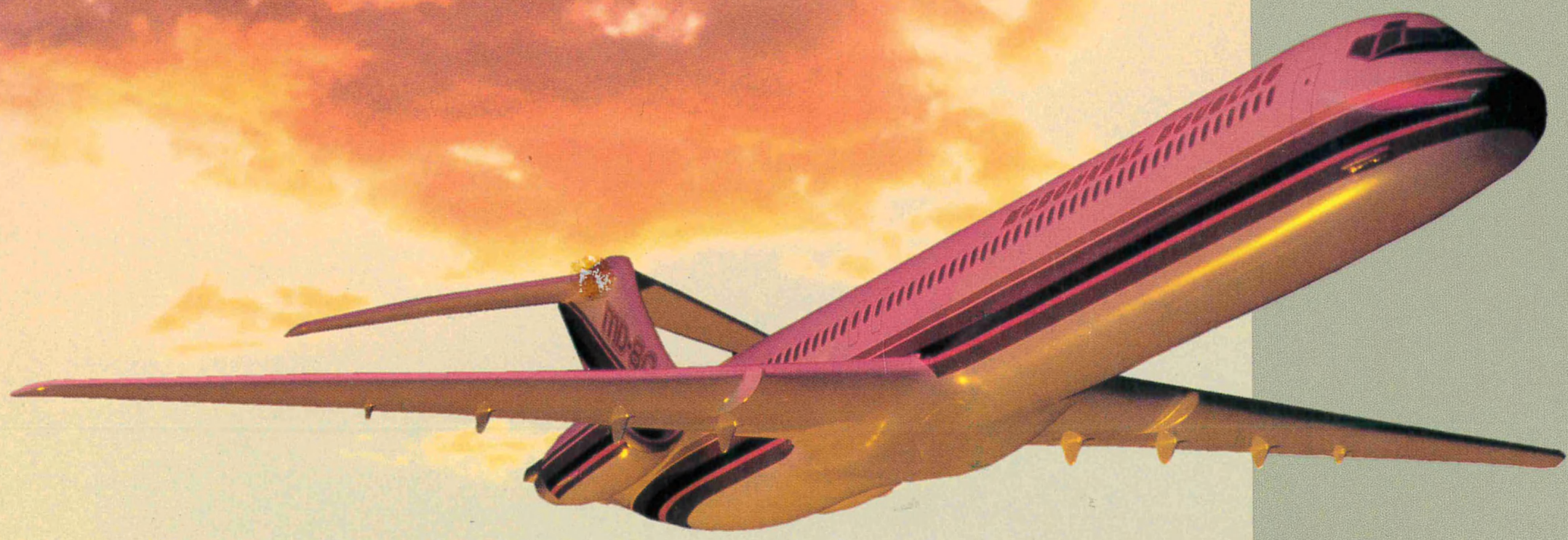
MD-80

NOW



MCDONNELL DOUGLAS

CONTENTS

INTRODUCTION 2

THE MD-80 SOLUTION 4

CONTINUOUS IMPROVEMENT DEFINED 8

BUSINESS SOLUTIONS. 14

THRUST TECHNOLOGY 20

THE ON-TIME AIRPLANE FOR ON-TIME AIRLINES 24

TAKE CONTROL. 28

PROVIDING THE FINEST IN COMFORT. 30

THE TURNAROUND SOLUTION. 38

SUMMARY. 42

INTRODUCTION

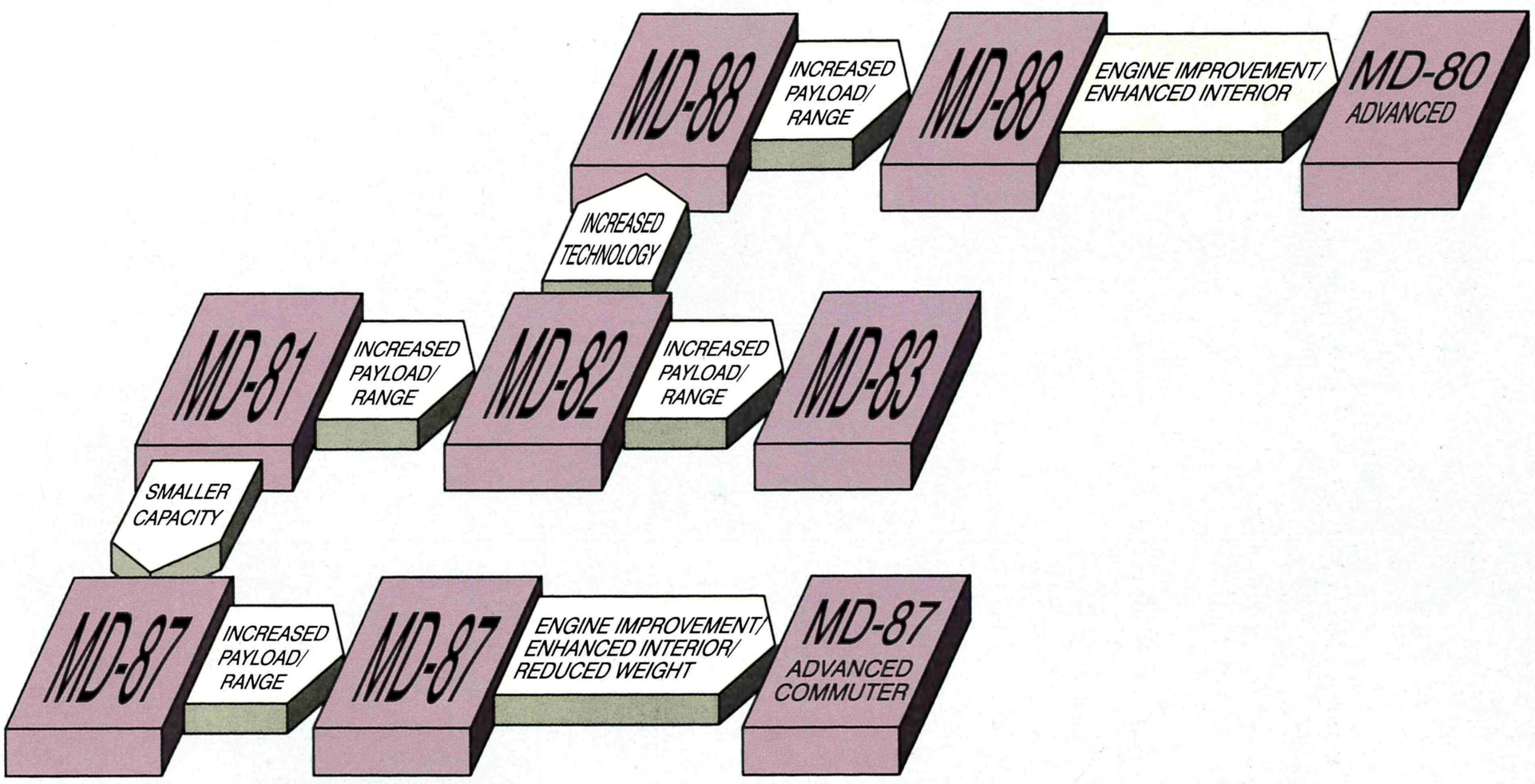
The MD-80 is most accurately epitomized by the phrase "continuous improvement defined." In the first 10 years since the introduction of the MD-80 twin-jet more than 800 have been delivered in various versions with commitments for more than 700 yet to be delivered. In this period, numerous improvements have been incorporated covering areas spanning powerplant, structures, aerodynamics, interior cabin design, flight and avionics systems, and maximum gross takeoff weight.

The improvements have been the result of McDonnell Douglas' goal to be responsive to the customer's needs for effective solutions without compromising the Douglas Aircraft twin-jet characteristic strength of high reliability, maintainability, safety, durability, and proven passenger comfort.

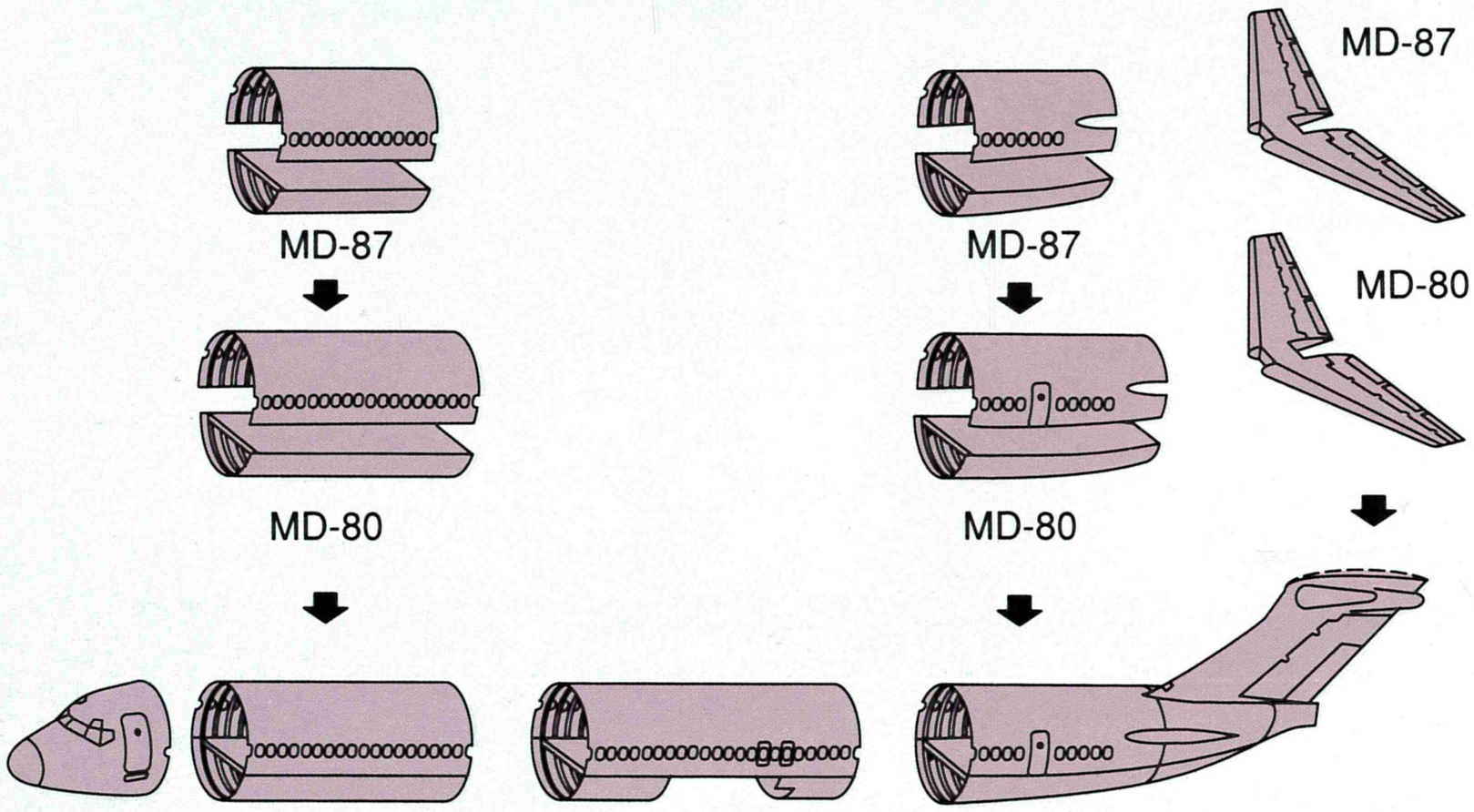
We invite airlines to consider the MD-80 Business Solution and join the global family of MD-80 operators who have selected and found the MD-80 to be the answer they can count on every day...The MD-80 now!

