中国商用飞机有限责任公司
COMMERCIAL AIRCRAFT CORPORATION OF CHINA, LTD.

Advanced Regional Jet for the 21 Century

ARJ21-700 Aircraft

Contents

- ARJ21 Program
- Aircraft Overview
- Aircraft Features
- Specific Technologies

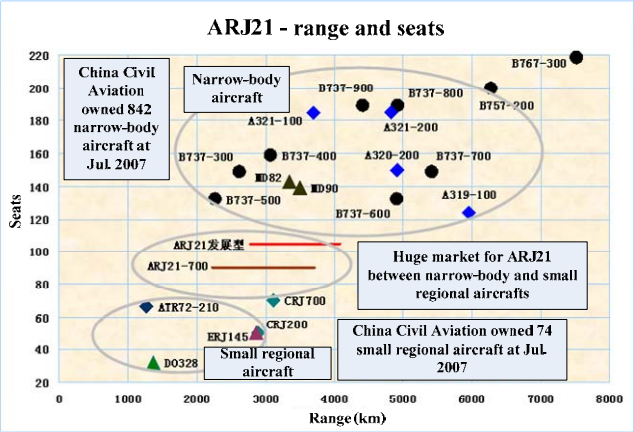
ARJ21 Program

Program Introduction

ARJ21 (Advanced Regional Jet for the 21st Century) is the first passenger jet developed and indigenously produced by the People's Republic of China. The baseline model -700 has 78-90 seats, and is the first project for Commercial Aircraft Corporation of China (COMAC). Now it is at the stage of flight testing and certification. Cooperating closely with suppliers like GE, Honeywell and Rockwell Collins, COMAC strictly followed the certification procedures and standards of FAA, EASA and CAAC in order to design an aircraft aiming for a domestic and oversea market.

Domestic Market Demands

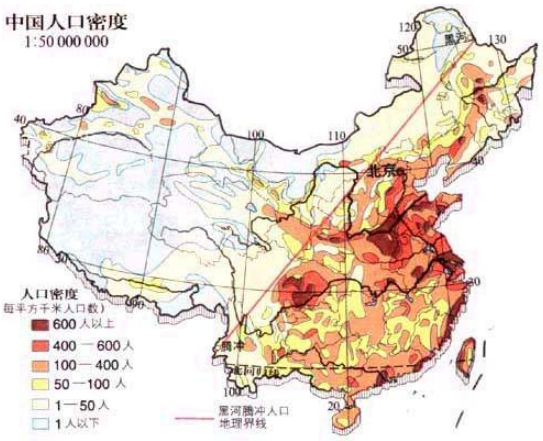
A 90 Seat Regional Jet , the First Aircraft from COMAC



Domestic Market Demands

China is a large country with sparse distributed Cities in the large western area. There is strong market demands for air transportation.

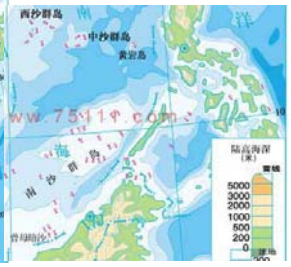
Domestic Market Demands



China population is mainly located in the middle and coast area. Western area is large but has less population, so it demands regional jet for travel.

Domestic Market Demands

China land is more than 30% occupied by plateau, so the high altitude airport request is one of important design point.



Domestic Market Demands

China railway is mainly concentrated in the eastern area and western area is difficulty to build railway. The air transportation is the best solution.

Principles for the Program

- **Based on market demands;**
- **Compliance of certification standards (CAAC, FAA and EASA);**
- **Competitive on operation economy and passenger comfort with similar aircraft;**
- **Fully consider the operation environment in the western area of China,**

especially the plateau & hot airports.

Orders

240 confirm and intent orders of ARJ21 have been placed from 10 customers.

GE Commercial Aviation Services
Lao Airlines
CLC 国银租赁 CDB Leasing
鲲鹏航空 Kunpeng Airlines
幸福航空 Joyair
山东航空
成都航空 CHENGDU AIRLINES
上海电气 SHANGHAI ELECTRIC
厦門航空 XIAMEN AIRLINES
SHANGHAI AIRLINES CO.,LTD.

Aviation Foundation in China

China aviation industry has 60 years history for aircraft manufacture and development. It has delivered more than 20,000 aircraft and helicopters. There are more than 200 companies and research centers in China.

