CIVIL AVIATION SAFETY AUTHORITY
OF PAPUA NEW GUINEA

PNG's Update on Transposition of Annex 14 Vol I SARPs

Workshop on Transposition of Annex 14 SARPs into National Aerodrome Standards

Langkawi, Malaysia,
17 February 2025

PNG National Aerodrome Standards

- The PNG Civil Aviation Rules were adopted from New Zealand, following the establishment of the current PNG Civil Aviation Act 2000.
- The 1st version of the PNG National Aerodrome Standards, the Civil Aviation Rule Part 139 Aerodromes - Certification and Operation, came into effect on 01 Jan 2004.
- The Part 139 remain the base document, while the transposition of Annex 14 Vol I SARPs are appended as appendices to Part 139.

PNG National Aerodrome Standards

- PNG legal framework does not support the imposition and enforcement of MOS, as commonly practiced by other States.
- Part 139 is applicable to;
  - international aerodromes,
  - security designated aerodromes, and
  - aerodromes that serve aircraft having seating configurations of 20 passenger seats or more .
- There are currently 24 aerodromes certified under Part 139 while there are about 600 known airstrips not required to be certified.

Transposition of Annex 14 Vol I SARPs

- Part 139 has since undergone 7 Notice of Proposed Rule Making (NPRM) amendments over the last 20 years to;
  - align National Aerodrome Standards with Annex 14 Vol I SARPs, and
  - adopt Annex 14 Vol I amendments including the latest Amendment 17.
- PNG has now transposed into Part 139, all applicable Annex 14 Standards including all applicable Recommended Practices, 1 492 SARPs in total.
- In turn, all the Part 139 requirements and standards have been transferred to certification and surveillance checklists in the Aerodrome Risk Profiling System (ADRPS), 150 pages in total.

Transposition of Annex 14 Vol I SARPs

An abstract of the ADRPS Assessment Sheets

AERODROME RISK PROFILING SYSTEM V7.0 — Assessment Sheet

RULE REF	DESCRIPTION	PORT MORESBY INTERNATIONAL AIRPORT		
		NC	RV	Finding
PART 139 APPENDIX I - AERODROME OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS				
I.1.1	***Aerodrome emergency plan***			
I.1.1 (a)	An aerodrome emergency plan must be established at an aerodrome, commensurate with the aircraft operations and other activities conducted at the aerodrome.	0	0	C
I.1.1 (b)	The aerodrome emergency plan must provide for the coordination of the actions to be taken in an emergency occurring at an aerodrome or in its vicinity.	0	0	C
I.1.1 (c)	The plan must coordinate the response or participation of all existing agencies which, in the opinion of the appropriate authority, could be of assistance in responding to an emergency.	0	0	C
I.1.1 (d)	The plan must observe Human Factors principles to ensure optimum response by all existing agencies participating in emergency operations.	1	0.64	PMIA must include in the AEP, public health emergencies, EOC coordination of crash off-site
I.1.2	***Aerodrome emergency exercise***			
I.1.2(a)	The plan must contain procedures for periodic testing of the adequacy of the plan and for reviewing the results in order to improve its effectiveness.	0	0	Refer to I.1.1(d)
I.1.2(b)	The plan must be tested by conducting:			
I.1.2(b)(1)	a full-scale aerodrome emergency exercise at intervals not exceeding two years and partial emergency exercises in the intervening year to ensure that any deficiencies found during the full-scale aerodrome emergency exercise have been corrected; or	1	0.64	PMIA must conduct an AEP table-top or full scale exercise for a crash off-site in aerodrome vicinity scenario, to test EOC coordination of
I.1.2(b)(2)	a series of modular tests commencing in the first year and concluding in a full-scale aerodrome emergency exercise at intervals not exceeding three years; and reviewed thereafter, or after an actual emergency, so as to correct any deficiency found during such exercises or actual emergency.	0	0	Refer to I.1.2(b)(i)

Implementation of Annex 14 Vol I SARPs

- The ADRPS was developed to perform quantitative risk-based assessments on non-compliance related hazards to determine risk values that give an indication of the level of safety at aerodromes.
- The ADRPS is based on the philosophy that every non-compliance has an associated risk.
- The risk associated with a non-compliance is measurable by the product of severity and likelihood factors.
- Using the ADRPS, the severity factor of the risk depends on the phase of flight in which the non-compliance affects, and the likelihood factor is determined by the frequency of aircraft movement.