THE MD-80 SOLUTION

AN ANSWER FOR EVERY NEED

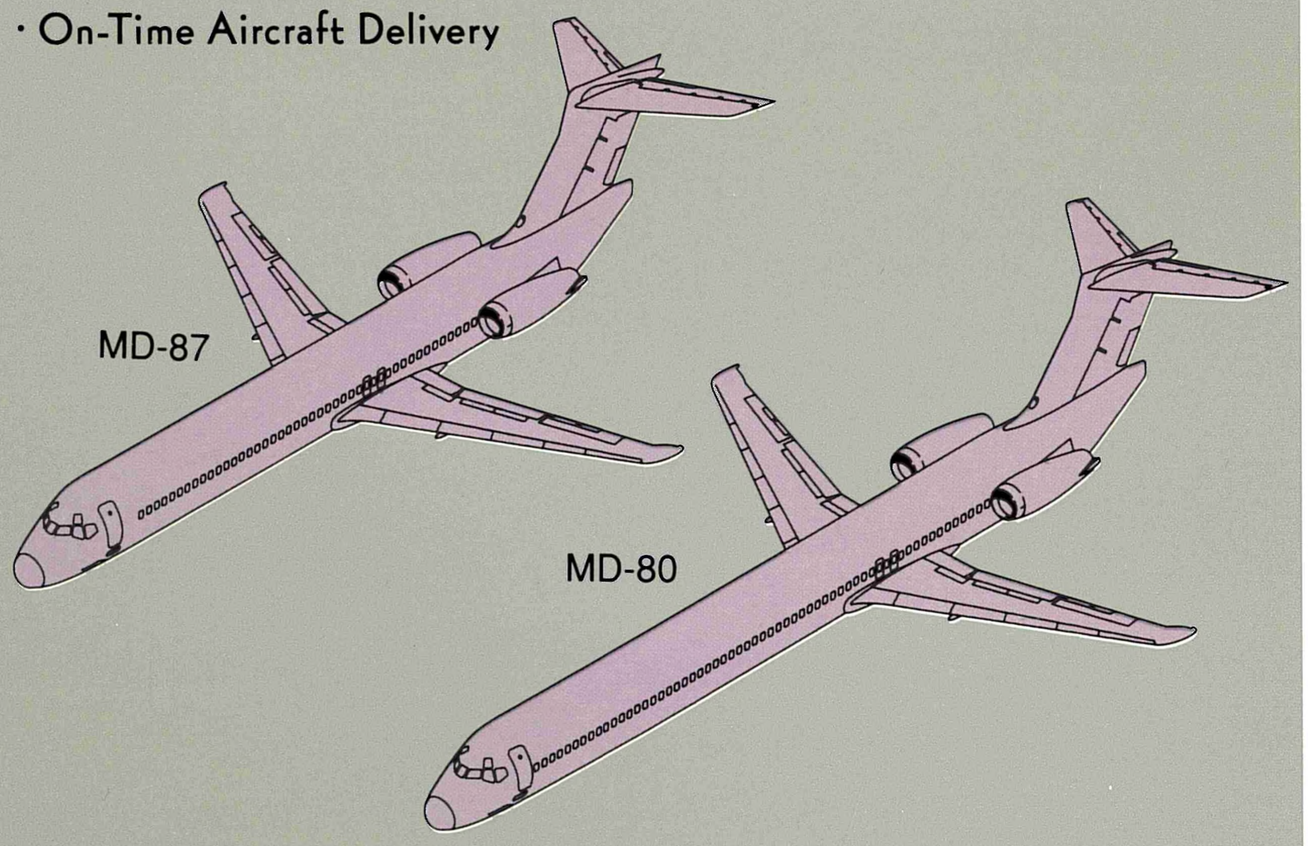


COMMONALITY AND EFFICIENCY THROUGH NEW MODULAR PRODUCTION STRATEGY



BENEFITS

- Higher Quality Products
- Improved Assembly Performance
- On-Time Aircraft Delivery



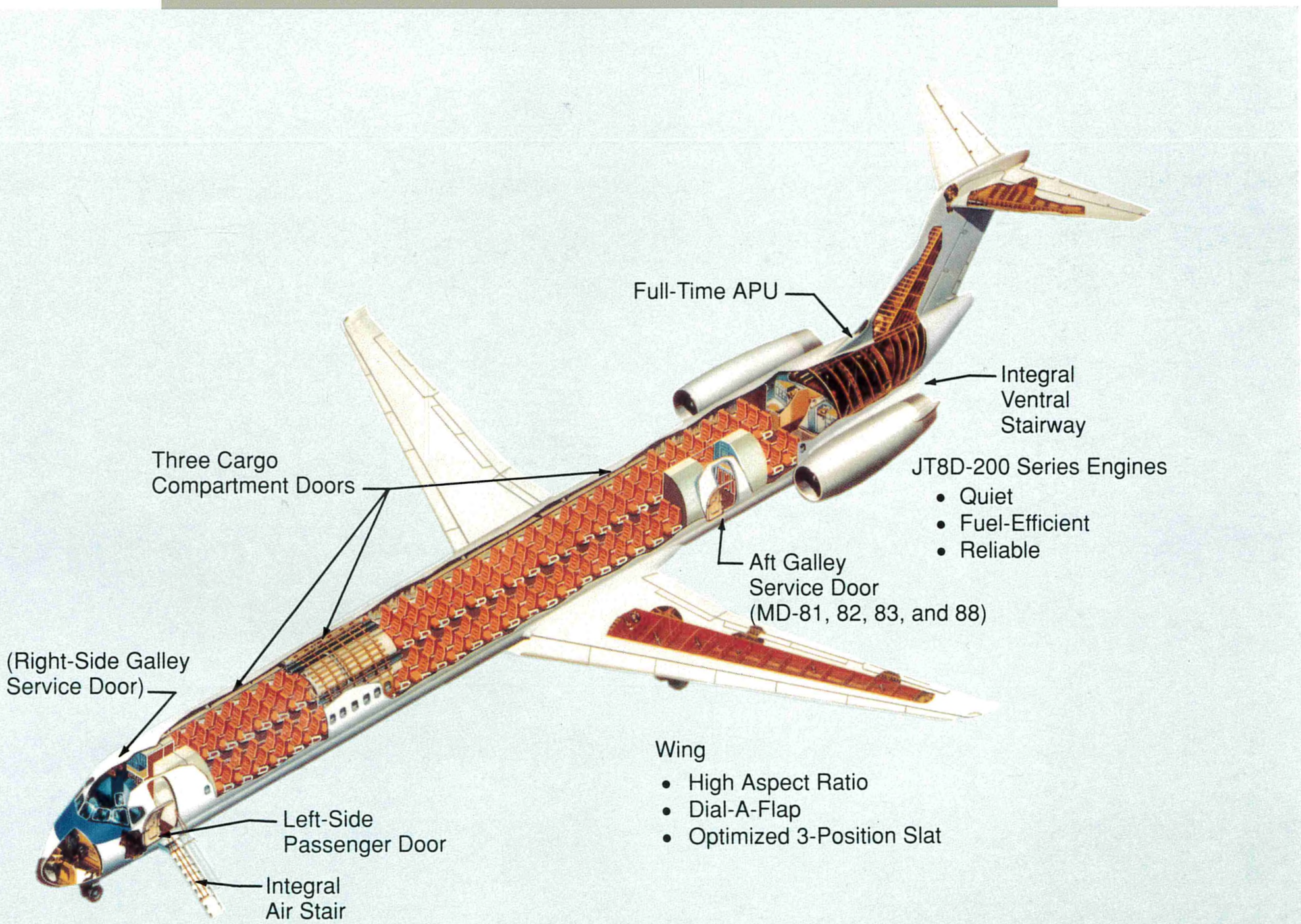
THE MD-80 DIFFERENCE

IMPROVED STRUCTURES AND CORROSION PROTECTION
- New Metallic Application
- Advanced Composites

FUSELAGE
- 5-Abreast Wide-Body Interior
- Configuration Flexibility

FLIGHT DECK
- Digital Avionics
- Integrated Digital Flight Guidance System
- Autoland
- Performance Management System
- Windshear System

Optional Characteristics Available for Special Needs



CONTINUOUS IMPROVEMENT DEFINED...