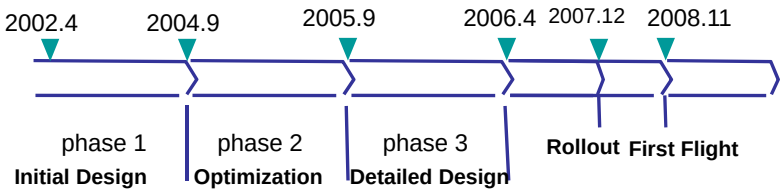
Aviation Foundation in China

The first commercial aircraft(Y-10) developed in Shanghai China began from 1970s,and its main manufacturer is preexistence of COMAC.

Project Development Model

Close cooperation between COMAC and international suppliers

Program Milestone



Flight Test

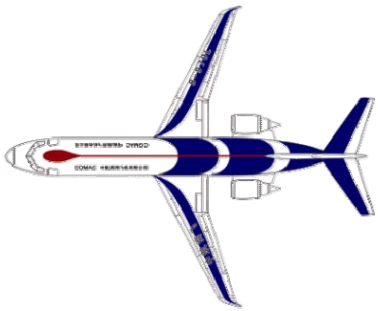
ARJ21-700 has done more than 700hrs flight tests. The results have shown that performances have reach its main targets.

Aircraft Overview

Brief Description

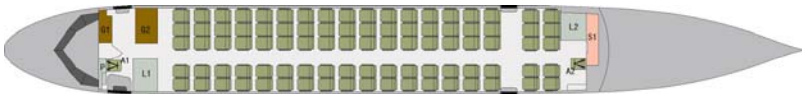
- A middle/short-range regional jet .
- Aircraft configuration: single low wing, two aft-fuselage mounted engines, T-tail, tricycle retractable landing gears, supercritical aerofoil, integrated winglet.
- Control-by-wire flight control system.
- ARJ21-700 is the base type of ARJ21 series. ARJ21-700 has two configurations: standard range (STD) and enhanced range (ER) .

Aircraft Dimensions



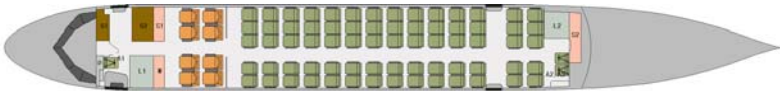
Wing Span	**27.288 m**
Length Overall	**33.464 m**
Height Overall	**8.442 m**
Wing Area	**79.86 m^2**
Wing Sweep Angle	**25°**
Track	**4.68 m**
Wheel Base	**14.878 m**
Max. Fuel Capacity	**13231 Liters**

Cabin Layout



90 Seat Single Class
at 31 Inch Pitch

G1, G2	Galley	A1	Fwd. Attendant Seat
L1	Fwd. Lavatory	A2	Aft Attendant Seat
L2	Aft Lavatory	S1	Stowage
P	Power Center		



78 Seat Mixed Class
8 Seats at 36 Inch Pitch
70 Seats at 32 Inch Pitch

G1, G2	Galley	A1	Fwd. Attendant Seat
L1	Fwd. Lavatory	A2,A3	Aft Attendant Seat
L2	Aft Lavatory	S1,S2	Stowage
P	Power Center	W	Wardrobe

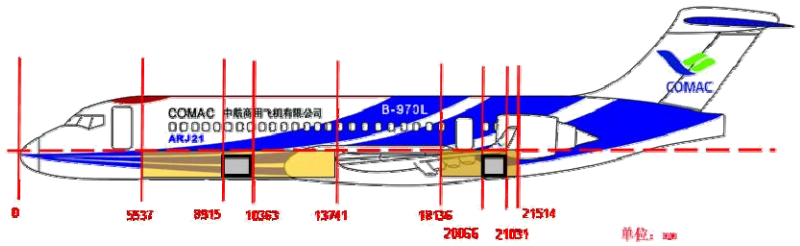
ARJ21-700 Design Weights

	ARJ21-700STD Standard	ARJ21-700ER Extended Range
Operating Empty Weight (kg/lb)	24955 / 55017	24955 / 55017
Max. Take-Off Weight (kg/lb)	40500 / 89288	43500 / 95902
Max. Landing Weight (kg/lb)	37665 / 83038	40455 / 89188
Max. Zero-Fuel Weight (kg/lb)	33890 / 74715	33890 / 74715
Max. Payload (kg/lb)	8,935 / 19,698	8,935 / 19,698
Max. Usable Fuel (kg/lb)	10,386 / 22,897	10,386 / 22,897
Standard Seating Capacity	90	90

