



ICAO

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**WESTERN AND CENTRAL AFRICA OFFICE**

**Twenty-Fourth Meeting on the Improvement of Air Traffic Services over the South Atlantic (SAT/24)**

**Luanda, Angola, 3-4 June 2019**

---

---

**Agenda Item 3: SAT Area Risk Assessment and LHD Monitoring**

**3.3.3 COLLISION RISK ASSESSMENT 12 AND LHD MONITORING**

*(Presented by the ARMA)*

<b>SUMMARY</b>
This paper provides the overall results of the AFI Collision Risk Assessment for the year 2017 and the focus on SAT Region contribution to the overall technical safety.
<b>REFERENCE(S): Collision Risk Assessment 12</b>
<b>Related ICAO Strategic Objective(s):</b>

**1. INTRODUCTION:**

1.1 This Working Paper presents the ninth post-implementation collision risk assessment for RVSM in AFI. The assessment and subsequent report addresses two of the AFI RVSM Safety Policy objectives, namely an assessment of the technical vertical collision risk measured against a Target Level of Safety (TLS) of  $2.5 \times 10^{-9}$  fatal accidents per flight hour, and an assessment of the total vertical collision risk measured against a TLS of  $5 \times 10^{-9}$  fatal accidents per flight hour.

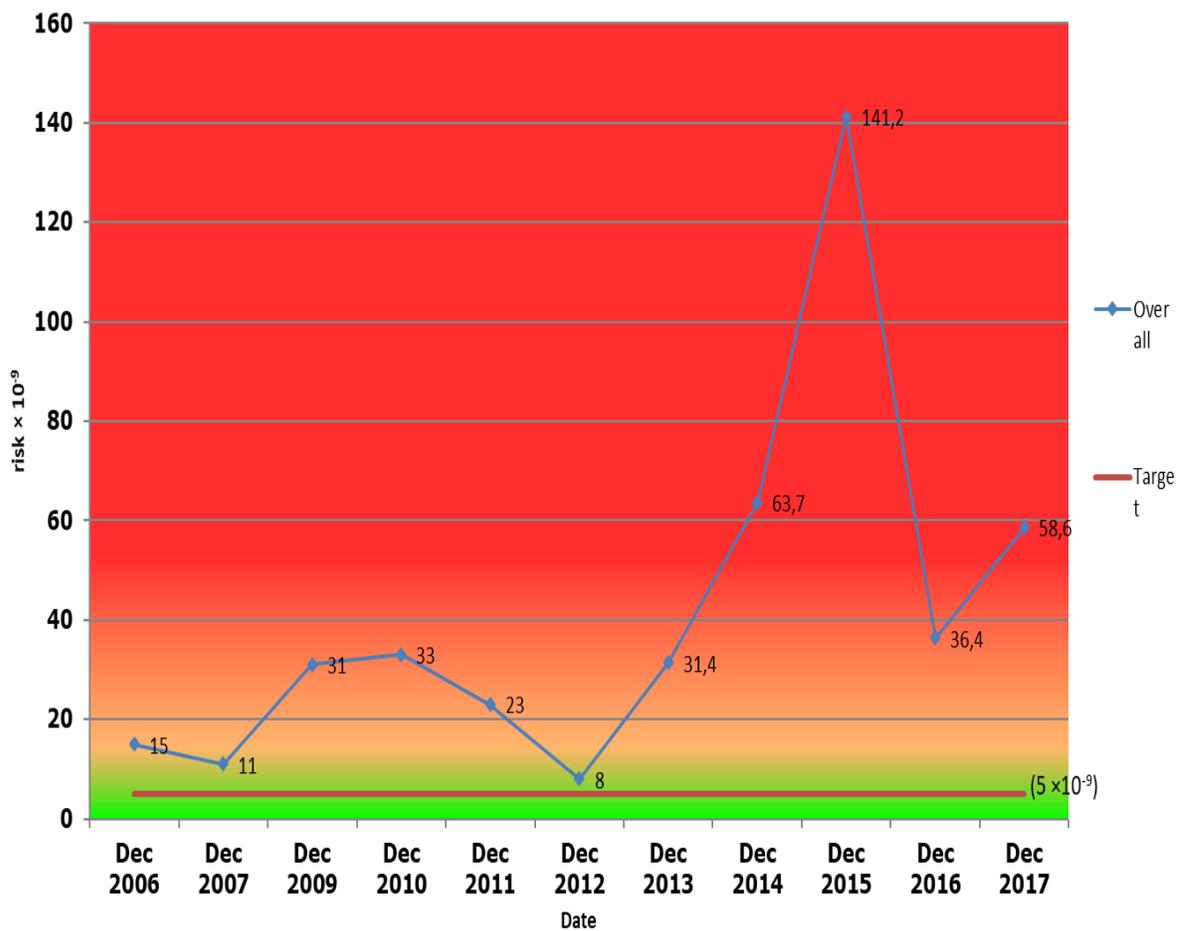
1.2 The technical and total vertical collision risk assessments are based on the data and information available from AFI RVSM operations during the calendar year 2017 as collected and collated by ARMA.