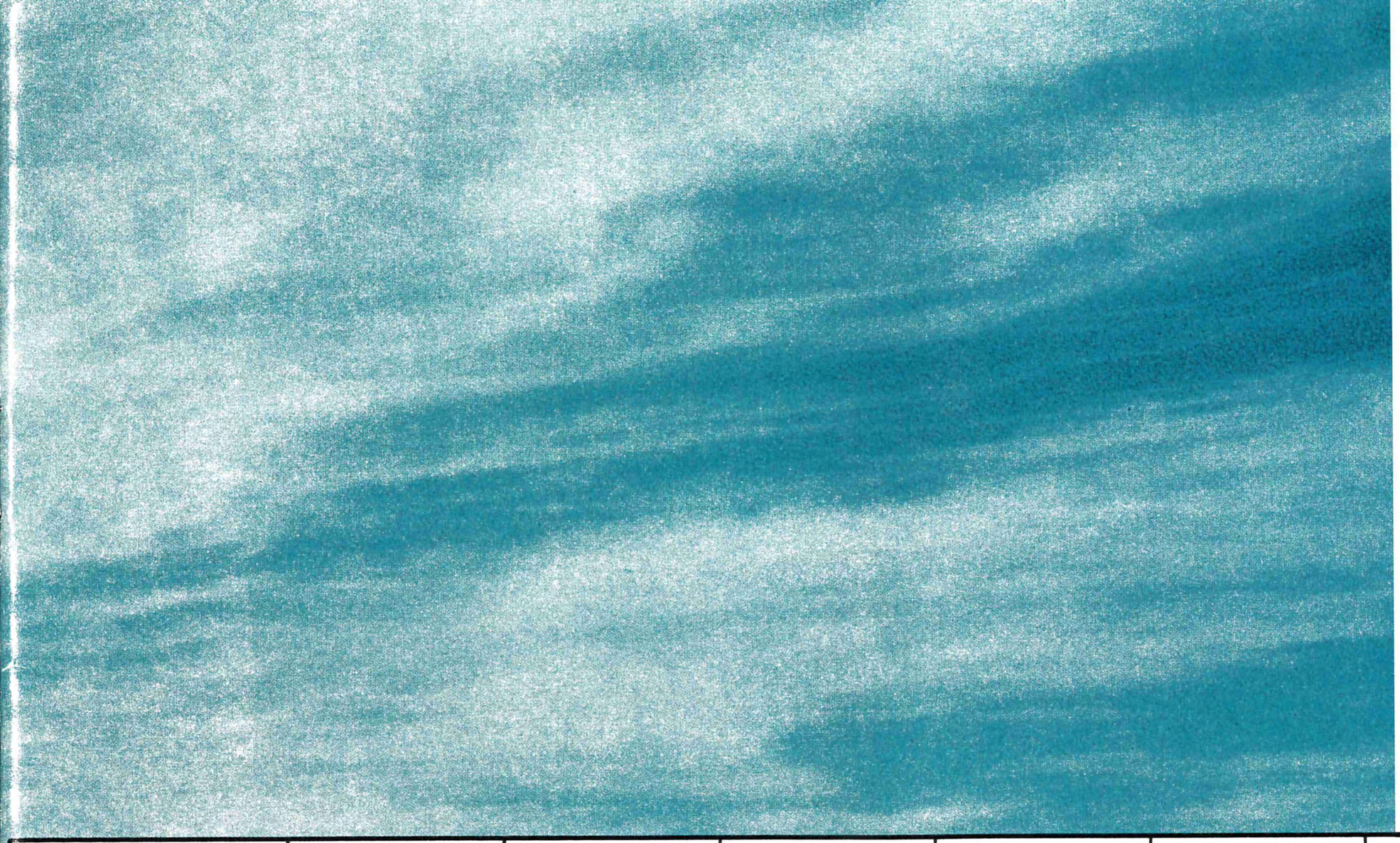
Power Plant

Increased MTOGW (Maximum Takeoff Gross Weights)

Structures/ Aerodynamics

Flight Deck

Interiors



JT8D-209

JT8D-217

JT8D-217A

JT8D-219

JT8D-217C

FOREIGN OBJECT DEFLECTOR

POWER PLANT PERFORMANCE IMPROVEMENTS

NEW APU

MD-82

MD-83

AUXILIARY FUEL TANKS

WEIGHT-REDUCTION PROGRAM (1982-86)

MD-87

MD-88

MD-80 WEIGHT REDUCTION PROGRAMS

CARBON/EPOXY SPOILERS

KEVLAR WING FILLET

KEVLAR/EPOXY INBOARD WING TRAILING EDGE

CARBON/EPOXY AILERONS AND TABS

CARBON/EPOXY RUDDER AND TAB

ADVANCE MD-80 TAIL CONE

WING ICE PREVENTION

MD-80 USAGE OF ADVANCE COMPOSITES

INITIAL CRUISE ALTITUDE IMPROVEMENT

-901 DFGC

FMS

84 ARINC 712

83 OMEGE ANV AHRS

-930 DFGC

-960 DFGC

FMS

IRS

EFIS

AHRS

ARINC 700

OVERHEAD ANNUNCIA-TOR PANEL

SOLID-STATE INSTRUMENT PANEL

DUAL FMS

DUAL IRS

MODE-S

WINDSHEAR WARNING SYSTEM

971-DFGC

EROPS

TCAS

DFGC

INITIAL CRUISE ALTITUDE

REDESIGNED STOWAGE RACKS

REDUCED FLAMMABILITY

AUDIO ENTERTAINMENT SYSTEM

MODULAR LAVATORY

PASSENGER COMFORT ENHANCEMENTS

CABIN ATTENDANT'S PANEL

REDUCED FLAMMABILITY

WIDE CENTER AISLE

LAVATORY SMOKE DETECTOR

REDUCED FLAMMABILITY

VIDEO ENTERTAINMENT SYSTEM

NEW INTERIOR CONCEPTS

1980 1985 1986 1987 1988 1989 1990 1991 1996

UNCOMPROMISING SAFETY

TRAFFIC COLLISION AVOIDANCE SYSTEM (TCAS)

- Self-Contained Supplement to Ground-Based Air Traffic Control (ATC)
- Tracks Aircraft up to 40.0 Nautical Miles
- Evaluates Collision Potential
- Displays and Announces Advisories
- Recommends Evasive Action
- Warning of Collision Potential Occurs at Least 20 to 30 Seconds Before Convergence
- Conducts Safe Separation from Intruder

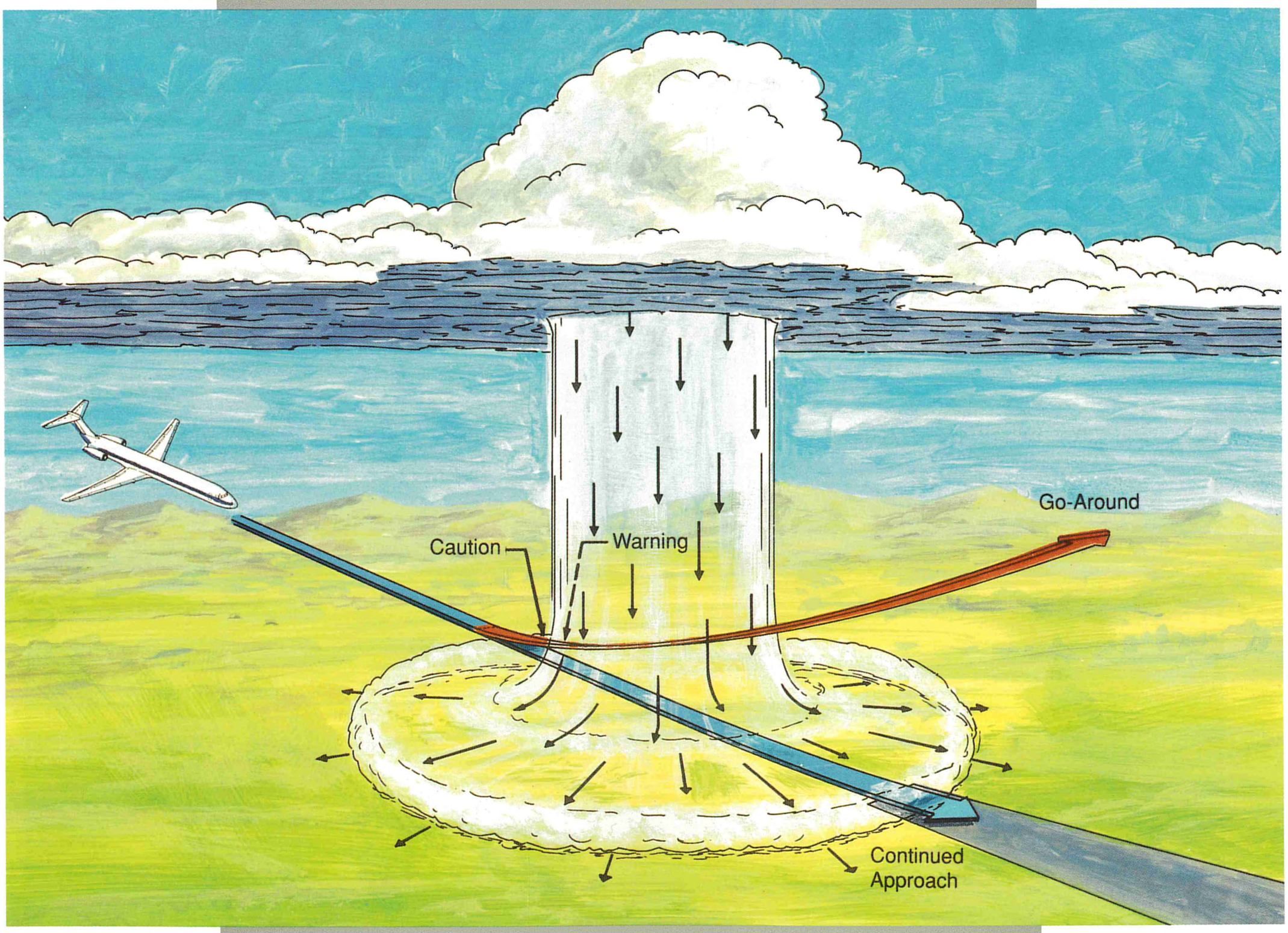
MODE-S TRANSPONDER

- Specifically designed for Use in Commercial Aircraft Transportation
- Provides Air-to-Air Data Exchange between TCAS-Equipped Aircraft for Coordinated Resolution of Encounters
- Assists with Tracking and Communications with Ground-Based Mode-S Sensors
- Transmits and Receives on Either the Top or Bottom Antenna to Optimize Signal Strength and Reduce Multipath Interference

APPROACH CASE

WINDSHEAR DETECTION SYSTEM

- Provides Caution and Warning Annunciations During Takeoff Roll, Takeoff, Approach, and Go-Around
- Aural Warning and Caution of Windshear
- Visual Warning and Caution on EFIS
- Maximum Power Setting in Windshear Takeoff and Go-Around Modes
- Autopilot Coupled and Flight Director Guidance for Increasing and Decreasing Windshear
- Automatic Reversion to Normal Guidance
- Shaker Margin Indication on EFIS
- Self-Test and Built-In Test Features
- Speed Floor Protection on Approach during Windshear Detection



INCREASING YOUR OPERATIONAL ECONOMY

EXTENDED TWIN-JET OPERATIONS (ETOPS)

- Extends MD-80 Operation from 60 Minutes to 120/180 Minutes
- Utilizes Twin-Jet Operation in Place of a Tri-Jet
- Gives MD-80 Improved Performance
- Retains High Dispatch Reliability with Minimal MEL Changes
- Can Be Incorporated with Minor Configuration Changes
- Starting 1991 ETOPS Will be Standard on All MD-80s

PLAN MODE

MAP MODE

SINGLE OR DUAL FLIGHT MANAGEMENT SYSTEM (FMS)

- Horizontal and Vertical Navigation for Improved Economics
- Standard Instrument Departures (SID)
- Standard Terminal Arrival Routes (STAR)
- Prestored Flight Plans Advantages

DUAL INERTIAL REFERENCE SYSTEM (IRS)

- Triple IRS System Also Available
- 2-Nautical Mile Per Hour Position Accuracy
- Certifiable for Sole-Source Navigation with Dual FMS

BUSINESS SOLUTIONS

FOR ANY OPERATIONAL NEED...