ARJ21-700 Flight Performance

	ARJ21-700STD	ARJ21-700ER
Max. Cruise Speed	M0.80	M0.80
Normal Cruise Speed	M0.78	M0.78
Initial cruise Altitude (Take-off with MTOW)	35000 ft	35000 ft
Take-off Field Length (MTOW , SL , ISA)	1,700 m	1,900 m
Landing Field Length (MLW , SL , ISA)	1,600 m	1,700 m
One Engine out Ceiling (90 Pax., 500 nm Mission Range Fuel and Reserves)	6,200 m	6,200 m
Range with 90 Pax.	1,200 nm	2,000 nm

Baggage / Cargo Compartment

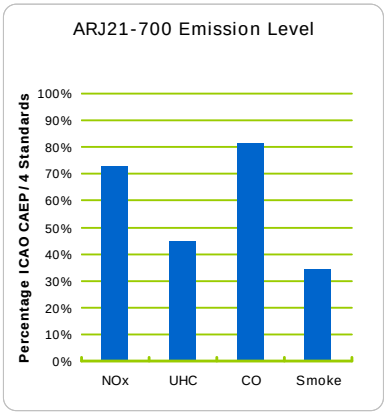


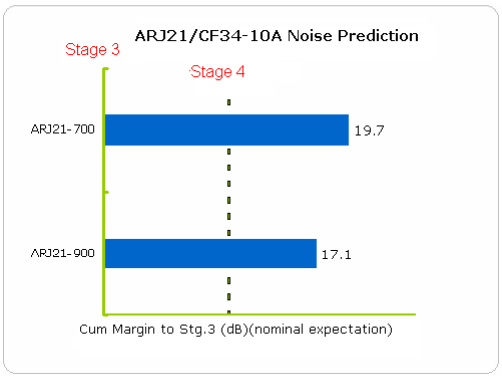
Under-floor Baggage / Cargo Compartment Volume:

Front Compartment Volume:	14.643 m^3 / 517.1 ft^3
Rear Compartment Volume:	5.502 m^3 / 194.3 ft^3
Total Volume :	20.145 m^3 / 711.4 ft^3

Emissions and Noise

CF34-10A Emissions and Noise

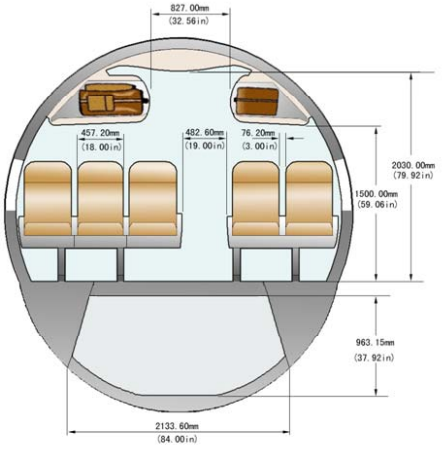




ICAO CAEP/4 standards: Applicable for new engine certification after 2003

Aircraft Features

Excellent Comfort



Cabin Cross Section

The cabin of ARJ21-700 offers trunk liner's comfort and large cargo compartment volume

Excellent Comfort

Cabin

Business Class

Economy Class

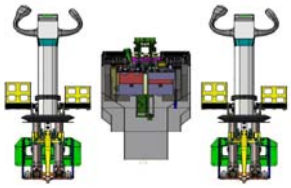
Passenger Service Unit

Excellent Comfort

Flight Deck

Pilot's Seat

Control Wheel & Pedal



Excellent Comfort

Galleys and Lavatory

GALLEY G1
2 half carts, 2 ice drawers, 2 coffee makers, 1 water boiler, Sink / water spigot, Waste flap / container, liquid containers and misc. compartments

