INTERNATIONAL CIVIL AVIATION ORGANIZATION

AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP
EIGHTEENTH MEETING (APIRG/18)
Kampala, Uganda (27 – 30 March 2012)

Agenda Item 3.3: AFI Regional Monitoring Agency (ARMA)

AFI RVSM COLLISION RISK ASSESSMENT NO 5

(Presented by ARMA)

SUMMARY
This WP presents the 2nd post-implementation Collision Risk Assessment (CRA) for Reduced Vertical Separation Minimum (RVSM) in the AFI Region. The assessment addresses two of the AFI RVSM Safety Policy objectives, i.e. an assessment of the Technical Vertical Collision risk and an assessment of the Total Vertical Collision risk.
REFERENCE(S): ICAO Doc 9574; ICAO Doc 9937; AFI RVSM Safety Policy; AFI RVSM CRA 5
Related ICAO Strategic Objective(s): A & C

1. INTRODUCTION

1.1 The meeting may recall that AFI CRA are inter alia calculated by making use of the monthly RVSM traffic data which is collected by Area Control Centers established to manage FIRs and submitted to the ARMA to monitor RVSM safety. Further to this Unsatisfactory Condition Reports (UCR) deposited into the central depository database managed by the ICAO TAG are reviewed and where applicable processed into the CRA.

1.2 CRA 5 presents the 2nd post-implementation CRA for RVSM in the AFI Region. The assessment addresses two of the AFI RVSM Safety Policy objectives, i.e. an assessment of the Technical Vertical Collision risk evaluated against a Target Level of Safety (TLS) of 2.5×10^{-9} fatal accidents per flight hour, and an assessment of the Total Vertical Collision risk evaluated against a TLS of 5×10^{-9} fatal accidents per flight hour.

1.3 The working paper will be supported by a short power point presentation to emphasize the salient points.

2. DISCUSSION

2.1 The estimate of the Technical Vertical Collision risk was once again calculated to be below the Technical Vertical TLS of 2.5×10^{-9} fatal accidents per flight hour however the estimate of the Total Vertical collision risk does not meet the total vertical TLS of 5×10^{-9} fatal accidents per flight hour as per the previous CRA's. These results are expounded on during the following discussion.

2.2 The estimate of the Technical Vertical Collision risk was found to be met by a factor of approximately 40 below the TLS whilst CRA 4 was a factor of 10 below the TLS.The estimate of the Technical Vertical Collision risk is affected by a number of limitations in the traffic flow data used for estimating the passing frequency parameter of the collision risk model. Precise and complete traffic flow data must be collected by all FIR's to make the passing frequency estimates more reliable. The aircraft population is integral with regard to the overall Altimetry System Error (ASE) distribution, and for the first time ARMA was able to include ASE measurements obtained from the AFI Height Monitoring Program.

2.3 The meeting should recall that the Total Vertical Collision Risk is calculated by including the Technical Vertical Collision Risk. The Total Vertical TLS was found to be exceeded by a factor of 6.6 whilst in CRA 4 the Total Vertical TLS was exceeded by a factor of 6. This is an increase of approximately 6%. The dominant component of the total vertical risk was the risk created due to aircraft having levelled off at a wrong flight level. This is true for both opposite and same direction traffic at incorrect flight levels. The estimate is conservative due to a lack of precise and complete information and could therefore be higher as under reporting is symptomatic. Encouraging and managing precise and complete Unsatisfactory Condition Reports and Large Height Deviation information is essential and should be supported by all role players.

2.4 RVSM collision risk is negatively affected by the very accurate GNSS based navigation both during flight and CRA calculations. The risk could be reduced by the official documented application of the Strategic Lateral Offset Procedure (SLOP) uniformly applied in all FIRs. To be able to take the risk mitigating effect of lateral offsets on lateral overlap into account, it needs to be officially published and implemented so that it can be quantified. Since SLOP is currently an unknown factor, the beneficial effects of lateral offsets have not been taken into account in CRA 5. SLOP is therefore a means to reduce the increase in the probability of lateral overlap.

2.5 The Assessment was difficult to compile due to the absence of data from various FIRs. The collection of data from ALL FIR's cannot be over emphasized. Data was received from a limited number of FIR's which constituted 35% of the total that should have been available. This is a 1% increase on the CRA 4 data. CRA 6 should provide an improved percentage as ASECNA has vastly improved their collection and submission management of RVSM assessment data which covers a large portion of AFI.

2.6 CRA's focus specifically on the occurrence of vertical events with CRA 5 taking 51 vertical events into account whereas CRA 4 had 41 vertical events. This indicates an increase of approximately 24% attributeable to aircraft operating at the wrong flight levels. The cause appears to be both from the Area Control Centre and flight deck.

2.7 As has been discussed in previous CRA's the horizontal events, which are not related to RVSM, need to be highlighted for attention with an increase of 35%.

2.8 The high incidence of Non-RVSM approved aircraft, both civil and State aircraft, specifically where State aircraft fail to flight plan correctly to gain access to RVSM airspace has not been worked into the CRA however is under discussion for the next Assessment. Technically there is a reduction in RVSM separation to adjacent flight levels increasing the risk on each associated flight. It is proposed that this aspect be referred to the forthcoming APIRG ATM/AIM/SAR Sub-Group meeting for resolution.

2.9 ACCs and Operators in the AFI region will need to increase RVSM awareness attitude whilst providing an ATM service and operating in RVSM airspace in order to arrest and bring the Total Vertical Risk back towards the agreed to TLS. RVSM vigilance cannot be over emphasized.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) take note of the contents of the working paper;
b) support all efforts for the official application of SLOP and ;
c) support the referral of Non Approved RVSM aircraft operations in RVSM airspace to the APIRG ATM/AIM/SAR Sub-Group for resolution

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