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AIR NAVIGATION SERVICES

GENERAL

CONFIRMATION OF (LVL) 1 ADVANCED SURFACE MOVEMENT CONTROL (SMC) AND GUIDANCE SYSTEM (A-SMGCS) AND IMPLEMENTATION OF LEVEL (LVL) 2 (CONFLICT DETECTION AND ALR) FUNCTIONALITY OF THE ADVANCED SURFACE MOVEMENT CONTROL (SMC) AND GUIDANCE SYSTEM (A-SMGCS) DEPLOYED AT BOTH OR TAMBO (FAOR) AND CAPE TOWN (FACT) INTERNATIONAL (INTL) AIRPORT (AP)

This AIC replaces AIC 40.14 dated 10-03-11; AIC 003/2016 dated 31 MAR 2016 and AIP SUP S069/13.

1. INTRODUCTION

Building on the implementation of (Level 1) A-SMGCS which was operational during the first half of 2010, the purpose of this Aeronautical Information Circular (AIC) is to inform users on the implementation of the Conflict Detection and Alerting (Level 2) A-SMGCS functionality at OR Tambo and Cape Town International Airports where these advanced surface movement, guidance and control systems have been deployed. Level 2 A-SMGCS functionality provides the tower controller with a prediction and/or detection of a possible conflict between aircraft and vehicles during the ground movement phase on the manoeuvring area or incursion of vehicles, aircraft or both onto the runway within the rules as set within the conflict detecting and alerting functionality.

The implementation of the Conflict Detection and Alerting (Level 2) A-SMGCS functionality at OR Tambo and Cape Town International Airports was fully operational on 31 March 2016.

2. BACKGROUND

The A-SMGCS systems and in particular the ground movement surveillance functionality (Level 1) has been operationally used at both airports since 22 April 2010.

During the ensuing period 2011 to May 2015, ATNS continued testing the A-SMGCS systems at FAOR and FACT and introduced a number of system upgrades, together with the installation of Mode-S squitter units on vehicles operating on or within the airport manoeuvring areas. The following enhancements have been made:

- *The systems have been upgraded to be fully compliant with the FPL2012 requirements.*
- *A second Surface Movement Radar (SMR) sensor has been installed and fully integrated into the A-SMGCS system at FACT.*
- *Co-operative vehicle transponders have been installed on the majority of vehicles operating on or within the manoeuvring areas at FAOR and FACT and remains an on-going activity for vehicles not yet equipped.*
- *A program of continuous improvement was initiated in 2011 to reduce the number of false ground targets being identified. This is an on-going activity.*

Runway Incursion Monitoring and Collision Avoidance (RIMCAS) testing took place during the period March 2014 to April 2015. This Level 2 A-SMGCS functionality has been operationally accepted for deployment within the A-SMGCS system at FAOR and FACT.

Level 2 A-SMGCS Functionality

The Level 2 A-SMGCS functionality is provided through the use of a specific software module (RIMCAS) within the A-SMGCS system designed to monitor movements on the airport surface, using data from the co-operative Multi-lateration (MLAT) and non-co-operative surface movement radar (SMR) surveillance sensors, in order to detect and identify possible conflict situations within the surveillance area.

The RIMCAS module warns the tower controller of runway area incursion by suitably equipped aircraft or vehicles, or incursion of mobiles into other designated restricted areas on the airport, such as Instrument Landing System (ILS) critical/sensitive areas, when an aircraft is due to land or takes off on the active runway. RIMCAS also monitors the status of stopbars associated with runways and give warnings when stopbars are crossed when lit, either by aircraft or vehicles.

Once a potentially hazardous situation is detected according to a configurable set of rules, RIMCAS sends an alert message to the tower controller position giving information on the identity and location of the involved targets and the severity of the situation.

The Level 2 A-SMGCS functionality does not provide any routing and guidance information. Routing and guidance are Level 3 and 4 A-SMGCS functionalities and are at present not under consideration by ATNS.