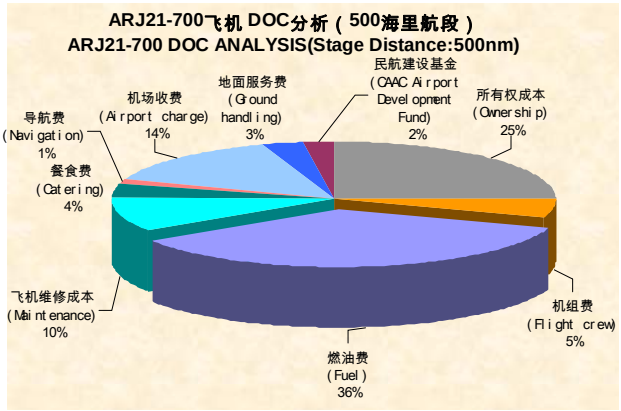
GALLEY G2
3 full carts, 2 ovens and misc. compartments

LAVATORY
Take latest design trend and implement, simple, clean, bright & maximum comfort with soft arc line.

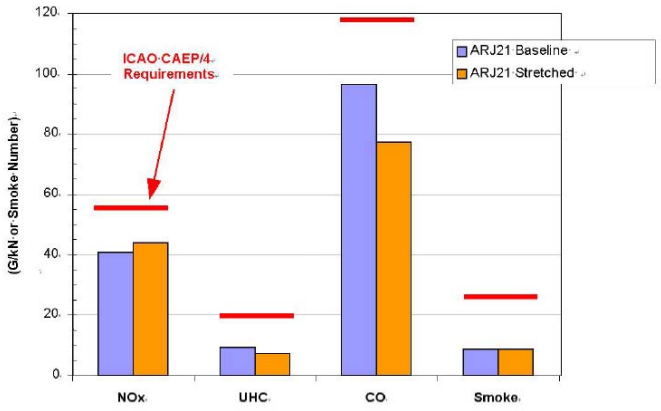


Advantageous Economy

At 2009 Chinese economic conditions, the DOC of ARJ21-700 is 8% lower than its competitors.



Outstanding Environment Friendliness



ARJ21(STD) Emission Prediction

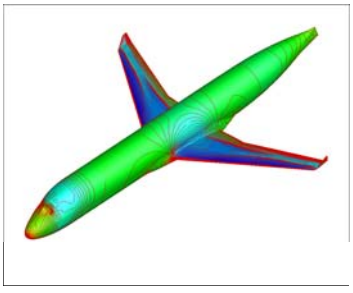
Specific Technologies

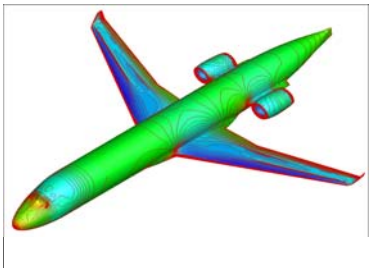
Specific Technologies

Advanced technologies like CFD simulations have been extensively applied in designing the ARJ21-700 aircraft, significantly reducing the time and cost of the product development. Meanwhile, by increasing the fuselage width and using advanced systems (flight control/avionics/ illumination system,etc), the comfortableness of the passengers has been greatly improved. All these features effectively make the ARJ21-700 much more advantageous than its competitors .

Aerodynamics

Extensive CFD Applications

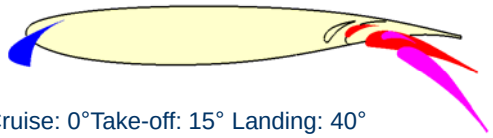




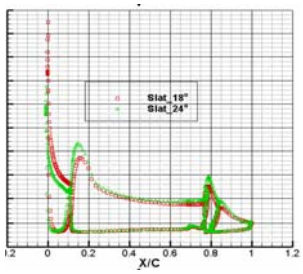
Wing Design: Integrated wing\engine design enhanced high speed aerodynamic efficiency.