2. DISCUSSION:

2.1

The CRA 12 2017 estimate of the total vertical collision risk was  $58.6 \times 10^{-9}$  fatal accidents per flight hour, i.e. 12 times the total vertical TLS. It was approximately 1.6 times larger than its CRA 11 2016 counterpart. The increase in the CRA 12 2017 estimate of the total vertical collision risk represented the combined effect of increases in the probabilities of vertical overlap due to improper flight level crossings and flying at wrong flight levels. The former increased by a factor of approximately 1.2 and the latter by a factor of approximately 1.8.

### Overall Collision Risk Assessment



## 2.2 SAT Area Risk Assessment 2017:

FIR/UIR	CRA 12 2017		CRA11 2016	CRA 10 2015	CRA 9 2014	CRA 8 2013
	n <sub>x</sub> (opp)	n <sub>x</sub> (equiv)				
Accra	0.003518	0.003675	0.02147	0.02926	-	-
Asmara	-	-	-	-	0.01249	-
Beira	0.082251	0.082341	0.15083	0.1175	0.1004	0.1141
Brazzaville	0.017984	0.018808	0.015836	0.1639	0.04408	0.04509
Cape Town	0.000000	0.000006	0.000005	0.000535	0.002702	0.00132
Dakar	0.09205	0.092379	0.072278	0.07351	0.1118	0.1524
Johannesburg	0.000049	0.000088	0.00079	0.000493	0.000630	0.00107
Johannesburg Oceanic	-	-	-	-	-	-
Luanda	-	-	-	-	-	-
N'Djamena	0.099002	0.099079	0.21169	0.2142	0.1444	0.09560
Niamey	0.07014	0.071261	0.19777	0.1767	0.04139	0.06608
Roberts	0.019510	0.019516	0.02175	0.01983	0.03652	0.03557

## 2.3 Large Height Deviation Monitoring(LHD)

The revised RVSM Large Height Deviation definition now includes the resultant outcome of coordination failures and reads as follows:

**Large Height Deviation (LHD).** A vertical deviation from an ATC assigned or coordinated altitude that results in an error of 300 ft or more. The deviation may be the result of human error, equipment malfunction or environmental factors such as turbulence, and should be reported in accordance with the LHD types

