International Civil Aviation Organization

AIR NAVIGATION SYSTEMS IMPLEMENTATION GROUP

First Meeting (ANSIG/1)
(Cairo, Egypt, 10 – 12 February 2015)

Agenda Item 4: Performance Framework for Regional Air Navigation Implementation

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

(Presented by Kingdom of Bahrain)

SUMMARY

This paper provides information on the status the implementation of B0-SURF "Advanced Surface Movement Guidance & Control System (A-SMGCS)" in Bahrain International Airport.

Action by the meeting is at paragraph 4.

REFERENCES

- Aviation System Block Upgrade Document
- Global Air Navigation Plan
- MIDANPIRG/14 Report

1. INTRODUCTION

1.1 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 priority 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)) set as a priority 1 Module, Advanced Surface Movement Guidance & Control System (A-SMGCS) A system providing routing, guidance and surveillance for the control of aircraft and vehicles in order to maintain the declared surface movement rate under all weather conditions within the aerodrome visibility operational level (AVOL) while maintaining the required level of safety.

1.3 For advanced surface movement guidance and control systems (A-SMGCS), the facilities and procedures also represent a significant improvement over and above performance levels associated to conventional A-SMGCS. The entire A-SMGCS concept, being based on a set of forward and backward compatible groupings of modular functionalities, will ensure these B0 facilities and procedures fully support seamless transitions to the more.

1.4 Element 1 – Surveillance

In the case of A-SMGCS, this element enhances the primary radar surface surveillance with the addition of at least one cooperative surface surveillance system. These systems include multilateration, secondary surveillance radar Mode S, and ADS-B. As with TMA and en-route secondary surveillance radars/ADS-B, the cooperative aspect of the surveillance allows for matching of equipped surveillance targets with flight data, and also reduces clutter and degraded operation associated with primary surveillance. The addition of cooperative surveillance of aircraft and vehicles adds a significant positive benefit to the performance of safety logic, as the tracking and short-term trajectory projection capabilities are improved with the higher quality surveillance. The addition of this capability also provides for a marginal improvement in routine management of taxi operations and more efficient sequencing of aircraft departures.

In the case of ADS-B APT, as an element of an A-SMGCS system, it provides controllers with traffic situational awareness on movement areas. The provision of surveillance information to the controller will allow the deployment of SMGCS procedures, augmenting the controller‘s situational awareness and helping the controller to manage the traffic in a more efficient way. In this respect, the ADS-B APT application does not aim to reduce the occurrence of runway incursions, but may reduce the occurrence of runway collisions by assisting in the detection of the incursions.

1.5 Element 2 – Alerting

In the case of A-SMGCS, where installed and operated, alerting with flight identification information also improves the ATC response to situations that require resolution such as runway incursion incidents and improved response times to unsafe surface situations. Levels of complexity as regards this functionality currently vary considerably between the various industrial solutions being offered. B0 implementations will serve as important initial validation for improved algorithms downstream.

2. A-SMGCS IMPLEMENTATION IN KINGDOM OF BAHRAIN

Ministry of Transportation and Telecommunications “Civil Aviation Affairs” Air Navigation Directorate in processes of completing A-SMGCS project by October 2015 which consists of A-SMGCS level 2, as follows:

A. Surface Movement primary Radar(s)
B. Multilateration system
C. ADSB receivers
D. Data Fusion
E. Incursion monitoring and alerting Logic/system
F. Vehicle tracking transponders

The main purpose of implementing A-SMGCS project is to improve flight Safety and efficiency of Air Traffic in the following key areas:

1. Track all movements of traffic both in the air and on the ground.
2. Prevent vehicle incursions into the runway area.
3. Prevent potential conflicts between aircraft.
4. Improve situational awareness during low visibility.
5. Provide real time data on aircraft and vehicle position on the manoeuvering area.
6. An improved efficiency for the improvement of Airport Collaborative Decision Making (A/CDM) which is progressing at Bahrain International Airport

The system accomplishes this in the following ways:

1. Primary radar tracking, a non-co-operative sensor detecting all movements on the surface of the maneuvering area. This consists of single primary radar to be located at mid-way point of the runway, north side of the airport.

2. Multilateration system, a co-operative network of sensors located at various locations around the airport. This system essentially triangulates the position of the target by extracting information from the aircraft/vehicle integral transponder.

3. Automatic dependent surveillance-broadcast (ADS-B) to improve the surveillance service at BIA, and Airspace to enhance safety and efficiency of Air Traffic.

4. Integration to existing airfield systems such as airfield lighting, gate management systems etc.

3. PROJECT TIME LINE

TASKS	DATE
Project Kick-off	01/04/2014
A-SMGCS infrastructure	15/11/2014
Factory Training	07/11/2014
A-SMGCS Installation	30/06/2015
A-SMGCS SAT	10/09/2015
A-SMGCS Final Acceptance	30/09/2015

4. ACTION BY THE MEETING

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

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