Implementation of Annex 14 Vol I SARPs

Abstract of the ADRPS Info Sheet

AERODROME RISK PROFILING SYSTEM 8.0 — Assessment Sheet

ADRPS 8.0 INFO SHEET

A. NON-COMPLIANCE POINT SCORING

The point scoring of this system is based on the philosophy that every non-compliance carries an associated risk. The scoring system counts non-compliances to measure risk. While safety itself is not directly measurable, risk can be quantified as the product of its Severity and Probability factors, given arbitrary values. The level of risk is then used to indicate the level of safety.

POINT SCORING

1	Non Compliances
0	Compliances
0	Non applicables
0	Exemptions

B. SEVERITY RATING

The Severity Rating of this system is based on the principle that the severity of an aircraft accident at an aerodrome depends on the phase of flight in which the accident occurs, assuming the worst possible realistic scenario. An accident caused by non-compliance can occur in various areas, including data publication, physical characteristics, obstacle limitations, visual aids, obstacle marking, restricted use areas, electrical systems, operational services, equipment, installations, or aerodrome maintenance. For example, an accident occurring during the approach phase of flight is considered more severe than one during the landing phase on the runway. Consequently, the severity factor assigned to the approach phase is higher than that of the landing phase.

SEVERITY RATING

A	1.00	Catastrophic -	Approach and Take-off Phase of Flight *Aircraft / equipment destroyed and Multiple deaths according to ICAO Doc. 9859 Table 2.*
B	0.80	Hazardous -	Landing Roll and Take-off Roll Phase of Flight *Serious injury and major equipment damage according to ICAO Doc. 9859 Table 2.*
C	0.60	Major -	Taxiing Phase of Flight *Serious incident and injury to persons according to ICAO Doc. 9859 Table 2.*
D	0.40	Minor -	Parking Phase of Flight *Nuisance, operating limitations, use of emergency procedures and minor incident according to ICAO Doc. 9859 Table 2.*
E	0.20	Negligible -	External factors that may impact safety of aircraft independent of normal aircraft operation. *Few consequences according to ICAO Doc. 9859 Table 2.*

C. PROBABILITY RATING

The Probability Rating of this system is based on the principle that aviation safety revolves around aircraft movement; without aircraft movement, there is no aviation risk. Therefore, the probability of an event occurring is determined by the Traffic Density at an aerodrome. Traffic Density is defined as the Total Movements during the Mean Busy Hour and can be measured per runway or per aerodrome. The Probability Rating is based on ICAO-defined Traffic Density types.

ICAO DEFINED TRAFFIC DENSITIES

Movement in the mean busy hour		
Density Type	**Per RWY**	**Per AD**
Light	< 16	< 20
Medium	16 - 25	20 - 35
Heavy	> 25	> 35

STATE DEFINED TRAFFIC DENSITIES

Movement in the mean busy hour		
Density Type	**Per RWY**	**Per AD**
Very Light	1	1
Light	< 3	< 5
Medium	3 - 5	5 - 10
Heavy	6 - 10	11 - 15
Very Heavy	> 10	> 15

PROBABILITY RATING

5	1.00	15	or more	
4	0.80	11	up to	15
3	0.60	5	up to	10
2	0.40	2	up to	4
1	0.20	1	or less	

AERODROME RISK PROFILING SYSTEM 8.0 — Assessment Sheet

D. RISK ASSESSMENT MATRIX

The Risk Matrix of this system is adopted from ICAO. The ICAO Risk Matrix assigns a letter scale for Severity and a number scale for Probability, resulting in an output product of variable indices. However, it is noted from ICAO's tolerability categorization that the ICAO's 5x5 Risk Matrix is not a square matrix. In a square matrix, 1B and 4E would have the same value and should be in the same Tolerability Level. To generate visual presentations of graphs from the input data, state-defined arbitrary values of risk indices are assigned to each risk index variable. These state-defined arbitrary values are based on the principle that a probability value cannot be greater than 1. Consequently, the assigned severity values are also within the range of 0-1, resulting in a 5x5 square matrix.

