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## IMPACT AND REDUCTION OF TCAS ALERTS

### 1 INTRODUCTION

Air traffic in the Amsterdam FIR consists of a mix of controlled IFR and (uncontrolled) VFR flights, which may be operating in close proximity. ATC provides separation in controlled airspace, but minimum separation with uncontrolled GA traffic can be as little as 500 FT. For example, between landing IFR flights in the Schiphol TMA 1 at 2000FT AMSL and VFR flights in class G airspace at 1500 FT AMSL. This may cause alerts of the traffic collision avoidance system (TCAS).

The purpose of this AIC is to inform GA pilots of:

- TCAS and TCAS alerts;
- the operational impact of TCAS alerts, and;
- why keeping distance from controlled airspace is important.

### 2 TCAS AND TCAS ALERTS

TCAS is a highly effective on-board system carried by commercial aircraft which identifies other aircraft in close proximity. TCAS interrogates mode S transponders of aircraft to create a four-dimensional map of aircraft in the nearby airspace based on the received distance, altitude and bearing data.

By extrapolating current range, altitude, and bearing data to anticipated future values, TCAS is able to determine potential collision threats and provides the following alerts:

- Traffic alerts (TA) which indicate nearby traffic. Pilots must make visual contact with the aircraft causing the TA to maintain visual separation.
- Resolution advisories (RA) providing guidance to avoid an imminent mid-air collision. Pilots must immediately execute the climb or descend instructions to increase vertical separation until TCAS provides the clear of conflict signal. Pilots must follow the RA instructions regardless of ATC instructions.

### 3 OPERATIONAL IMPACT OF TCAS RA ALERTS

TCAS RAs are triggered when the potential vertical distance between aircraft is 600 FT or less. Aircraft operating in the Schiphol TMA 1 at 2000 FT AMSL may therefore receive RA alerts for GA traffic operating at 1400 FT AMSL and 1500 FT AMSL under the TMA.

Unexpected climb RAs during the final phase of the flight will disturb the landing sequence and flow of traffic, especially in parallel landing operations. Additionally, unexpected RAs may trigger RAs for other controlled flights in close proximity, which will increase the ATC workload considerably. Especially in areas with dense traffic near controlled airspaces like the Schiphol TMAs.

### 4 KEEP DISTANCE FROM CONTROLLED AIRSPACE

Simulations have shown that a distance of 700 FT or more between uncontrolled VFR traffic and controlled IFR traffic is enough to prevent TCAS alerts. When flying in airspace class G, it is therefore highly recommended to stay clear of controlled airspaces.

Pilots are advised to comply with the **TAKE 2** principle:

- Remain 200 FT from the base of controlled airspace and/or;
- Remain 2 NM from the edge of any controlled airspace.

When you comply to these distances, you will not only reduce the risk of a TCAS RA, but also reduce the risk of an airspace infringement and the effects of wake turbulence.

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