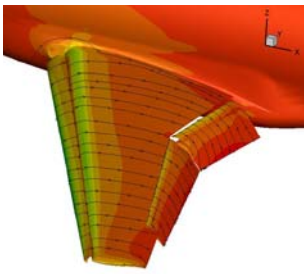
Aerodynamics

High-lift Device Design



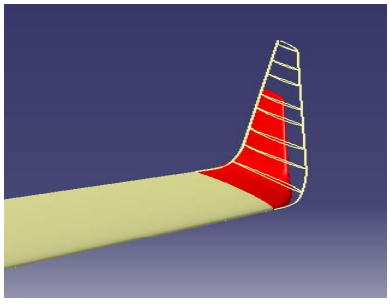
Cruise: 0°Take-off: 15° Landing: 40°





Aerodynamics

Winglet Optimization

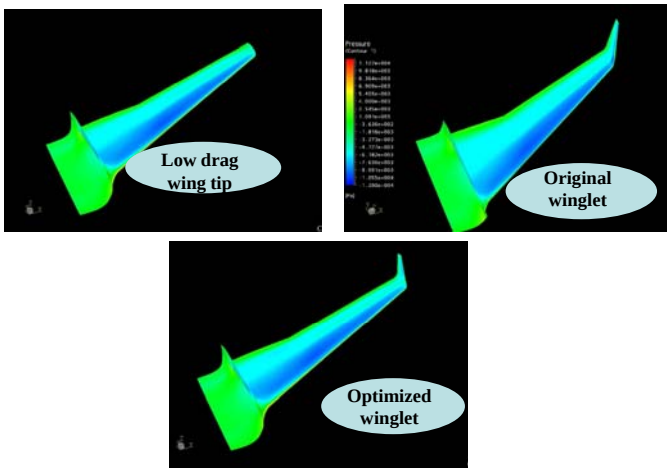


Optimized (red) vs. Original

Original winglet has flutter problem and high structure weight.

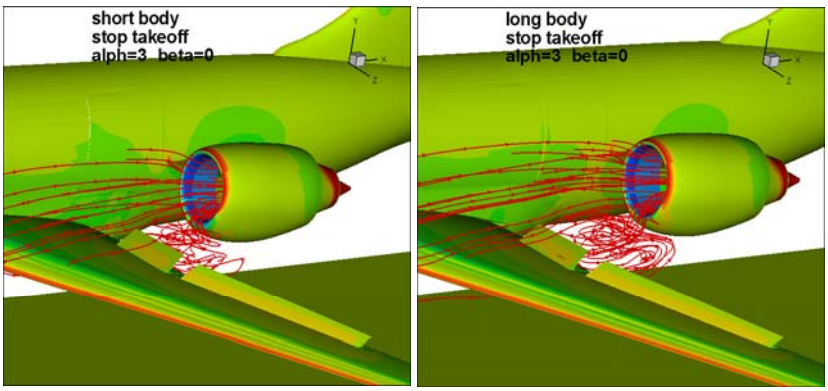
Optimized winglet has smaller size and weight, no flutter problem, and maintains the same aerodynamic performance.