The deployment and implementation of Level 2 A-SMGCS functionality will not be used in any way to relieve pilots and vehicle operators of their responsibilities in respect of avoiding collisions on the ground.

Fitment of Mode-S Vehicle Squitters

All vehicles operating on or within the manoeuvring areas of the FAOR and FACT aerodromes shall be fitted with co-operative Mode-S vehicle squitters. The vehicle squitters identify a specific vehicle and its associated call sign through the allocated Mode-S squitter code to the tower controller.

The manoeuvring areas at both FAOR and FACT airports include all entrances to taxiways, the taxiways and runways, and the crossings of service roads and taxiways within the manoeuvring areas. The boundaries for vehicle operation within the manoeuvring areas at both FAOR and FACT are shown in annexure A and B respectively.

The majority of vehicles operated on or within the manoeuvring areas at FAOR and FACT have been fitted with Mode-S vehicle squitters. Where users have positively identified its vehicles as operating on or within the manoeuvring areas at the two airports, such vehicles will be fitted with Mode-S vehicle squitters.

Non-equipped vehicles requiring urgent ad-hoc entry into the manoeuvring areas transponder compulsory areas, will only be allowed to enter if they are accompanied by another vehicle having a fully operational squitter or are being escorted by Fire and Rescue, and provided that the two vehicles are never more than 10M apart.

The Technical Support Managers at the two airports may be contacted at 011-928-8468 (FAOR) and 021-937-1132 (FACT) respectively for more information on the rental/lease conditions of the Mode-S vehicle squitters from ATNS.

Operation of Aircraft Transponders during the Departure and Arrival of the Ground Movement Phase

A-SMGCS has been developed to help improve upon current systems, procedures and practices in the face of increasing traffic levels, airport complexity and the need to maintain the highest level of service at all times and in all weather conditions maximizing the use of the existing infrastructure, while maintaining a safe and efficient flow of air traffic.

The A-SMGCS makes use of more than one source of data, as with the SMGCS, it utilizes a SMR for the detection of non-cooperative targets, and adds to that by using Multilateration, which will allow the accurate tracking and identification of cooperative targets.

All this data is fused together and displayed on an integrated display to the controller.

With the introduction of A-SMGCS, if Mode-S transponders are left switched on at the gates, this will have a potential risk for MLAT false targets due to the close proximity of terminal buildings. This has the potential to trigger false RIMCAS alerts on the NOVA Multi Sensor Tracker (MST) system.

Due to these reflections, transponders have to be switched off immediately after parking and only be switched on before push back/taxi.

In order to prevent the potential risk for MLAT false targets; aircrew shall adhere to the following procedures:

- Aircraft operators shall ensure that Mode S transponders are able to operate when an aircraft is on the ground, transmitting Mode S squitter and replying to Mode S addressed interrogations only.
- When an aircraft is on the ground, the transponder shall be inhibited to reply to Mode S all-call interrogation and replies to Mode A/C interrogations shall also be suppressed.
- Flight crew shall select the assigned Mode A (squawk) code and activate the Mode S transponder at the request for pushback or taxi, whichever is first, and after landing until reaching the aircraft stand.
- The transponder shall be switched off immediately after parking.
- Activation of a Mode S transponder normally means selecting the AUTO or XPDR position and transponders provided with on-the-ground sensors are automatically switched in this function before take-off and after landing. If using a transponder not fitted with an on-ground-sensor then refer to the operator's guide. Selection of STAND-BY mode will not activate the Mode S transponder and selecting ON could override the required suppression of SSR Mode A replies and Mode S all-call replies when an aircraft is on the ground.

