it's part of B2-SURF elements).

3.   ACTION BY THE MEETING

3.1   The meeting is invited to review and update the status of implementation of the B0-SURF Module in the MID Region; and take action as appropriate.

APPENDIX A

A-SMGCS Implementation Elements

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

Description and purpose

Basic A-SMGCS provides surveillance and alerting of movements of both aircraft and vehicles on the aerodrome thus improving runway/aerodrome safety. ADS-B information is used when available (ADS-B APT).

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
Y	Y	Y	Y	Y

Applicability consideration:

A-SMGCS is applicable to any aerodrome and all classes of aircraft/vehicles. Implementation is to be based on requirements stemming from individual aerodrome operational and cost-benefit assessments. ADS-B APT, when applied is an element of A-SMGCS, is designed to be applied at aerodromes with medium traffic complexity, having up to two active runways at a time and the runway width of minimum 45 m.

B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)			
Elements	*Applicability*	**Performance Indicators/Supporting Metrics**	**Targets**
A-SMGCS Level 1*	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEDF, OEJN, OERK, OMDB, OMAA, OMDW	Indicator: % of applicable international aerodromes having implemented A-SMGCS Level 1 Supporting Metric: Number of applicable international aerodromes having implemented A-SMGCS Level 1	70% by Dec. 2017
A-SMGCS Level 2*	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEDF, OEJN, OERK, OMDB, OMAA, OMDW	Indicator: % of applicable international aerodromes having implemented A-SMGCS Level 2 Supporting Metric: Number of applicable international aerodromes having implemented A-SMGCS Level 2	50% by Dec. 2017

Reference: Eurocontrol Document – "Definition of A-SMGCS Implementation Levels, Edition 1.2, 2010".

TABLE B0-SURF (A-SMGCS Level 1-2)

EXPLANATION OF THE TABLE

Column

1   Name of the State
2   Name of City/Aerodrome and Location Indicator where A-SMGCS is required
3   Status of implementation of A-SMGCS Level 1, where:
      Y – Yes, implemented
      N – No, not implemented
4   Status of implementation of A-SMGCS Level 2, where:
      Y – Yes, implemented
      N – No, not implemented
5   Action plan — short description of the State's Action Plan with regard to the implementation of A-SMGCS Level 1-2, especially for items with "N".
6   Remarks - additional information (e.g. case of difference between level 1 and level 2 applicability)

State	City/ Aerodrome Location Indicator	Level 1	Level 2	Action Plan	Remarks
1	*2*	*3*	*4*	*5*	*6*
BAHRAIN	Bahrain/Bahrain Intl (OBBI)	N	N	A-SMGCS Level 1-2 Project is under Execution phase. expected completion on Sep 2015	
EGYPT	Cairo/Cairo Intl (HECA)	Y	Y		
IRAN	Tehran/Mehrabad Intl (OIII)	N	N		
KUWAIT	Kuwait/Kuwait Intl (OKBK)	N	N		
OMAN	Muscat/Muscat Intl (OOMS)	N	N		
QATAR	Doha/Doha Intl (OTBD)	Y	Y		
QATAR	Doha/Hamad Intl (OTHH)	Y	Y		
SAUDI ARABIA	Dammam/King Fahad Intl (OEDF)	N	N		
SAUDI ARABIA	JEDDAH/King Abdulaziz Intl (OEJN)	N	N		
SAUDI ARABIA	RIYADH/King Khalid Intl (OERK)	N	N		
UAE	Abu Dhabi/Abu Dhabi Intl (OMAA)	Y	Y	Level 4 2017	
UAE	Dubai/Dubai Intl (OMDB)	Y	Y	Level 4 2016	
UAE	DUBAI/Al Maktoum Intl (OMDW)	Y	N	Level 4 2018	
Total Percentage		**46**	**46**		

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