Aerodynamics



Aerodynamics

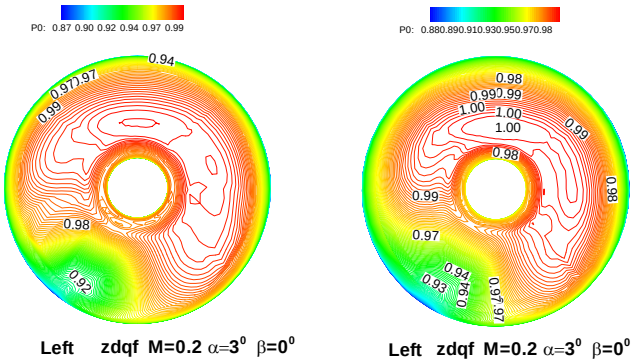
Engine Inlet Flow Field Distortion



Short fuselage layout **long fuselage layout**

Aerodynamics

Inlet Total Pressure with Different Fuselages

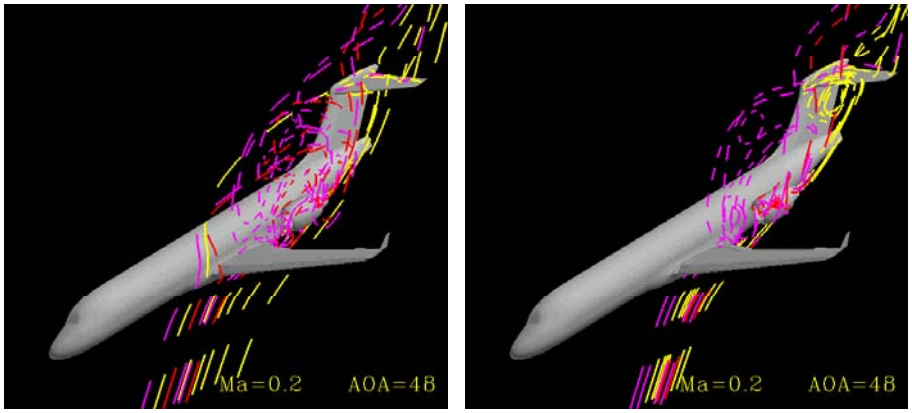


Left zdqf M=0.2 α=3^0 β=0^0 Left zdqf M=0.2 α=3^0 β=0^0

Original IDC = 5.88% Optimized IDC = 5.0%

Lower distortion index after optimization

Aerodynamics

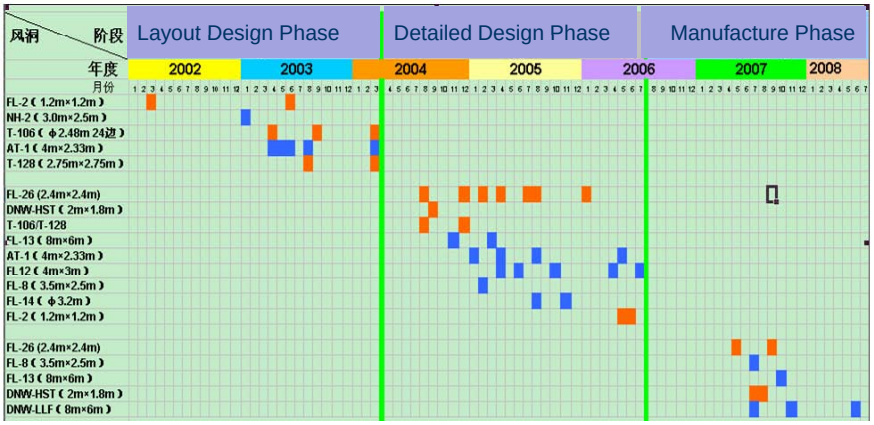


Original **Optimized**

Significant improvement on deep stall characteristic

Aerodynamics

Wind Tunnel Test

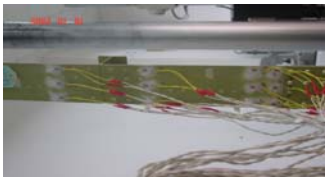


Wind Tunnel Test

Aeroelastic Wind Tunnel Test

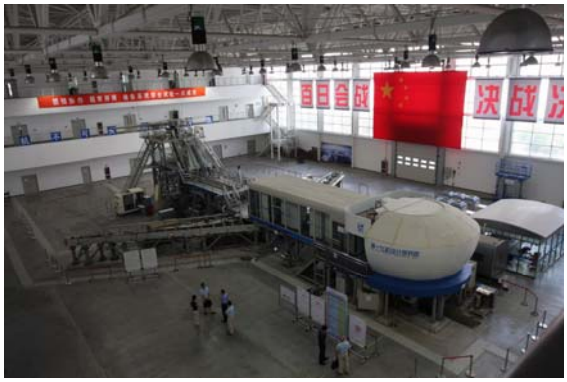
Full Scale Static Test

Fatigue & Damage Tolerance Test

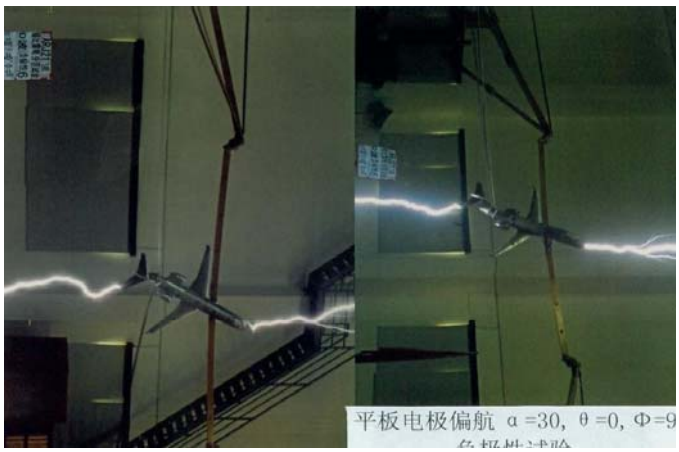




Stringer fitting fatigue test

Iron Bird Bench Test



E3 Test

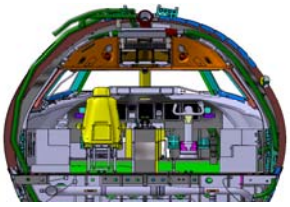


Full Scale Pressurization Tightness / Rain Test

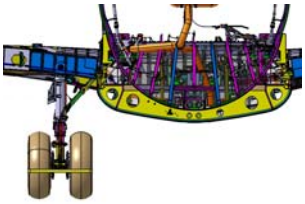
Digital Mock-up

Corresponding to the advanced 3D digital analogy design method used in ARJ21-700 project,a majority of physical mock-up is replaced by digital mock-up.