MODEL		MD-81 BASELINE
Engines		JT8D-217C
Passenger Capacity		155
Maximum Takeoff Weight	(LB)	140,000
	(kg)	63,504
Maximum Landing Weight	(LB)	128,000
	(kg)	58,061
Maximum Zero Fuel Weight	(LB)	118,000
	(kg)	53,525
Operational Weight Empty (Typical)	(LB)	78,440
	(kg)	35,580
Fuel Capacity	(LB)*	39,128
	(kg)	17,748
Cargo Volume	(FT^3)	1,253
	(m^3)	35.48
Range with Full Load of Passengers and Baggage**		
· Domestic Reserves	(N MI)	1,630
	(km)	3,019
· International Reserves	(N MI)	1,624
	(km)	3,008

MD-82	MD-83	MD-87 BASELINE	MD-87 TYPICAL OPTIONS
JT8D-217C	JT8D-219	JT8D-217C	JT8D-219
155	155	130	130
149,500 67,813	160,000 72,576	140,000 63,504	149,500 67,813
130,000 58,968	139,500 63,277	128,000 58,061	130,000 58,968
122,000 55,339	122,000 55,339	112,000 50,803	112,000 50,803
78,528 35,620	78,720 80,238 35,707 36,396	74,139 33,629	74,227 75,745 33,669 34,358
39,128 17,748	39,128 46,699 17,748 21,183	39,128 17,748	39,128 46,699 17,748 21,183
1,253 35.48	1,253 1,013 35.48 28.68	938 26.56	938 697 26.56 19.68
2,176 4,030	2,168 2,618 4,015 4,849	2,405 4,454	2,400 2,874 4,445 5,323
2,132 3,948	2,126 2,543 3,937 4,710	2,330 4,315	2,325 2,767 4,306 5,124

*Standard Fuel is 39,128 LB. Standard Plus 1,130 U.S. GAL is 46,699 LB
**200 LB Per Passenger and Baggage, Based on Mid Center of Gravity

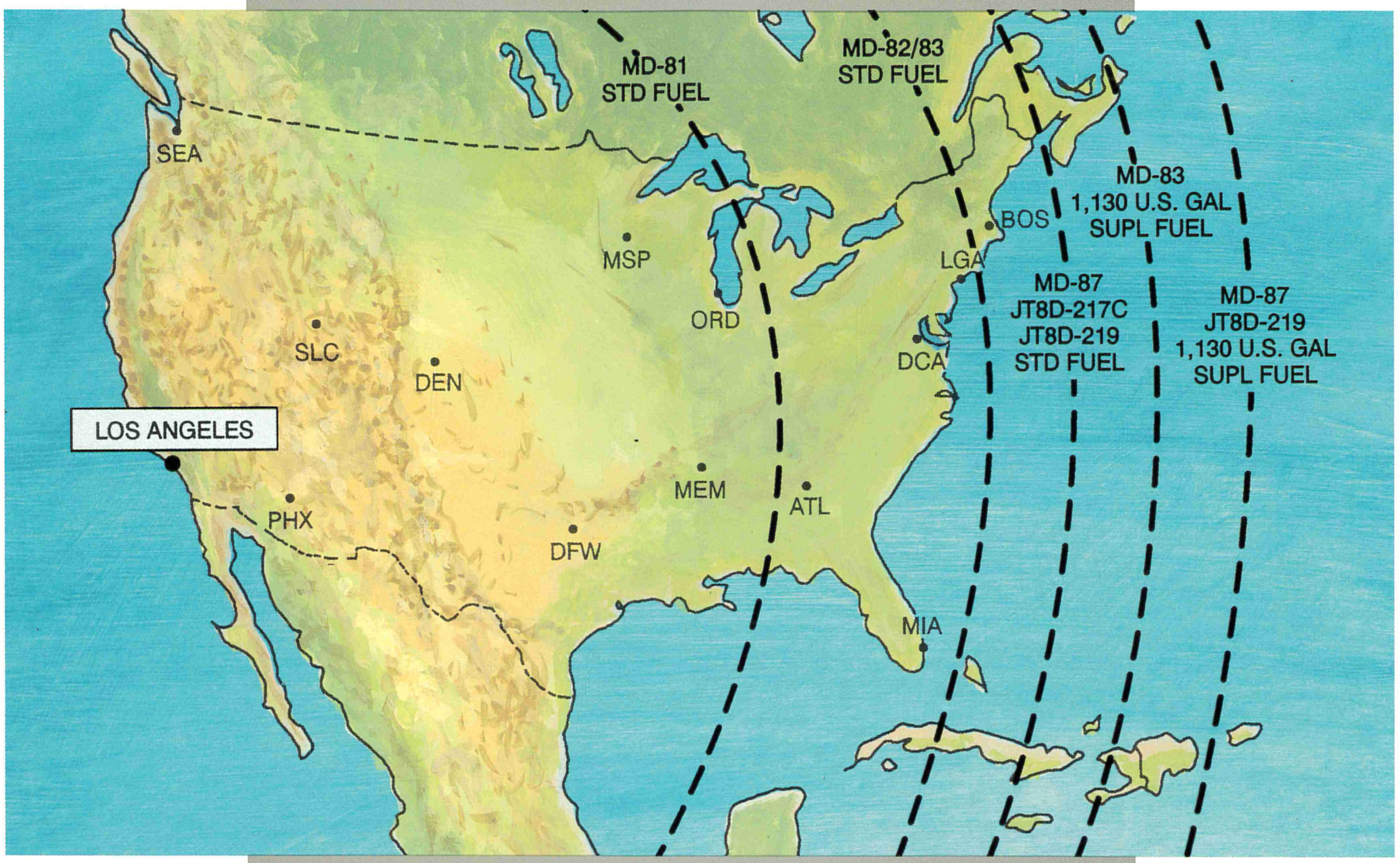
*Standard Fuel is 17,748 kg, Standard Plus 1,130 U.S. GAL is 21,183 kg
**90.7 kg Per Passenger and Baggage, Based on Mid Center of Gravity

***NOTE: The MD-88 Configuration Can Be Any of the Operational Weights of the MD-81, -82 or -83.**

Characteristics are based on DS 8000E

FOR ANY RANGE REQUIREMENT

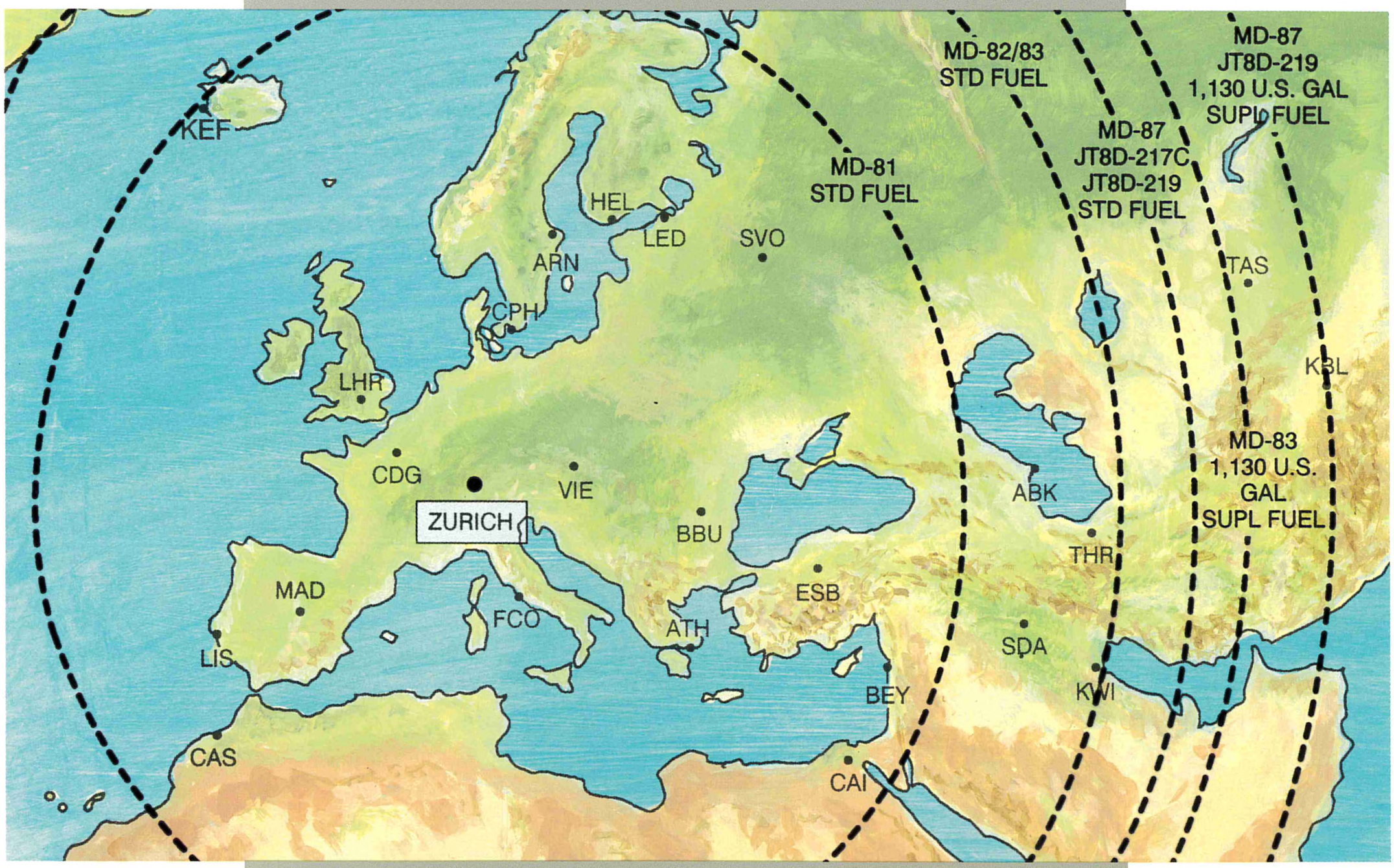
RANGE PERFORMANCE FROM LOS ANGELES
JT8D-217C/-219 Engines



MD-80
· 155 PSGR and Baggage
· Domestic Reserves
· Great Circle Distance
· 85% Annual En Route Winds

MD-87
· 130 PSGR and Baggage
· International Reserves
· Great Circle Distance
· 85% Annual En Route Winds
Based on Mid Center of Gravity

