International Civil Aviation Organization
Seventh Meeting of the Aerodromes Operations and Planning Sub-Group (AOP/SG/7)
Bangkok, Thailand, 3 to 6 July 2023

Agenda Item 8: Any other business

THE AIRPORT CHARACTERISTICS AND OPERATION OF ARJ21-700

(Presented by China)

SUMMARY

ARJ21 is one of the commercial aircraft in short-medium range turbofan regional aircraft, and is now operating in China and Indonesia. ARJ21-700 is the basic aircraft of ARJ21 family. This Paper intends to share key airport characteristics of ARJ21-700 and airports operation experience, for helping to establish the good airport compatibility in Asia and Pacific (APAC) Regions.

1. INTRODUCTION

ARJ21 General Introduction

1.1 ARJ21, the first short-medium range turbofan regional aircraft developed by China in accordance with international civil aviation regulations, it owns independent intellectual property right. It is manufactured by Commercial Aircraft Corporation of China, Ltd. (COMAC). ARJ21-700 is the basic aircraft of ARJ21 family. ARJ21-700 aircraft obtained the Type Certificate (TC) from Civil Aviation Administration of China (CAAC) on December 30th, 2014 and the Production Certificate (PC) from CAAC on July 9th, 2017. So far, ARJ21-700 aircraft have been entered into route operation for seven years.

1.2 The range of ARJ21-700 is 2,225 - 3,700 km, and is mainly used for meeting the operating requirements of radial routes from central cities to surrounding middle and small cities. The aircraft has excellent performance in high temperature conditions, crosswind capability and night operability.

1.3 Up to now, one hundred and five ARJ21-700 have been delivered for operation, successively operated in more than 370 routes, 120 cities, and carried more than 7.2 million passengers. ARJ21-700 was officially delivered two flights to its first overseas customer in Indonesia on Dec 18th, 2022 and Jun 2023. This is the first time for China's jet to enter the overseas market. Four airports, such as Ngurah Rai International Airport and Morowali Industrial Park Airport, have been opened routes. The safety and reliability of the aircraft have been verified.

Airport and Air Traffic Management Institute (AAI)

1.4 Airport and Air Traffic Management Institute (AAI) is a department of Shanghai Aircraft Customer Service Co., Ltd. which is the customer center of COMAC. AAI focus on the activities of aircraft in the airport, researching relevant policies, regulations, standards and new technologies, solving the compatibility issues of aircraft of COMAC in the airport. AAI provides operational support to ensure the safe and smooth operation and good compatibility of aircraft in the airport.

2. DISCUSSION

ARJ21-700 Key Characteristics for Airport

2.1 To meet the requirements of different regions and different route structures for regional aircraft, the basic ARJ21-700 has Standard Range Version (STD) and Extended Range Version (ER). More derivative type, like cargo aircraft is under developing. Before the aircraft enter into route, it is necessary to pay attention to the following characteristic data.

Length of Runways

2.2 ARJ21-700 has various requirement of length of the runway at different altitudes, with an increasing of 8 to 12 m for every 100 ft (30.5 m) elevating altitude. Please refer to Table 1 for details.

Table 1 ARJ21-700 various requirement of length of the runway at different altitudes

Altitude	Length of Runway（ISA+15℃）		
	Not operational	Payload/Range Restrictions	Operational
0 to 500 ft	<1,578 m (5,177 ft)	1,578 to 2,205 m (5,177 to 7,234 ft)	≥2,205 m (7,234 ft)
501 to 1,000 ft	<1,618 m (5,308 ft)	1,618 to 2,264 m (5,308 to 7,427 ft)	≥2,264 m (7,427 ft)
1,001 to 1,500 ft	<1,653 m (5,423 ft)	1,653 to 2,320 m (5,423 to 7,611 ft)	≥2,320 m (7,611 ft)
1,501 to 2,000 ft	<1,695 m (5,561 ft)	1,695 to 2,384 m (5,561 to 7,821 ft)	≥2,384 m (7,821 ft)
2,001 to 2,500 ft	<1,739 m (5,705 ft)	1,739 to 2,446 m (5,705 to 8,025 ft)	≥2,446 m (8,025 ft)
2,501 to 3,000 ft	<1,781 m (5,843 ft)	1,781 to 2,510 m (5,843 to 8,235 ft)	≥2,510 m (8,235 ft)
3,001 to 3,500 ft	<1,820 m (5,971 ft)	1,820 to 2,564 m (5,971 to 8,412 ft)	≥2,564 m (8,412 ft)

