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Chief Editor: Hsi Chen

Associate Editor: Jane Wang

Contributing Editors:

Bill Chen, Jim Chen, Yuan Hong, Louis Huang, Jan Hu, John Lai, Charles Lee, Wai Lim, Frank Lin, Nelson Mar, Phil Oyoung, Fred Shen, Philip Tang, Rock Teng, Tony Torng, Gordon Wei, Eric Yang, Peter Yuan.

Dear Members:

The ARJ21 is scheduled today to unveil the first passenger jet made in China, the 90-seat commercial jet at a ceremony in Shanghai.

In a nationally televised ceremony, the Xiangfeng, or "Flying Phoenix," was towed into a hangar at the Shanghai Aircraft Manufacturing Factory amid flashing laser lights and rousing music.

Many key parts are being sourced from overseas, including engines from General Electric Co., electronics from Rockwell Collins Inc. and flight controls from Honeywell International Inc. and Parker Hannifin Corp.

Newsletter Editor



The Xiangfeng, or "Flying Phoenix," is towed into a hangar at the Shanghai Aircraft Manufacturing Factory amid flashing laser lights and rousing band music unveiling ceremony in Shanghai Friday Dec. 21, 2007.

ARJ21 Advanced Regional Jet

ARJ21 Advanced Regional Jet is a two-engine commercial passenger jet aircraft. The ARJ21 is China's first self-designed passenger jet. This program is contributed to by 19 major U.S. and European aerospace components suppliers, including General Electric (engine production) and Rockwell Collins (avionics production).

ARJ21 selected GE's CF34-10A engine, made in the USA, to power the ARJ21 regional jet. GE sees a potential market for 500 ARJ21s over the next 20 years, representing a potential value to GE of \$3 billion.



GE's CF34-10A

Rockwell Collins' Pro Line 21 avionics system, made in the USA, is a key feature of the new ARJ21 regional jet. The ARJ21 flight deck configuration strives for commonality with air transport flight decks, and is the result of a joint definition, the airline pilot community and Rockwell Collins.



Rockwell Collins' Pro Line 21 avionics system

The 78- to 90-seat aircraft is designed to meet the demanding conditions of China's diverse environment and will be a contender in the world marketplace for regional jets.

The final trial production stage began in June 2006. The first flight is scheduled for March 2008, and the aircraft is expected to become available to buyers in September 2009. It aims to manufacture 11 ARJ21s a year by 2010, and 50 per year by 2015.

The ARJ21 will be built using tooling which was originally provided by the McDonnell Douglas company for licence production of the MD-90 in China. Because of this, it bears a strong resemblance to the DC-9 series of aircraft, with an identical cabin cross section, nose profile and tail. An all new supercritical wing has been designed by Antonov. It will have a sweepback of 25°, and be fitted with winglets to improve aerodynamic performance.

Manufacturer

The consortium was formed to develop the aircraft. The “Made in China” components of the aircraft will be manufactured by the members of the consortium:

- **Chengdu Aircraft Industry Group: construction of the nose**
- **Shanghai Aircraft Company: final assembly**

- **Shenyang Aircraft Corporation: construction of the empennage (complete tail unit)**
- **Xian Aircraft Company: construction of the wings and fuselage**

The Shanghai Aircraft Research Institute and the Xian Aircraft Design and Research Institute, which are also members of the consortium, are responsible for the design.