RANGE PERFORMANCE FROM ZURICH
JT8D-217C/-219 Engines



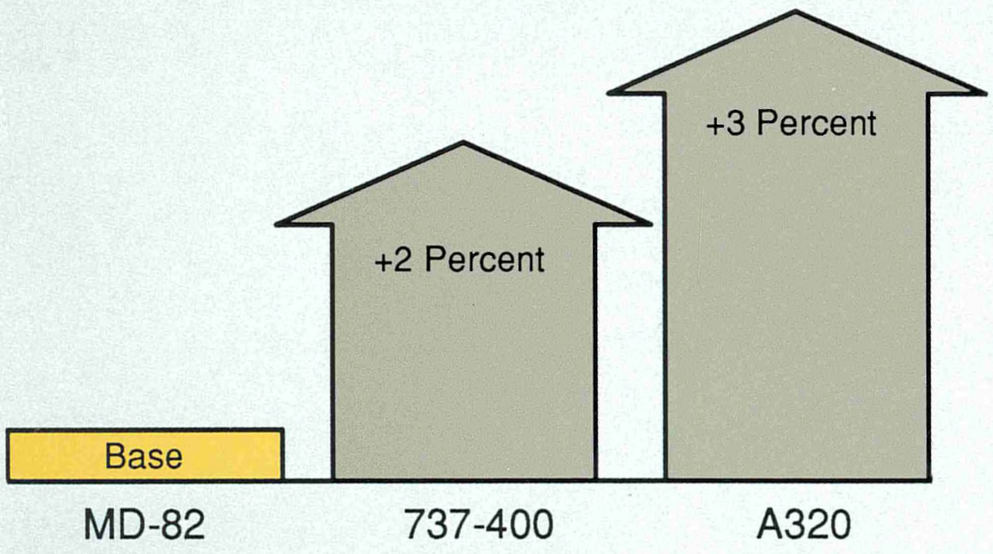
MD-80
- 155 PSGR and Baggage
- International Reserves
- Great Circle Distance
- 85% Annual En Route Winds

MD-87
- 130 PSGR and Baggage
- Domestic Reserves
- Great Circle Distance
- 85% Annual En Route Winds

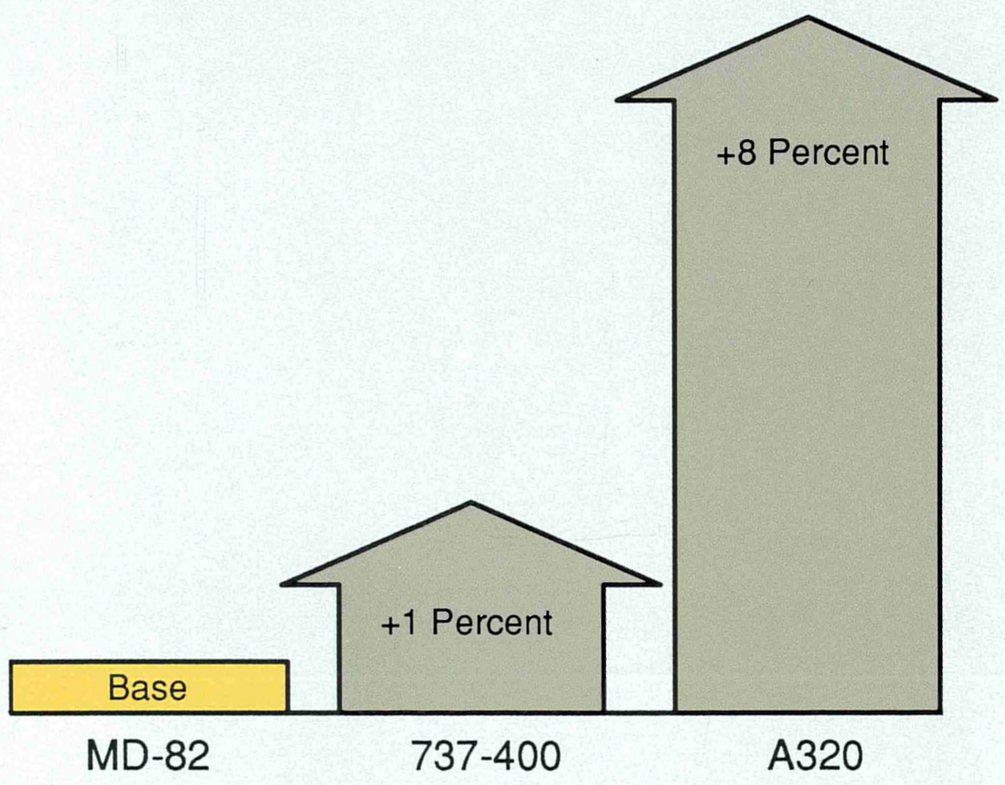
  Based on Mid Center of Gravity

COMPARE THE ECONOMICS

Direct Operating Cost Per Seat
(Percent Difference 500-N-Mi Trip)



Direct Operating Cost Per Trip
(Percent Difference 500-N-Mi Trip)



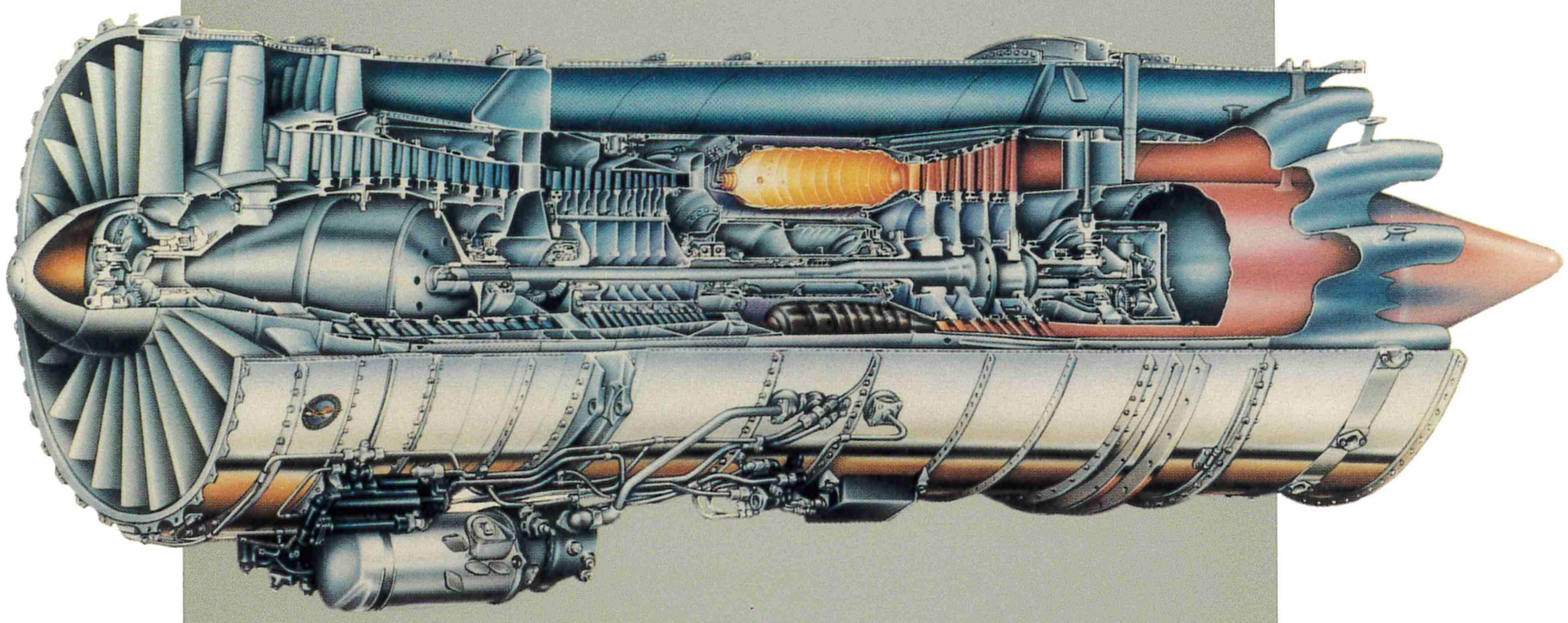
MCDONNELL DOUGLAS

THRUST TECHNOLOGY

PROVEN DESIGN PLUS IMPROVED TECHNOLOGY

JT8D-200 SERIES ENGINE
Designed for High-Frequency Operation

- Fan and Low-Pressure Compressor
- Improved High Turbine Cooling
- High-Efficiency, Low-Pressure Turbine
- New Advanced-Technology Exhaust Gas Mixer
- Low-Emissions Combustor and Fuel Nozzles



ENGINE CHARACTERISTICS

	JT8D-217C	JT8D-219
Takeoff – Sea Level Static		
· Normal T.O. Thrust (lb/°F)	20,000/84	21,000/84
· Max T.O. Thrust (lb/°F)	20,850/84	21,700/84
Bypass Ratio	1.73	1.70
Max Cruise – M_n = 0.8; 30,000 FT (9,144 m) · Thrust (lb)	6,300	6,300
Engine Weight	4,535/1,527	4,535/1,527
Inlet Flow Path Dia. (in/cm)	49.2/125.0	49.2/125.0

