International Civil Aviation Organization

Runway and Ground Safety Working Group

Second Meeting (RGS WG/2)
(Cairo, Egypt, 19 - 21 May 2015)

Agenda Item 3: Coordination between RASG-MID and MIDANPIRG in the area of Aerodrome Safety

ASBU MODULE B0-SURF (A-SMGCS LEVEL 1-2)

(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

- Definition of A-SMGCS Implementation Levels (Eurocontrol, 2010)
- ICAO A-SMGCS Manual (Doc 9830)
- MID Region Air Navigation Strategy
- 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. The Strategy includes Tables for all twelve priorities 1 ASBU Modules along with their associated elements, applicability, performance indicators, supporting metrics and performance targets.

1.2 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.

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 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 and implementation Performance Indicators/Supporting Metrics 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 Implementation challenges include financial constraints, unavailability of supporting systems in the airports, training needs, and lack of qualified human resources.

2.9 The Table at **Appendix B** was developed to monitor the implementation status of the B0-SURF elements.

3. ACTION BY THE MEETING

3.1 The meeting is invited to urge States to:

a) note the information included in this working paper;

b) review and update the status of implementation of the different B0-SURF elements; and

c) recommend measures to expedite the implementation process and meet the agreed performance targets.

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, 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)				
EGYPT	Cairo/Cairo Intl (HECA)	Y	Y		
IRAN	Tehran/Mehrabad Intl (OIII)				
KUWAIT	Kuwait/Kuwait Intl (OKBK)				
OMAN	Muscat/Muscat Intl (OOMS)				
QATAR	Doha/Doha Intl (OTBD)	Y	Y		
QATAR	Doha/Hamad Intl (OTHH)	Y	Y		
SAUDI ARABIA	JEDDAH/King Abdulaziz Intl (OEJN)				
SAUDI ARABIA	RIYADH/King Khalid Intl (OERK)				
UAE	Abu Dhabi/Abu Dhabi Intl (OMAA)	Y	Y		
UAE	Dubai/Dubai Intl (OMDB)	Y	Y		
UAE	DUBAI/Al Maktoum Intl (OMDW)	Y	Y		
Total Percentage					

APPENDIX B

Table B0-SURF Implementation

EXPLANATION OF THE TABLE

Column:

1 Name of the State.

2 Name of City/Aerodrome and Location Indicator

3 **Non-cooperative Surveillance Sensors (NCSS):** e.g. Surface Movement Radar (SMR). This is required for Level 1 and Level 2.
Implementation status of (NCSS) is indicated by:
Y – Yes, implemented
N – No, not implemented

4 **Cooperative Surveillance Sensor (CSS)**: e.g.; Multilateration and ADS-B. This is required for Level 1 and Level 2.
Implementation status of (CSS) is indicated by:
Y – Yes, implemented
N – No, not implemented

5 **Data Fusion (FS)**: The process of combining surveillance information from two or more sensor systems or sources. This is required for Level 1 and Level 2.
Implementation status of (FS) is indicated by:
Y – Yes, implemented
N – No, not implemented

6 **Alert**: Conflict/infringement detection. This is required for Level 2
Implementation status of Alert is indicated by:
Y – Yes, implemented
N – No, not implemented

7 Action Plan: short description of the State's Action Plan with regard to the implementation of A-SMGCS.

8 Remarks — additional information (e.g. case of difference between level 1 and level 2 applicability)

TABLE B0-SURF
Monitoring of A-SMGCS Elements Implementation

State	City/Aerodrome Location Indicator	NCSS	CSS	DF	Alert	Action Plan	Remarks
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
BAHRAIN	Bahrain/Bahrain (OBBI)						
EGYPT	Cairo/Cairo Intl (HECA)						
IRAN,	Tehran/Mehrabad (OIII)						
KUWAIT	Kuwait/Kuwait Intl (OKBK)						
OMAN	Muscat/Muscat Intl (OOMS)						
QATAR	Doha/Doha Intl (OTBD)						
QATAR	Doha/Hamad Intl (OTHH)						
SAUDI ARABIA	JEDDAH/King Abdulaziz Intl (OEJN)						
SAUDI ARABIA	RIYADH/King Khalid Intl (OERK)						
UAE	Abu Dhabi/Abu Dhabi (OMAA)						
UAE	Dubai/Dubai Intl (OMDB)						
UAE	DUBAI/Al Maktoum (OMDW)						

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