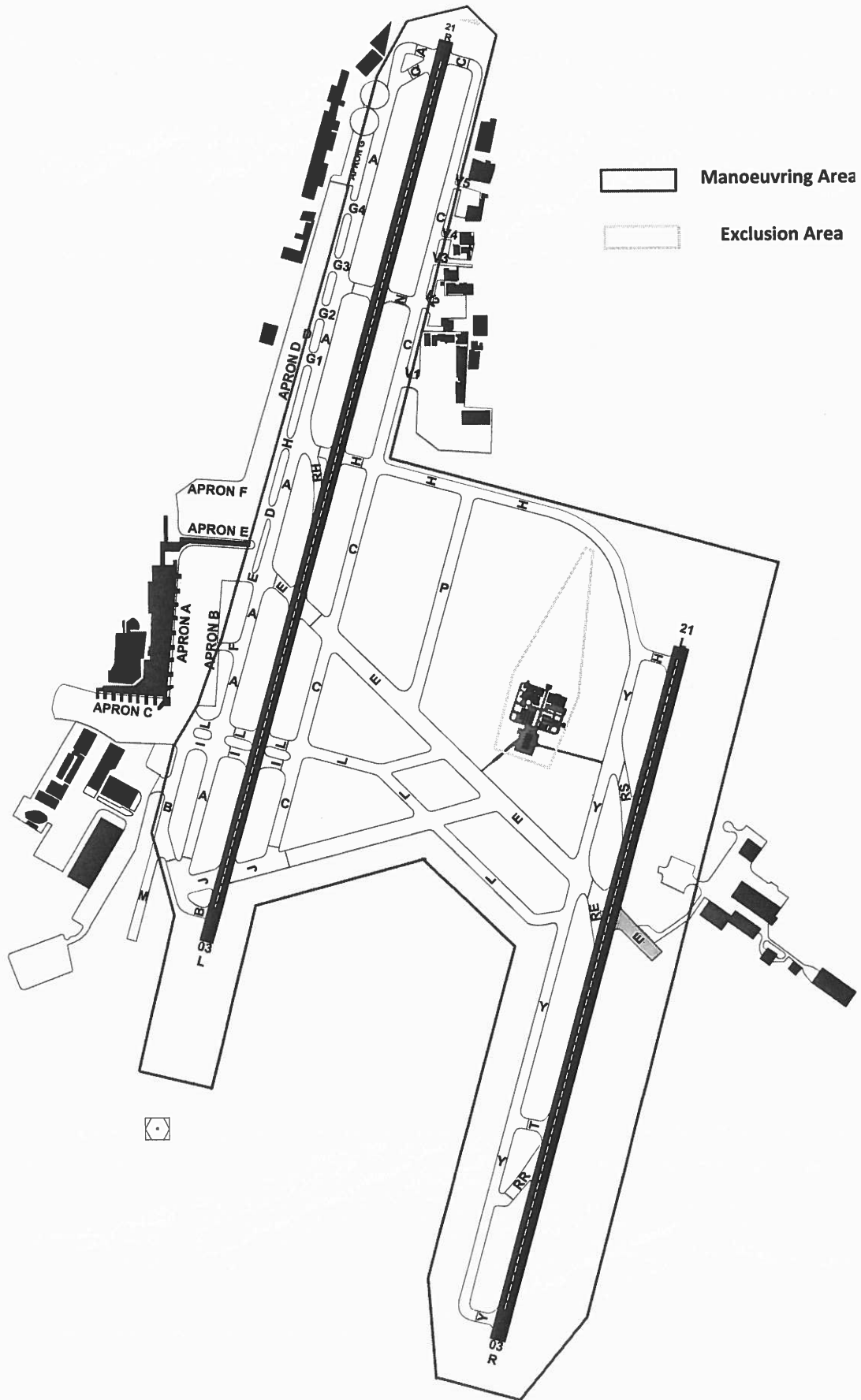
Level 2 A-SMGCS Operational Date

The Level 2 A-SMGCS functionality was operational on 31 March 2016.



ADCA

DIRECTOR OF CIVIL AVIATION



Annexure B – Manoeuvring Area FACT, Vehicle Squitter Operation

Manoeuvring Area