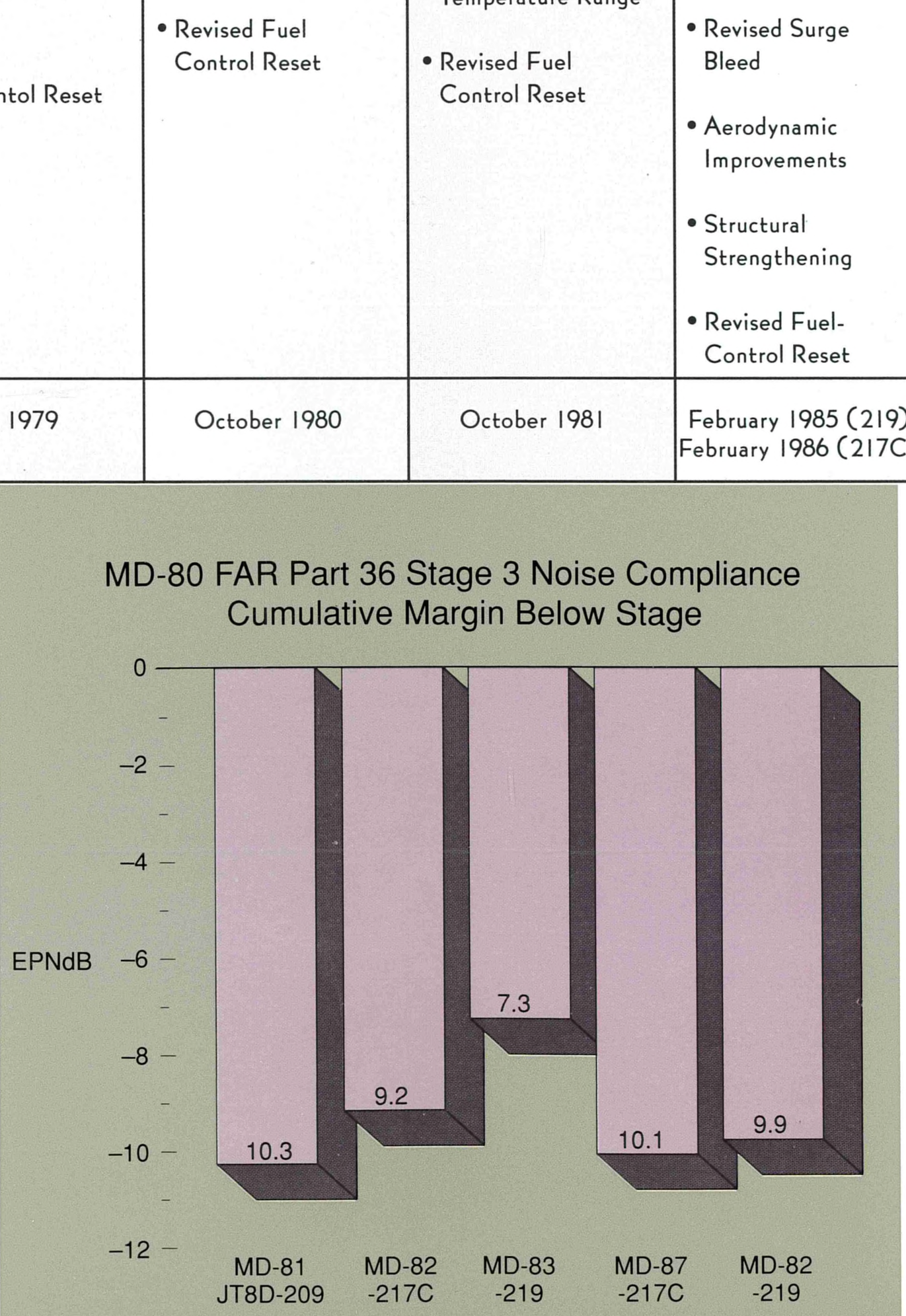
THE QUIET NEIGHBOR

IMPROVING TRADITION

JT8D-200 TAILORED TO MD-80 FAMILY REQUIREMENTS

	JT8D-209 (JT8D-9A Base)	JT8D-217	JT8D-217A	JT8D-219/217C	JT8D-XXX
	• New Low Spool • Low-Emissions Burner • Acoustic Fan Duct • Mixer • Fuel-Contol Reset	• Increased Takeoff Thrust • Improved -17 High-Pressure Turbine (Cooled) • Revised Fuel Control Reset	• Improved Altitude and Hot-Day Takeoff Thrust • Improved Normal Takeoff Thrust Temperature Range • Revised Fuel Control Reset	• Increased Normal and Max Takeoff Thrust • -17 High-Pressure Turbine (Cooled) • Revised Surge Bleed • Aerodynamic Improvements • Structural Strengthening • Revised Fuel-Control Reset	• Lower Fuel Emissions and Fuel Burn • New Fan • Lower Core Flow Velocity • More Efficient Combustion • Improved Mixing
Certified (Engine)	June 1979	October 1980	October 1981	February 1985 (219) February 1986 (217C)	June 1993

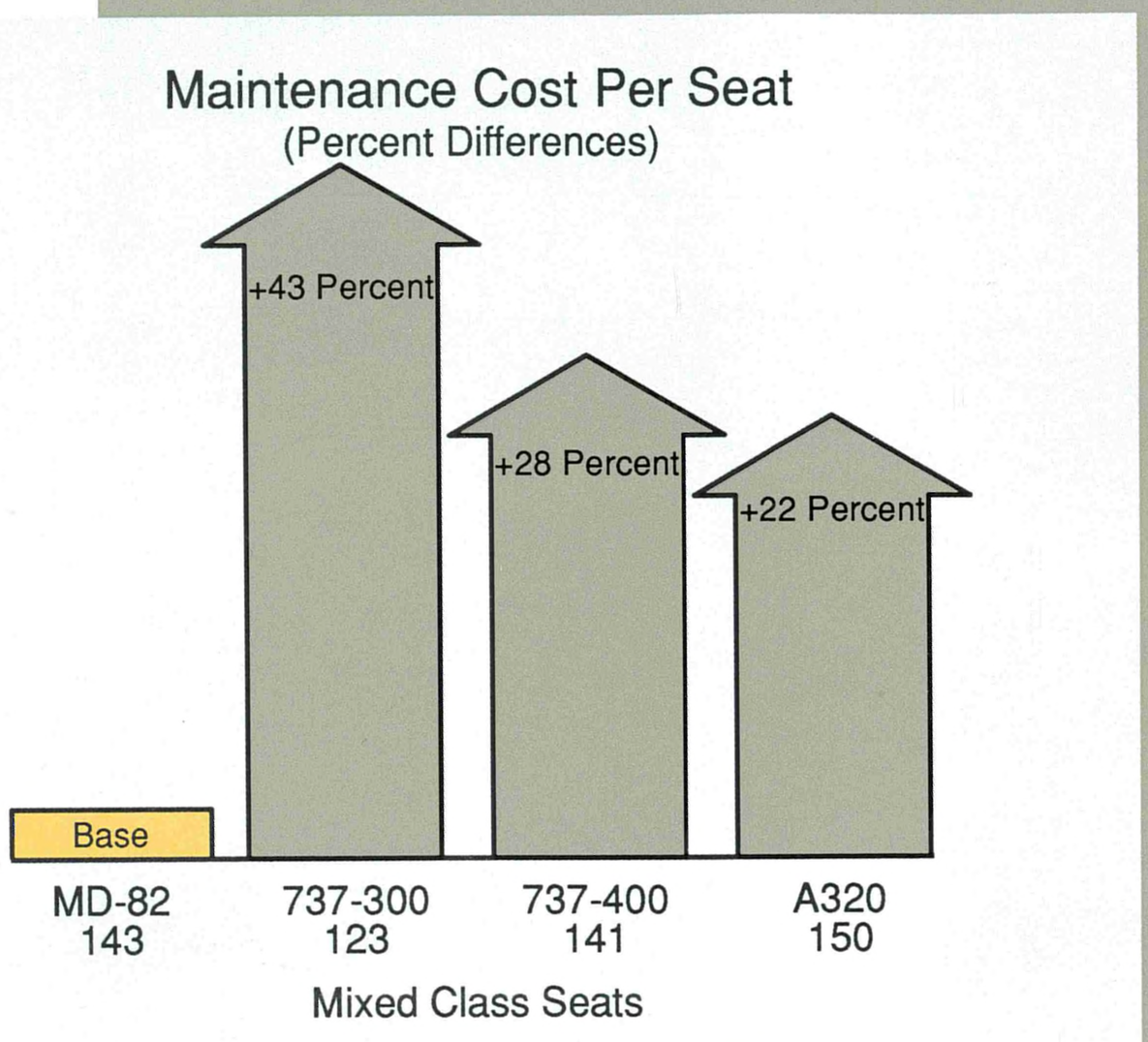
MD-80 FAR Part 36 Stage 3 Noise Compliance
Cumulative Margin Below Stage

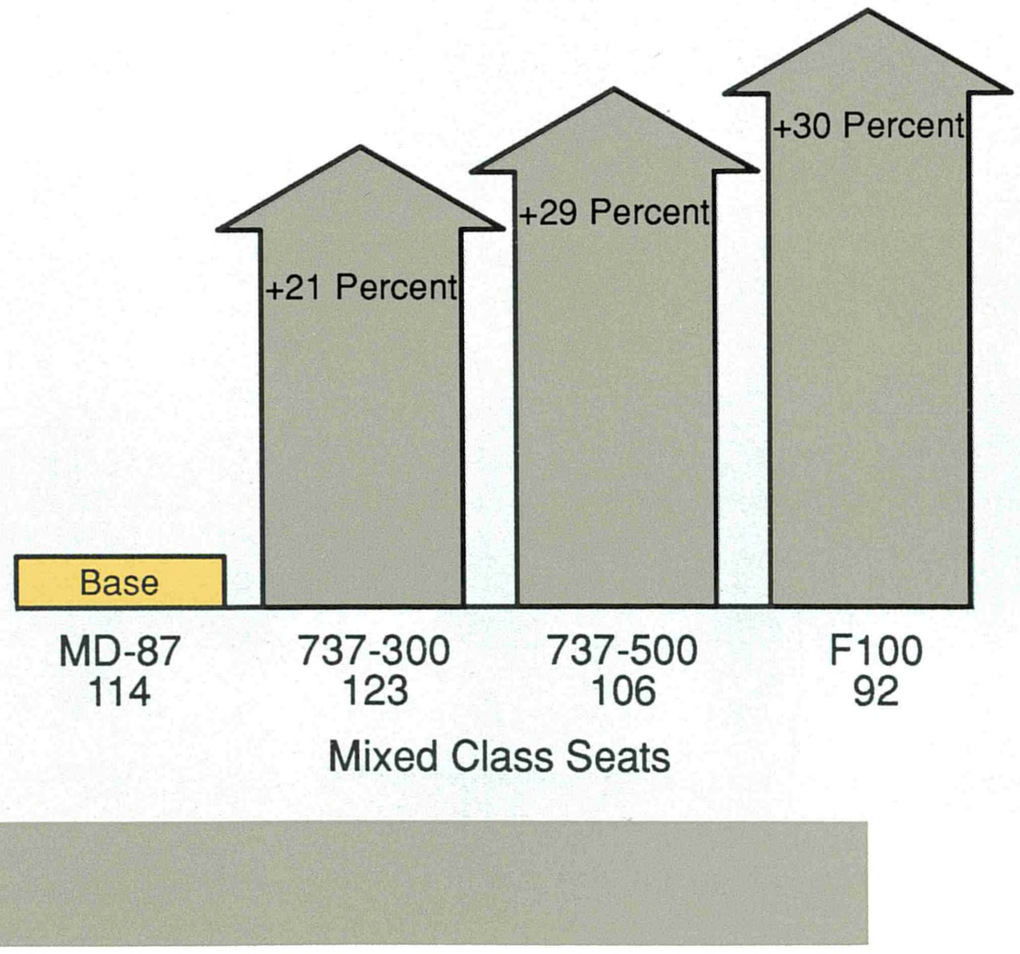


THE ON-TIME AIRPLANE FOR ON-TIME AIRLINES

CONTINUOUS HIGH RELIABILITY

LOWEST IN MAINTENANCE COST





THE TOUGHEST AIRFRAME IN THE INDUSTRY

One of the MD-80's strengths is its superior airframe design concept that McDonnell Douglas is continuously improving upon, which began with the rugged DC-9 family of twin-jets. There isn't a longer life airframe in jet transport service today. The aircraft's structural analysis and structural design standards are considered to be superior to its competition. In addition, McDonnell Douglas has put a major focus on corrosion prevention. Year by year, McDonnell Douglas has found better ways to upgrade corrosion protection. This inhibits the aging process. The MD-80's airframe is an aerospace leader when it comes to longevity, maintainability, reliability and passenger comfort.