ICAO DEFINED RISK MATRIX		*SEVERITY*				
		Catastrophic	Hazardous	Major	Minor	Negligible
PROBABILITY		A	B	C	D	E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely Improbable	1	1A	1B	1C	1D	1E

STATE DEFINED RISK MATRIX		*SEVERITY*				
		Catastrophic	Hazardous	Major	Minor	Negligible
PROBABILITY		1.00	0.80	0.60	0.40	0.20
Frequent	1.00	1.00	0.80	0.60	0.40	0.20
Occasional	0.80	0.80	0.64	0.48	0.32	0.16
Remote	0.60	0.60	0.48	0.36	0.24	0.12
Improbable	0.40	0.40	0.32	0.24	0.16	0.08
Extremely Improbable	0.20	0.20	0.16	0.12	0.08	0.04

E. TOLERABLE MATRIX

ICAO DEFINED TOLERABILITY INDEX RANGE

5A,5B,5C,4A,4B,3A	Level 1 Intolerable - Unacceptable under the existing circumstances.
5D,5E,4C,4D,4E,3B,3C,3D,2A,2B,2C,1A	Level 2 Tolerable - Acceptable based on risk mitigation.
3E,2D,2E,1B,1C,1D,1E	Level 3 Acceptable - As low as reasonably practiceable.

STATE DEFINED TOLERABILITY INDEX RANGE

10			Level 0 Disqualified - noncompliance with prerequisite requirement.
0.60	-	1.00	Level 1 Intolerable - Unacceptable under the existing circumstances.
0.20	-	0.59	Level 2 Tolerable - Acceptable based on risk mitigation.
0.01	-	0.19	Level 3 Acceptable - As low as reasonably practicable.

G. OVERALL LEVEL OF COMPLIANCE & SAFETY IMPACTING ON VALIDITY OF ADOC

Below is a translation of Total Risk Value into certification validity;

Total Risk Value	ADOC Duration	ADOC Duration
0 to 1.99	5 years	60 months
2 to 3.99	4 years	48 months
4 to 5.99	3 years	36 months
6 to 7.99	2 years	24 months
8 to 9.99	1 year	12 months
10 and above	0 years	0 months

Implementation of Annex 14 Vol I SARPs

Abstract of the ADRPS Info Sheet showing comparison of ICAO Doc 9859 Safety Risk Matrix and the State defined Safety Risk Matrix.

ICAO DEFINED RISK MATRIX		SEVERITY				
		Catastrophic	Hazardous	Major	Minor	Negligible
PROBABILITY		A	B	C	D	E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely Improbable	1	1A	1B	1C	1D	1E