Specifications (ARJ21, the baseline model)

General characteristics

- **Capacity: 78-85 passengers**
 - **First class: 38 in seat pitch with 2+2 seating arrangement**
 - **Economy class: 32 in seat pitch with 3+2 seating arrangement**
- **Payload: 16.799 m³ (593.25 ft³)**
- **Cabin length: 18.426 m (60 ft 5.43 in)**
- **Length: 33.46 m (109 ft 9 in)**
- **Wingspan: 27.29 m (89 ft 7 in)**
- **Height: 8.44 m (27 ft 8 in)**
- **Wing area: 79.86m² (859.61ft²)**
- **Empty weight: 24.955kg (55,016lb)**
- **Max takeoff weight: 40,500 kg (89,300 lb)**
- **Fuel tank capacity: 10,386 kg (22,897 lb)**
- **Powerplant: 2× General Electric CF34-10A turbofans, 68.20 kN (15,332 lbf) each**

Performance

- **Cruise speed: 0.78 Mach (926 km/h, 576 mph)**
- **Range:**
 - **Standard: 1,200 nmi (1,400 mi, 2,200 km)**
 - **Extended: 2,000 nmi (2,300 mi, 3,700 km)**
- **Service ceiling: 11,900 m (39,042 ft)**

Orders and options

Totals	71 Orders (35 firm)	
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經濟艙 5 座佈局

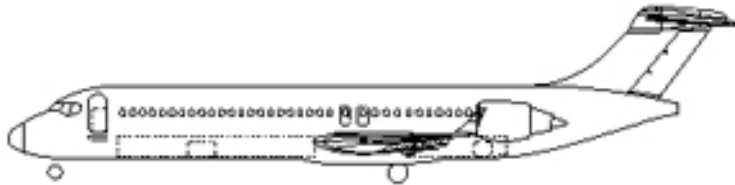


座艙佈局，從公務艙(4 座)向經濟艙(5 座)

ARJ-700系列
70-80座級



ARJ-900系列
90-100座級



ARJ21 新支線飛機上天

2007 年 10 月份接受 FAA 評估

ARJ21 共獲得 71 架訂單。訂戶當中除了傳統的航空公司外，還有專業的飛機租賃公司。ARJ21 之所以受到飛機租賃公司的青睞，主要是目前機艙內座位在 50-110 座、飛行距離在 600-1200 公里的支線飛機市場前景頗為看好。

未來 20 年，僅國內新增支線飛機的市場需求就有 600 架左右。而 ARJ21 飛機正是完全按照我國自然環境自行設計研製的。它的單次航程在 2000 公里以內，能適應我國西部高原機場的起降，並具備在複雜航路穿越障礙的能力。

ARJ21 新支線飛機今年將啟動海外銷售，爭取有所突破。本月 9 日，美國聯邦航空管理局 (FAA) 在上海設立了辦事處，該辦事處成員將協助民航總局對 ARJ21 飛機進行適航審定工作，決定 ARJ21 飛機能不能飛。今年 10 月份，該辦事處將對 ARJ21 飛機適航整體安排進行全面評估。

明年啟動「升級版」設計

目前啟動總裝的 ARJ21 飛機的型號是 ARJ21-700 型，已經使乘客能享受幹線大飛機同樣的舒適。ARJ21-700 型的「升版」——ARJ21-900 型已經開始進行市場調研和方案論證。按照業內人士的說法，ARJ21-900 型是發展型和加強型的產品，主要表現在容量增大和設計優化。比如 ARJ21-900 型飛機採用全經濟型佈局，能夠容納 105 名乘客，而現在的 ARJ21-700 型飛機一般只有 90 座。另外，有關方面在

研究 ARJ21-900 型飛機的經濟性、舒適性方面也「很有想法」，還將考慮未來把這種飛機變成貨運機、公務機。

ARJ21-900 型飛機預計明年全面啟動設計工作，2010 年首架新支線發展型飛機首飛。將來，ARJ21 系列飛機不但要逐步在國內市場嶄露頭角，還要打入國際市場。

ARJ21 支線飛機具有以下四大優勢：

1、適應性，以未來西部交通樞紐格爾木機場九寨黃龍機場作為設計的臨界條件。

我國西部地區具有相對簡陋的機場條件和航線上障礙物很多的特點，這既要求飛機有過硬的起飛和爬升性能，在不減載的情況下能在較短的距離內起落，又要保證飛機能在較為惡劣的氣候環境中運營，並對飛機性能如單發升限等提出了很高的要求。ARJ21 飛機可以很好地適應中國復雜的地理環境，是世界上第一架完全按照中國自己的自然環境來建立設計標準的飛機，在西部航線和西部機場適應性上具有很強的優勢。