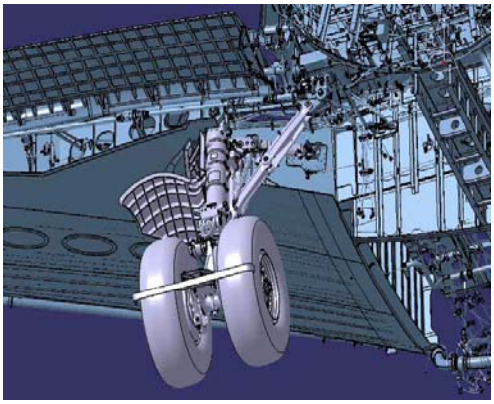
Digital Mock-up



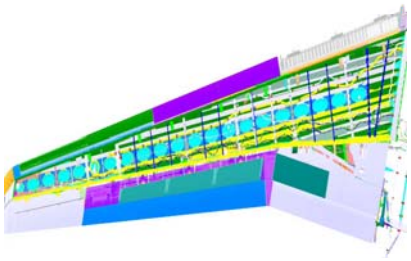
Cockpit layout



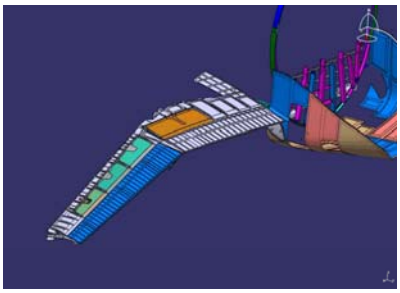
Landing gear layout



Digital Mock-up

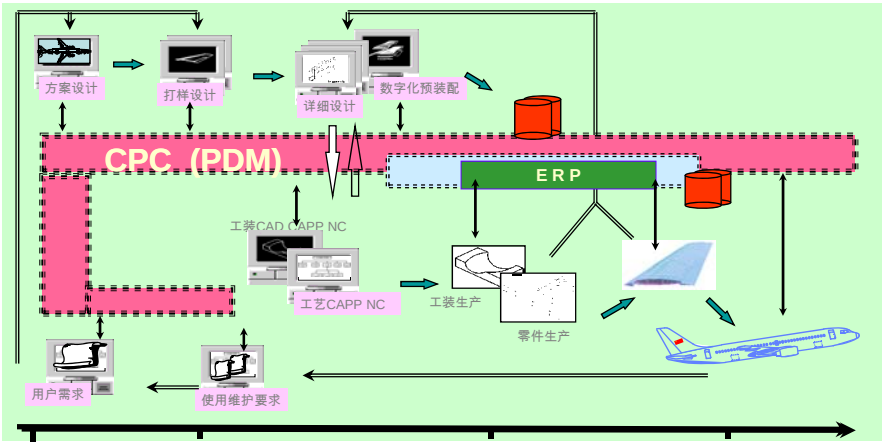


Wing layout



Integrated Design and Manufacture

The PDM and ERP system have introduced in ARJ21 design and manufacture process and concurrent engineering has been used in development to accelerate the development.



Advanced Avionics System

- **Pro Line 21 is a cost effective advanced technology avionic system based on proven airline experience**
- **It offers system growth and flexibility**
- **Ethernet based avionics system LAN, its network standard is the same on latest trunk liner.**

Electrical Power System

- As a critical system, the quality and reliability of power supply directly affect the performance of the whole aircraft.
- Electrical power system employs constant speed constant frequency generator, ram air turbine (RAT) generator, and no-disruption power supply switch.
- These advanced technologies significantly improve the reliability and safety of electrical system.
- The electrical power supply system has reliable and high-margin power generation, automatic power distribution, trouble diagnosis, status self-examination and warning functions.

Summary

- ARJ21-700 is the first passenger jet developed by COMAC.
- It serves the short/medium range routes with 78-90 seats.
- The program is now on the certification stage as scheduled.
- We expect it to be a success.

Thank you !