TAKE CONTROL

TECHNOLOGY YOU CAN COUNT ON

FLIGHT COMPARTMENT PANELS
(Standard on MD-88. Available as an Option on All MD-80 Models)

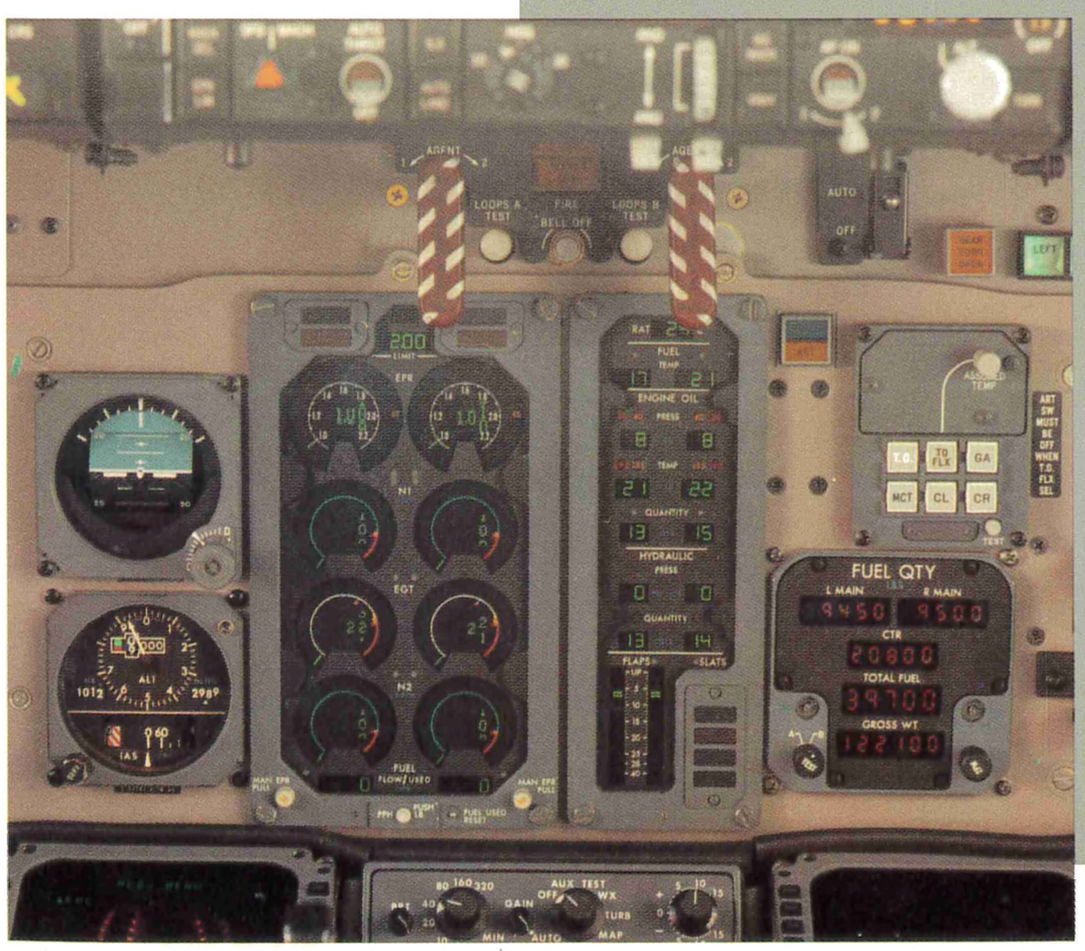
STANDARD ON MD-88

- Electronic Flight Instrument System (EFIS)
- Flight Management System (FMS)
  - Digital DME
  - Digital Clock
- IRS (Internal Reference System) or
- AHRS (Attitude and Heading Reference System)
- Solid-State Instruments
  - Electronic Engine Display Panel (EEDP)
  - Electronic System Display Panel (ESDP)
  - Thrust Rating Panel (TRP)
- Electronic Overhead Annunciator Panel (EOAP)

Any of These Features Is Available Individually on Aircraft Models MD-81, MD-82, MD-83 and MD-87

