



International Civil Aviation Organization

**MIDANPIRG Steering Group**

**Fourth Meeting (MSG/4)**  
*(Cairo, Egypt, 24 - 26 November 2014)*

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**Agenda Item 4: MID Region Air Navigation**

**ADVANCED SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM (A-SMGCS)**

*(Presented by the Secretariat)*

**SUMMARY**

The purpose of this paper is to provide the participants with information on the Advanced Surface Movement Guidance and Control System (A-SMGCS) which is part of the MID Air navigation Strategy.

Action by the meeting is at paragraph 3.

**REFERENCES**

- Eurocontrol Definition of A-SMGCS Implementation Levels, Edition 1.2, 2010
- ICAO Advanced Surface Movement, Guidance and Control Systems (A-SMGCS) Manual (Doc 9830), First edition – 2004

**1. INTRODUCTION**

1.1 The Advanced Surface Movement Guidance and Control Systems (A-SMGCS), as described by ICAO Manual (Doc 9830), 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.

1.2 A-SMGCS: Improves access to portions of the manoeuvring area obscured from view of the control tower for vehicles and aircraft.

1.3 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. DISCUSSION**

2.1 The MID Air Navigation Strategy includes ASBU Module B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2).

2.2 Under ICAO Manual for A-SMGCS (Doc 9830), the following four basic functions are defined:

- **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).

2.3 Criteria for determining the A-SMGCS implementation levels, as described by ICAO Doc 9830, is provided at **Appendix A** to the Information Paper.

### 3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper.

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## Appendix B

### A-SMGCS IMPLEMENTATION LEVELS

Criteria for the categorization of aerodromes on the basis of visibility conditions, traffic density and aerodrome layout are given in Appendix A. The appropriate level of functional implementation of an A-SMGCS at a particular aerodrome can be determined by identifying the criteria that apply. There are 36 possible aerodrome type criteria combinations, 4 functional criteria (surveillance, control, routing and guidance) and 3 user groups (controller, pilot/vehicle driver and system) to consider. Overall, the number of options is too large to be of practical assistance to

anyone tasked with defining the level of implementation that is appropriate for a given aerodrome. Table B-1 is an example of one means of grouping A-SMGCS implementation into 5 levels that together cover all cases. The table shows that the 4 basic functions are provided at all levels. Within the table, the role played by automation and avionics increases progressively through the levels. Level V corresponds to the most demanding aerodrome requirements where the level of automation is the highest.

**Table B-1. Criteria for determining A-SMGCS implementation levels**

Aerodrome type	User	Surveillance	Control			Routing	Guidance				Level	
			Conflict prediction and/or detection	Conflict analysis	Conflict resolution		Ground					
							*1	*2	*3	*4		
T-1: 1:(B)(L) T-2: 1:(B)(M) T-3: 1:(B)(H) T-4: 1:(S)(L)	Controller	X	X	X	X	X						I
	Pilot/Vehicle driver		X	X	X		X					
	System											
T-5: 1:(S)(M) T-6: 1:(S)(H) T-7: 1:(C)(L) T-10: 2:(B)(L) T-11: 2:(B)(M) T-13: 2:(S)(L)	Controller	X	X	X	X	X						II
	Pilot/Vehicle driver		X	X	X		X	X				
	System	X	X									

Aerodrome type	User	Surveillance	Control			Routing	Guidance				Level	
			Conflict prediction and/or detection	Conflict analysis	Conflict resolution		Ground					
							*1	*2	*3	*4		
T-8: 1:(C)(M) T-12: 2:(B)(H) T-14: 2:(S)(M) T-16: 2:(C)(L) T-19: 3:(B)(L) T-20: 3:(B)(M) T-22: 3:(S)(L)	Controller		X	X	X				X			III
	Pilot/Vehicle driver		X	X <sup>1)</sup>	X <sup>1)</sup>		X					
	System	X	X	X	X	X						
T-9: 1:(C)(H) T-15: 2:(S)(H) T-17: 2:(C)(M) T-18: 2:(C)(H) T-21: 3:(B)(H) T-23: 3:(S)(M) T-24: 3:(S)(H) T-25: 3:(C)(L) T-26: 3:(C)(M) T-27: 3:(C)(H)	Controller		X	X	X							IV
	Pilot/Vehicle driver		X	X <sup>1)</sup>	X <sup>1)</sup>		X					
	System	X	X	X	X	X				X		
T-28: 4:(B)(L) T-29: 4:(B)(M) T-30: 4:(B)(H) T-31: 4:(S)(L) T-32: 4:(S)(M) T-33: 4:(S)(H) T-34: 4:(C)(L) T-35: 4:(C)(M) T-36: 4:(C)(H)	Controller		X	X	X							V
	Pilot/Vehicle driver						X				X	
	System	X	X	X	X	X				X		

\*1. Painted centre line and taxiway guidance signs      *Note 1.— Does not apply in visibility condition 3.*  
 \*2. Fixed centre line lights  
 \*3. Manual switched centre line lights  
 \*4. Automatic switched centre line lights