2、舒適性，客艙寬度達 3.14 米，在同類支線飛機中是最寬敞的，達到了與幹線飛機同等的客艙舒適性，而且增大了下貨艙的高度和容積。

基本型和加長型分別擁有 17.7 立方米和 20.9 立方米的下貨艙，貨艙高度接近 1 米，能為旅客提供更多的行李空間。對於客艙的內裝飾和服務設備，綜合考慮了線條、顏色、圖案、照明和實用等因素，以保證乘客獲得最大程度的舒適感。

3、經濟性，低于同類競爭飛機的直接使用成本和全壽命成本。

ARJ21 從飛機的開始設計就對飛機的全壽命成本(LCC)進行嚴格控制。通過採用長壽命結構設計，注重高可靠性、維修性設計，使飛機的可靠性和安全性得以提高，從而降低維護成本；採用低油耗先進渦扇發動機，提高了飛機的使用經濟性；運用以 IT 技術為代表的先進研發手段及和國際接軌的生產管理和質保體系，在很大程度上降低研制和生產成本。

4、共同性，與 150 座主力機種的性能和使用特徵有盡可能多的共同性，保障無縫隙服務。

ARJ21 飛機的另一設計目標是與 150 座級幹線飛機有一定共同性，這不僅體現在與 150 座級幹線飛機具有相近的飛行性能和相媲美 的舒適性，同時在駕駛艙人機界面、維護人機界面和相應操作程序方面盡量保持共通性，從而可降低航空公司飛行員換裝培訓成本，提高飛機調配使用的靈活性。

自主研發不是“自給自足”

與過去曾經在上海組裝的麥道 82、麥道 90 相比，ARJ21 支線飛機最大的不同，就是它擁有自主知識產權。

從 ARJ21 起步開始，對於它自主知識產權的含量有多高的問題外界有過議論。主要原因是，ARJ21 在研制過程中，諸多關鍵設備採取全球招標。ARJ21 先後選定了美國 GE 公司、霍尼維爾公司、漢勝公司、科林斯公司、帕克公司、歐洲利勃海爾等 19 家世界頂級係統供應商，其中採用了 GE 的發動機、霍尼維爾的航電設備等世界一流產品。因此有人問，“這樣的飛機，到底算不算自主知識產權？”

ARJ21 飛機研制負責人表示，自主知識產權的概念，絕對不是“閉門造車”，也不是“自給自足”，任何設備都自己來生產。在全球航空工業中，全球採購和協同是不可阻擋的潮流，目前，無論是波音還是空客，從不苛求本地產率或國產率，包括俄羅斯前不久下線的蘇霍伊—100 噴氣飛機，也是採用許多國外設備。ARJ21 擁有自主知識產權，是因為它整體設計、性能指標、機型結構、發展方向以及今後的市場開拓等等都是由中航第一集團為主制定的，是一種綜合能力的體現。