Note:- The upper limit of payload/range restrictions depends on 43,500kg (95,901 lb) of ER type maximum takeoff weight, and the lower limit is 37,000kg (81,571 lb), which both with dry smooth runway, zero wind and no slope.

Width of Runways

2.3 The standard runway width for ARJ21-700 is 45 m(148 ft), and more detail please see Table 2.

Table 2 Width of Runways for ARJ21-700 requirement

Not operational	Payload Restrictions	Operational
<30 m (98 ft)	30 to 45m (98 to 148 ft)	⩾45m (148 ft)

ACN

2.4 The ACNs for ARJ21-700, please see Table 3.

Table 3 ACNs for ARJ21-700

ARJ21-700	Flexible pavement				Rigid pavement			
	Subgrade category				Subgrade category			
	high	medium	low	ultra low	high	medium	low	ultra low
STD	20	21	24	27	22	23	25	26
ER	22	23	26	30	24	26	27	29

Plateau Performance

2.5 ARJ21-700 has the outstanding plateau performance in its class. After the test flight in Daocheng (ZCY/ZUDC) in 2020, TO&LD altitude has achieved 14,472 ft /4,411 m, covering all high plateau airports in China.

Ground clearance of Passenger and Service Door

2.6 The passenger door height of the ARJ21-700 in the empty state is 2,385 (-40℃) ~2,461 (15℃) mm above ground, which is 2,254 (forward limit of center of gravity, -40℃) ~2,356 (rear limit of center of gravity, 15℃) mm above the ground in maximum taxiing weight state.

2.7 The service door height of the ARJ21-700 in the empty state is 2,364 (-40℃) ~2,440 (15℃) mm above ground, which is 2,233 (forward limit of center of gravity, -40℃) ~2,341 (rear limit of center of gravity, 15℃) mm above the ground in maximum taxiing weight state.

Ground Servicing

2.8 COMAC keeps taking actions to promote the airport compatibility of ARJ21-700.

2.9 In order to improve the passenger boarding bridge docking rate and APU substitution of ARJ21 for reducing carbon emissions, AAI is devoted to working with equipment manufacturers to develop products with a wider range of application that can achieve universal use for regional and trunk aircraft. Meanwhile, customized renovation for boarding bridge have been implemented at multiple airports in China.

2.10 For establishing the good airport compatibility of ARJ21, AAI assists servicing providers to modify ground support equipment without reducing generality, such as lengthening pipelines of lavatory service vehicle for more abundant operating space, developing new catering trucks for more quickly and conveniently operation, calculating universal mooring layout for adding adaptive mooring apron, growing towbarless trucks with Non-Technical Objection for more towing choice.

2.11 Along with the increasing of ARJ21-700 fleet size in certain regions and the world, it is expected that airports can take the operation requirements of ARJ21 into consideration while constructing airports or reconstructing airport facilities and ground support equipment. The data in the paper is for reference only. More information and characteristics of ARJ21 can be obtained from COMAC website. Web link: http://english.comac.cc/Galleries/Technical/.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) Call on airports and related units considering the operating requirement of ARJ21 aircraft during airport design and operation.

b) If ARJ21 expands local routes in APAC, it will be much helpful for aircraft operators to get information on airport service units and ground support equipment. Call on airports and related units providing the information for building a safer and more efficient operation environment to ARJ21.

c) Any requirement and questions on airport compatibility of ARJ21, welcome to send the mail to airport.compatibility@comac.cc.

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