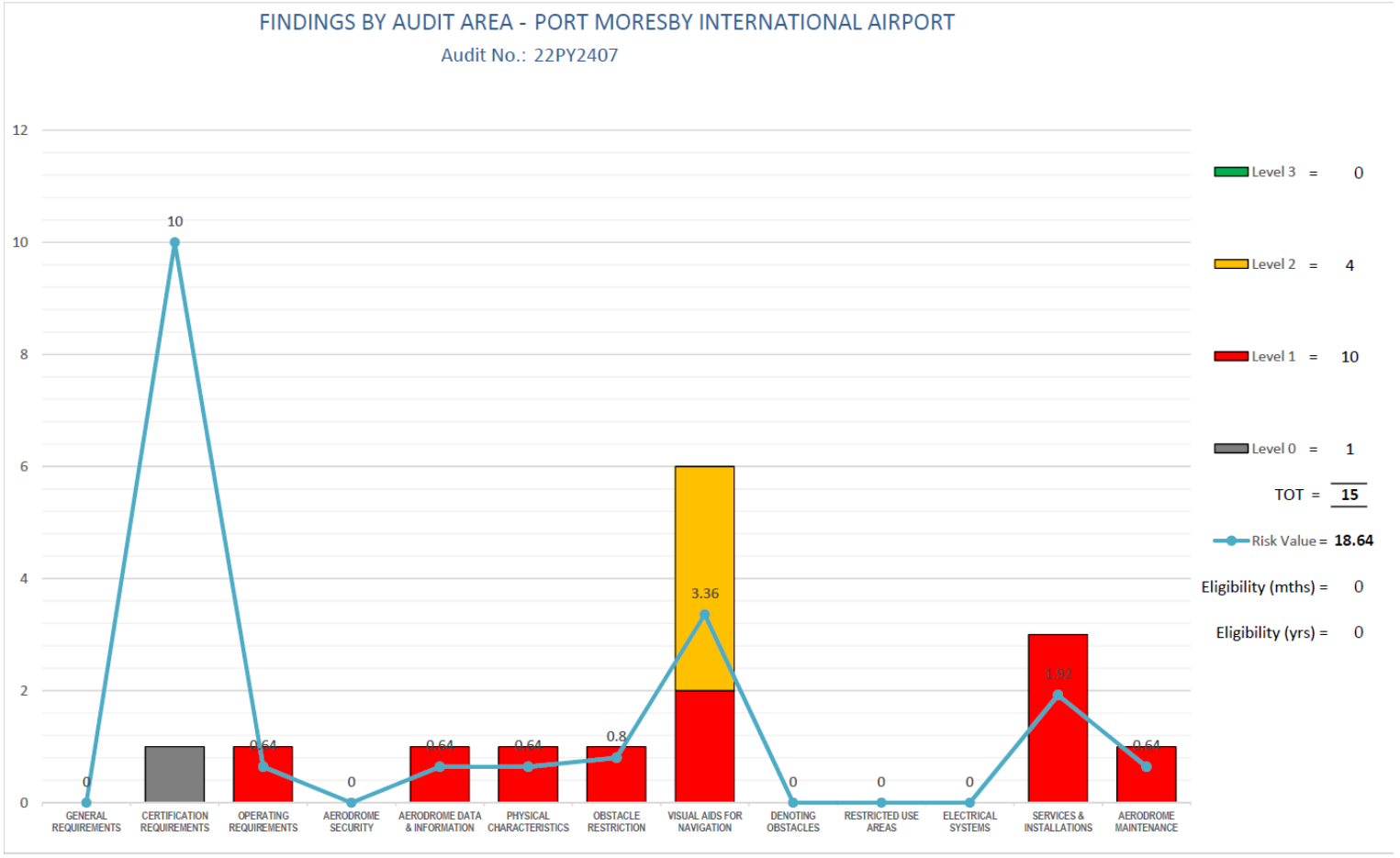
STATE DEFINED RISK MATRIX		SEVERITY				
		Catastrophic	Hazardous	Major	Minor	Negligible
PROBABILITY		1.00	0.80	0.60	0.40	0.20
Frequent	1.00	1.00	0.80	0.60	0.40	0.20
Occasional	0.80	0.80	0.64	0.48	0.32	0.16
Remote	0.60	0.60	0.48	0.36	0.24	0.12
Improbable	0.40	0.40	0.32	0.24	0.16	0.08
Extremely Improbable	0.20	0.20	0.16	0.12	0.08	0.04

Implementation of Annex 14 Vol I SARPs

- For instance, a non-compliance with Obstacle Limitation Surfaces (OLS) affecting the approach/take-off phases is allocated the highest severity rating than a non-compliance affecting take-off/landing roll phases of flight.
- An aerodrome with the high frequency of movement is allocated a higher likelihood factor than an aerodrome with low traffic flow.
- The severity and likelihood factors are predetermined in the ADRPS to achieve objective assessment outcomes.
- The ADRPS outputs a Total Risk Value (TRV) of an aerodrome and which then translated to certificate validity.