ARJ21 「出世記」

2003 年 12 月 20 日，ARJ21 新支線飛機在上海、西安、成都、瀋陽四地同時開工，申城重拾飛機夢想。

2006 年 9 月 9 日，中國一航西安飛機工業(集團)公司向上海飛機製造廠交付首架 ARJ21 飛機前機身段部件。

2006 年 9 月 13 日，ARJ21 新支線飛機在上海大場基地開工建設，總裝任務正式「落滬」。

2006 年 12 月 20 日，中國一航成都飛機工業(集團)公司正式交付 ARJ21 新支線飛機機頭。

2007 年 3 月 7 日，中國一航西安飛機工業(集團)公司正式交付 ARJ21 飛機的機翼和中機身。

2007 年 3 月 13 日，中國一航瀋陽飛機工業(集團)在瀋陽順利交付了國產 ARJ21 新型渦扇支線飛機的首個尾段。

2007 年 3 月 30 日，自主研發、擁有自主知識產權的新型支線飛機 ARJ21 將在上海開始總裝。

2007年12月21日，總裝下線，向世人揭開面紗。ARJ21的名字也已經公佈，定名為“翔鳳”。

Comments from Outside China on ARJ21

China to Introduce First Passenger Jet, Challenging Bombardier

Dec. 21 (Bloomberg) -- China will introduce its first passenger jet today, taking on Bombardier Inc. and Empresa Brasileira de Aeronautica SA in the world's fastest-growing aviation market.

China Aviation Industry Corp. I, the nation's biggest plane maker, will showcase its first ARJ21 regional jet at the Shanghai Aircraft Manufacturing Factory later today. The 70-to-90-seater jet is slated to be test flown in March and delivered to the first customer in the third quarter of 2009.

The ARJ21, or Advanced Regional Jet for the 21st Century, is the first step in China's ambition to become a global aircraft maker and capitalize on a domestic aviation market forecast to need as many as 3,400 new planes in the next 20 years. Winning orders against Bombardier and Embraer will be a challenge because of the ARJ21's unproven technology, analyst Jim Eckes said.

“It'll be a hard sell,” said Eckes, managing director at Hong Kong-based aircraft-leasing company Indoswiss Aviation. “There are a number of planes available today in this seat range. The Chinese are trying to break into the market and, to a degree, reinventing the wheel.”

Outsourced

While AVIC I bills the ARJ21 as being developed solely with Chinese technology, many key parts are being sourced from overseas, including engines from General Electric Co., electronics from Rockwell Collins Inc. and flight controls from Honeywell International Inc. and Parker Hannifin Corp.

“The challenges are quite obvious for a young aviation industry like China,” Pui Ho, director of Parker's involvement in the ARJ21 program, said in September. “The legacy of Chinese-style management means that sometimes the delegation of responsibility isn't as efficient as we would hope.”

China's previous attempt to build a passenger jet in the 1970s culminated in the Y-10, a 150-seat, four-engine plane that resembled the Boeing 707. Neither of the two Y-10s produced ever flew a commercial flight.

No Guarantee

Even certification from overseas regulatory bodies is unlikely to guarantee sales for the ARJ21, which will need an extensive network of maintenance and spare-parts providers, industry officials have said.

“The challenge would be bigger because the network doesn't exist,” Robert Laird, senior vice president of greater China sales for commercial airplanes at Boeing, said in September. “They'd have to establish it through partnerships.”

China invested 8 billion yuan to develop the ARJ21, building on technology used in its military planes and the MA60, AVIC I's Hu said in September.

That compares with as much as the \$20 billion needed to develop and market a plane in the West, Laird said.

“Skill, productivity and the ability to provide risk-sharing cash are how you are competitive in this business,” said Richard Aboulafia, vice president of the Teal Group, a Fairfax, Virginia-based consulting company. “It has nothing to do with low cost.”

项目	ARJ21-700(STD)	ARJ21F	ARJ21B	ARJ21-900(STD)
翼展(米)	27.29			
机长(米)	33.46			36.36
机高(米)	8.44			
标准布局载客(人)	78	-	20	98
货舱容积(立方米)	20.15	111.3(主货舱)	-	23.43
商载(吨)	8.9	10.15(主货舱)	3	11.2
空机重(吨)	24.96	26.36	25.75	26.27
最大使用高度(米)	11900			
最大起飞总重(吨)	40.5	43.5	43.5	43.6
最大可用速度	马赫 0.82			
满客航程(公里)	2250	3334	6112	2250
发动机型号	两台 GE 公司 CF34-10A 涡扇发动机			