

FOR THE AFRICA REGION

Model for Determining the Airport Acceptance Rate (AAR)

For: ICAO Workshop in Abuja, Nigeria

Date: July 8, 2024

Introduction to determining the AAR



Introduction

Airport Acceptance Rate (AAR):

A **dynamic parameter** specifying the number of arrival aircraft that an airport, in conjunction with

- terminal airspace,
- ramp space,
- parking space, and
- terminal facilities,

can accept under specific conditions during any consecutive 60-minute period.

Introduction

Airport Primary Runway Configuration:

An airport configuration which handles **three percent** or more of the annual operations.

Doc 9971, Appendix II-B, 1.2

Introduction

Formula method for calculating the Optimum AAR:

Ground speed in knots at the runway threshold

divided by

Spacing interval at the runway threshold in NM

Optimum AAR

Introduction

Table method for determining the Optimum AAR (Doc 9971)

Table II-App B-1. Optimum AAR

	<i>Nautical miles between aircraft at the runway threshold</i>									
	3	3.5	4	4.5	5	6	7	8	9	10
	<i>Potential AAR</i>									
<i>Ground speed at the runway threshold</i>										
140 knots	46	40	35	31	28	23	20	17	15	14
130 knots	43	37	32	28	26	21	18	16	14	13
120 knots	40	34	30	26	24	20	17	15	13	12
110 knots	36	31	27	24	22	18	15	13	12	11

The process



Administrative Considerations

- Identify the organization responsible for the establishment and implementation of AARs at the selected airports

NOTE: It is recommended that you establish a small working group of the stakeholders that will have input into the AAR value. For example, ATCOs, supervisors, airport authority, a major airline.

- Establish optimum AARs for the airport identified; and
- Review and validate the airport primary runway configurations and associated AARs at least once each year

Doc 9971, Appendix II-B, 2

Other Considerations

- Calculate optimum AAR values for each airport runway configuration for the following meteorological conditions:
 - ✓ **Visual Meteorological Conditions (VMC)** - meteorological conditions allow vectoring for visual approaches
 - ✓ **Marginal VMC** - meteorological conditions do not allow vectoring for visual approaches, but visual separation on final is possible
 - ✓ **Instrument Meteorological Conditions (IMC)** – visual approaches and visual separation on final are not possible
 - ✓ **Low IMC** - meteorological conditions dictate Category II or III operations

Doc 9971, Appendix II-B, 3.1

Formula Method to calculate the Optimum AAR

- Determine the average ground speed crossing the runway threshold and the spacing interval required between successive arrivals
- Divide the groundspeed by the spacing interval to determine the optimal AAR

NOTE: when the quotient is a fraction, round down to the next whole number

Doc 9971, Appendix II-B, 3.2

Example of the Formula Method

Example 1: $130 \text{ KTS} / 5 \text{ nm} = 26$

Optimum AAR = 26 arrivals per hour

Doc 9971, Appendix II-B, 3.2

130 KTS: Example aircraft ground speed on final at your airport

5 NM: Example required spacing between arrivals on final at your airport

26: Example optimum airport acceptance rate at your airport

Example of the Formula Method

Example 2: $120 \text{ KTS} / 7 \text{ nm} = 17.14$
(round down to 17)

Optimum AAR = 17 arrivals per hour

Doc 9971, Appendix II-B, 3.2

120 KTS: Example aircraft ground speed on final at your airport

7 NM: Example required spacing between arrivals on final at your airport

17: Example optimum airport acceptance rate at your airport

Table Method for Calculating the Optimum AAR

Table II-App B-1. Optimum AAR

	<i>Nautical miles between aircraft at the runway threshold</i>									
	3	3.5	4	4.5	5	6	7	8	9	10
	<i>Potential AAR</i>									
<i>Ground speed at the runway threshold</i>										
140 knots	46	40	35	31	28	23	20	17	15	14
130 knots	43	37	32	28	26	21	18	16	14	13
120 knots	40	34	30	26	24	20	17	15	13	12
110 knots	36	31	27	24	22	18	15	13	12	11

Doc 9971, Appendix II-B, 3.2

Conditions that affect the Optimum AAR

Identify any conditions that may affect the optimum AAR. Examples:

- intersecting arrival and departure runways
- lateral distance between arrival runways
- dual use runways — runways that share arrivals and departures
- land and hold short operations
- availability of high speed taxiways

Doc 9971, Appendix II-B, 3.3



Conditions that affect the Optimum AAR

Identify any conditions that may affect the optimum AAR. Examples:

- airspace limitations and constraints
- procedural limitations (noise abatement, missed approach procedures)
- taxiway layouts
- meteorological conditions

Doc 9971, Appendix II-B, 3.3

Accounting for the Conditions

Potential AAR:

The theoretical acceptance rate at the runway threshold – before taking other factors into consideration and adjustment factors.

NOTE: This is the same as the Optimum AAR value

Actual AAR:

The Potential AAR at the runway threshold adjusted for other factors

Doc 9971, Appendix II-B, 3.4

Actual AAR

For any runway configuration:

POTENTIAL AAR (that is, Optimum AAR)

– ADJUSTMENT FACTORS

ACTUAL AAR

NOTE: This is the value that you publish

Doc 9971, Appendix II-B, 3.4

Example of Actual AAR

Table II-App B-2. Example of actual AAR

<i>RUNWAY CONFIGURATION</i>	<i>AAR for VMC</i>	<i>AAR for MARGINAL VMC</i>	<i>AAR for IMC</i>
RWY 13	24	21	19
RWY 31	23	20	17

Doc 9971, Appendix II-B, 3.4



Thank you!