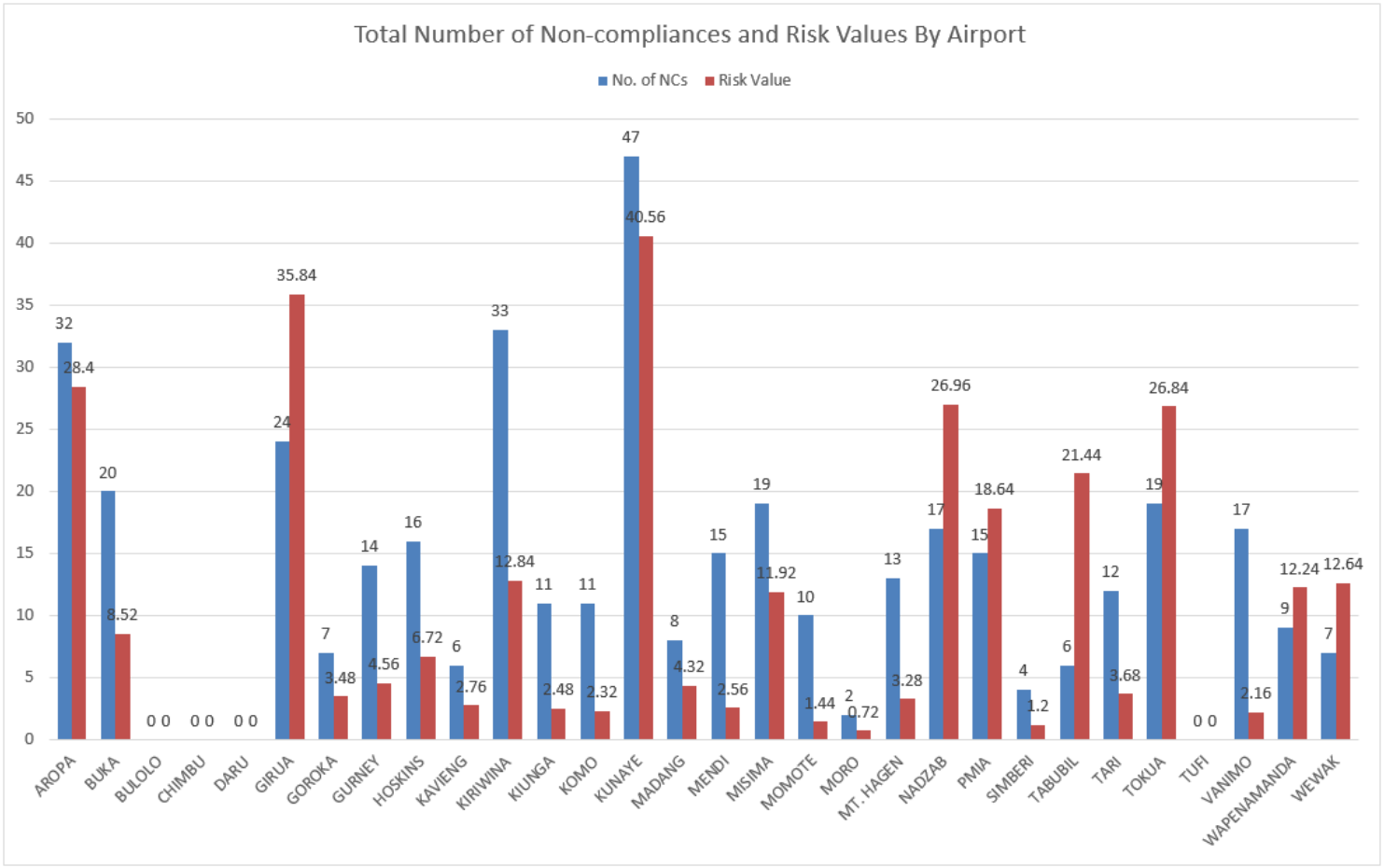
Implementation of Annex 14 Vol I SARPs

Abstract of the ADRPS Dashboard showing number of non-compliances and associated risk values by audit area for an aerodrome.



Implementation of Annex 14 Vol I SARPs

Abstract of the ADRPS Dashboard showing total number of non-compliances and total risk values for all certified airports in PNG



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End of Presentation

Thank you for listening