2.4 The main contributing factor is as follows:

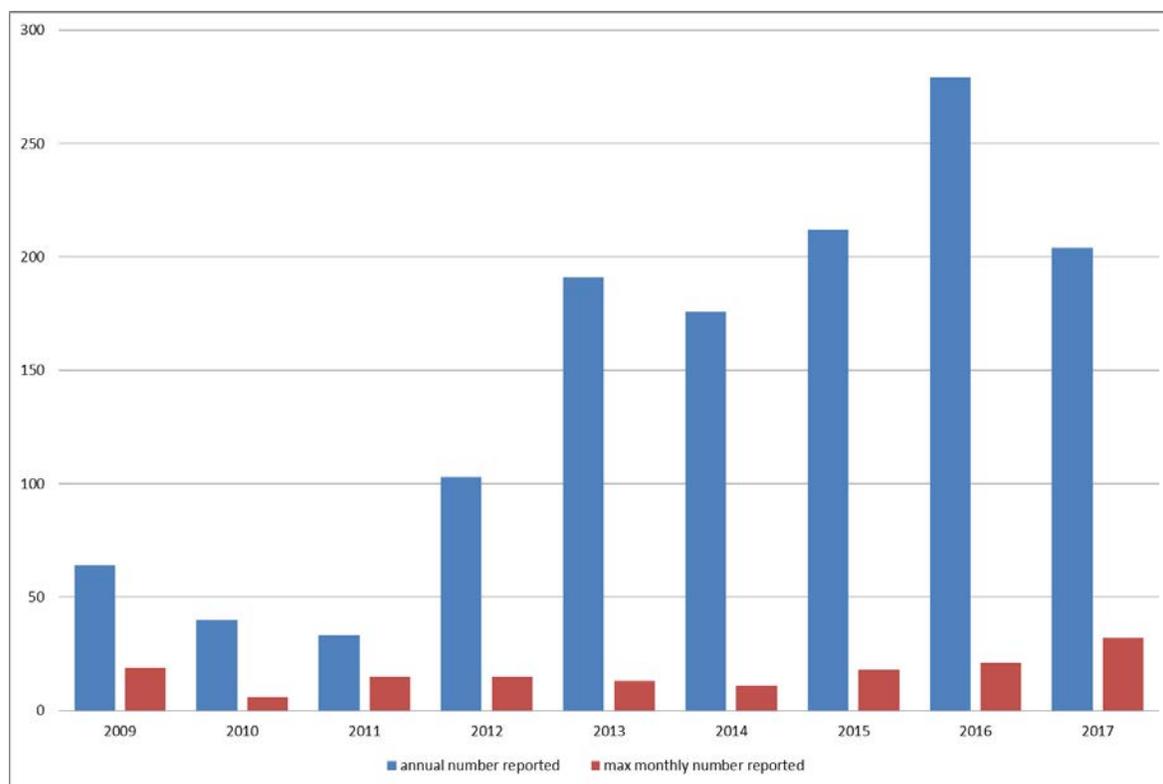
- i. Human Factors ACC's.

A new trend of LHD, Code E - Coordination errors in the ATC-to-ATC transfer or control responsibility as a result of Human Factors (e.g. late or non-existent coordination; incorrect time estimate/actual; flight level, ATS route, etc. not in accordance with agreed parameter.

FIR/UIR	Nr of Months with submitted Form 3	Nr of Coordination failures	Nr of Communication failures	Nr of Turbulence events	Nr of ACAS events
Accra	11	16	61	17	3
Asmara	0	-	-	-	-
Beira	12	2	0	0	0
Brazzaville					
- Brazzaville	6	1	0	2	0

- Douala	7	0	0	1	0
- Libreville	4	0	0	0	0
Cape Town	8	0	0	0	0
Dakar					
-Abidjan	0	-	-	-	-
-Bamako	12	0	0	4	0
-Dakar	11	0	0	0	0
-Nouakchott	3	3	4	0	2
Johannesburg	10	111	34	49	1
Johannesburg Oceanic	0	-	-	-	-
Luanda	0	-	-	-	-
N'Djamena	7	6	3	7	0
Niamey					
-Niamey	11	0	3	1	0
-Ouagadougou	12	0	0	0	0
Roberts	11	0	0	0	0
<b>Total</b>		<b>145</b>	<b>105</b>	<b>81</b>	<b>6</b>

2.5 The graph below will illustrate the figures for 2009 onwards to 2017 of LHD



**3. ACTION BY THE MEETING:**

3.1. The meeting is invited to:

- a) take note of the contents of this paper;
- b) continue addressing the co-ordination failures between ACC's thus enhancing RVSM safety
- c) ACC Sector Management to create a co-ordinations failure awareness program using posters and presentations to mitigate human error co-ordination failures.
- d) Remedial actions required to assist the ATC units to mitigate the risk.

-END-