Captain's Instrument Panel

Overhead Annunciator Panel



Center Instrument Panel

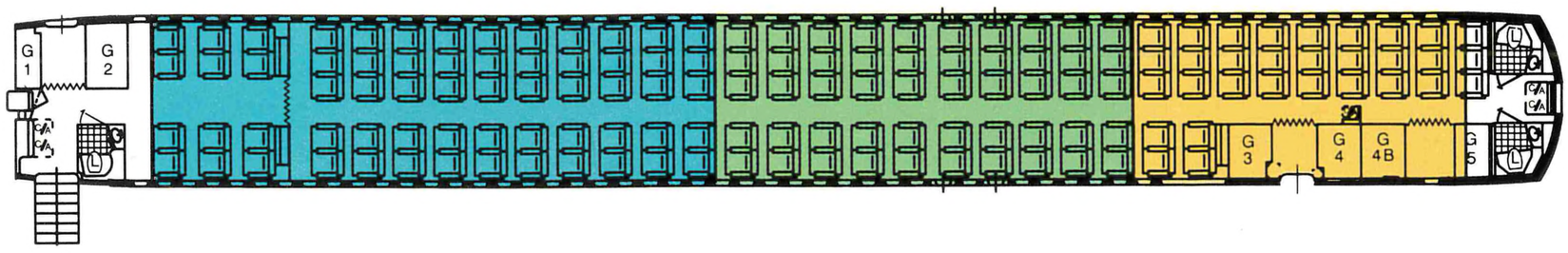
PROVIDING THE FINEST IN COMFORT

EXIT
EXIT
MD-80 THEATRE
MD-80 THEATRE
MD-80 THEATRE

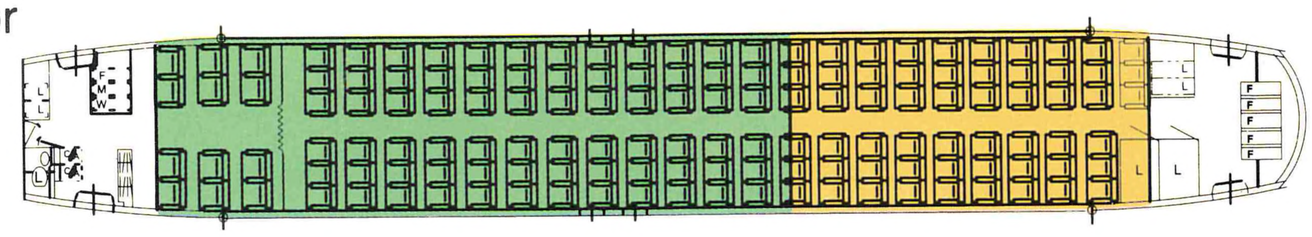
EXPERIENCE THE QUIET CLASS

- A Pleasing Passenger Environment
- Passengers Enjoy a Quieter Ride

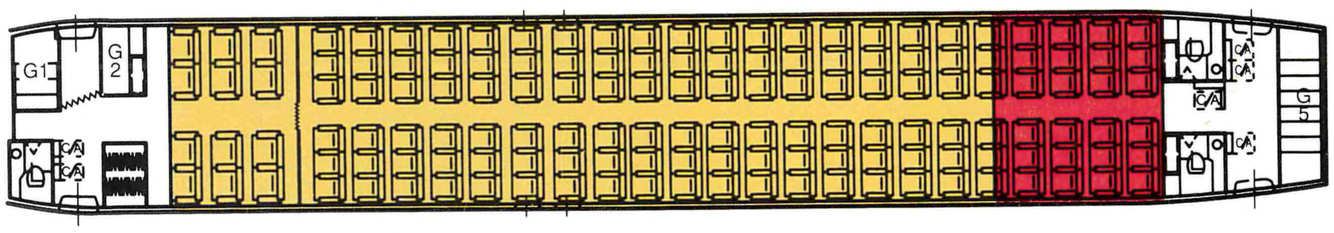
MD-80 Interior



737-400 Interior



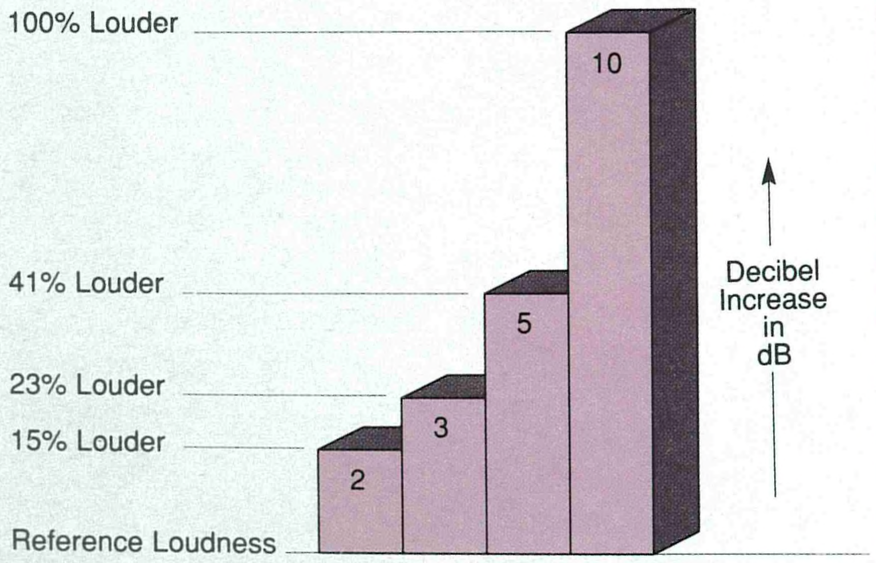
A320 Interior



dB Level

- 80-82
- 82-85
- 85-90
- 90+

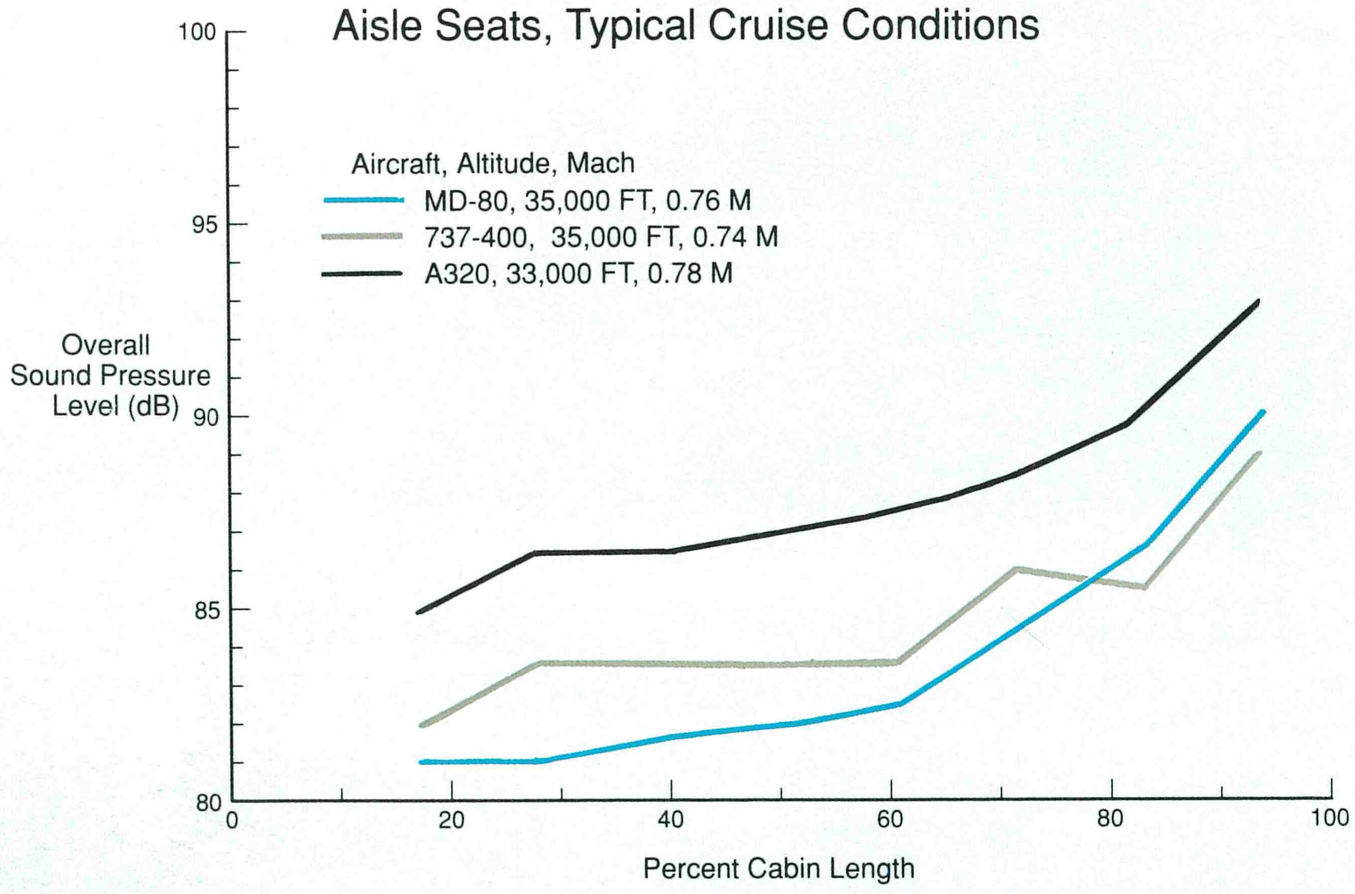
What a Change in dB Levels Really Means



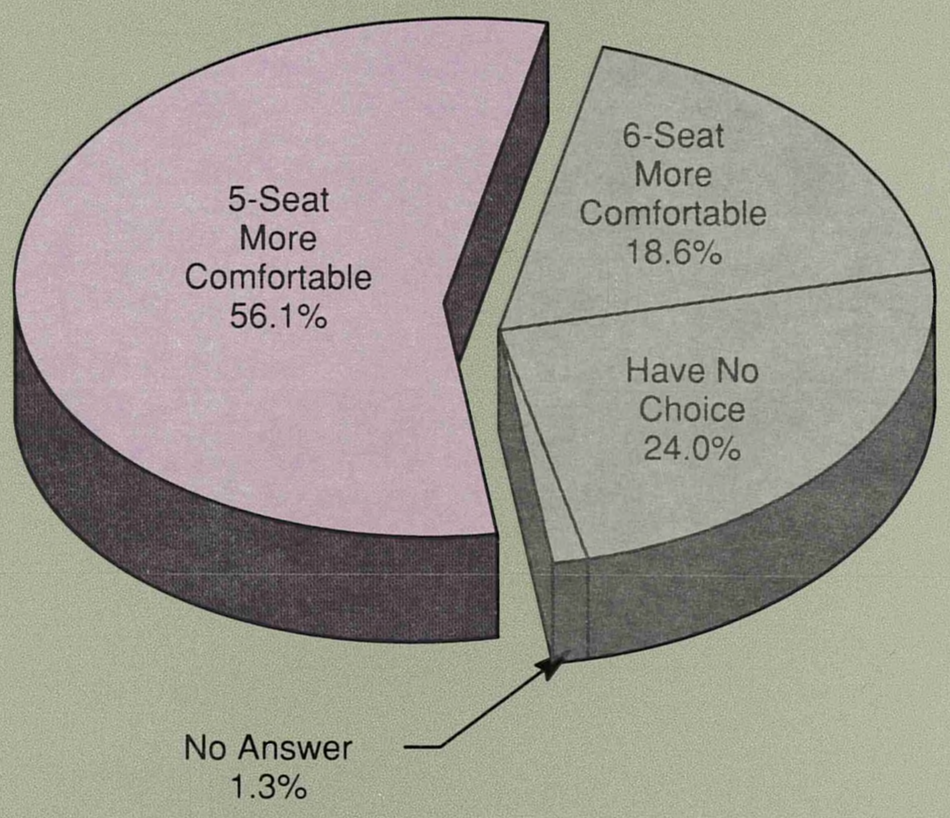
10-dB Noise Increase is TWICE as Loud

Cabin Noise Levels

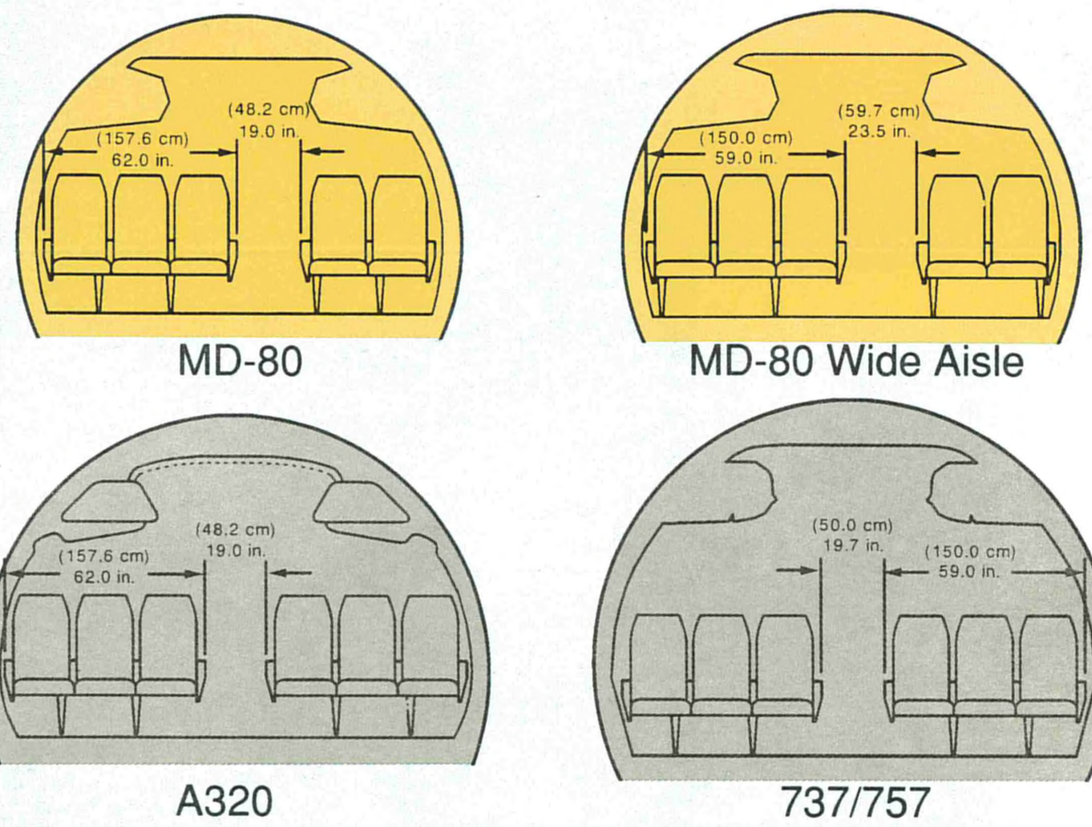
Aisle Seats, Typical Cruise Conditions



THE CUSTOMER'S CHOICE



The Ultimate in Passenger Comfort



FOCUSING ON DETAIL

BAGGAGE RACKS

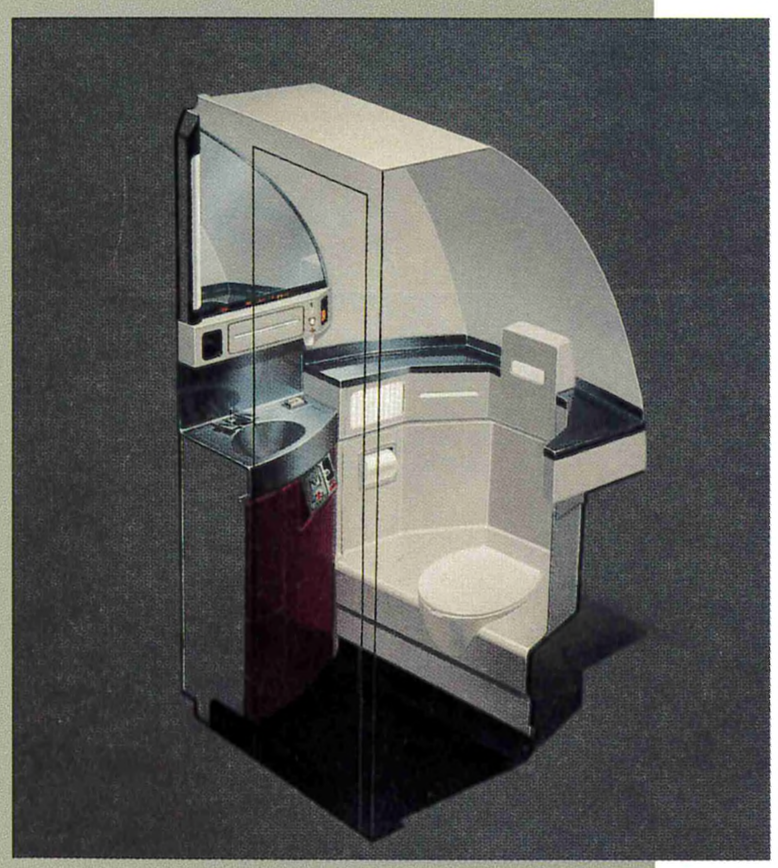
- Lightweight Kevlar, 55 in. (139.7 cm) Long and 7.4 ft^3 (0.21 m^3) per Section
- 105 lb (47.6 kg) Allowable Weight per Section
- 1.7 ft^3 (0.048 m^3) per Passenger (Standard 155-Passenger Configuration)
- Suit Bag Can Be Laid Flat in Compartment

PASSENGER SERVICE UNIT

- Contemporary Styling
- Adjustable Reading Light
- Passenger Address Speakers
- Ordinance Signs
- Attendant Call Buttons
- Chemical Oxygen

BACK LIT HANDRAILS (OPTIONAL)

WIDE-AISLE SEATING



MODULAR LAVATORY

- Contemporary Styling
- Provisions for the Handicapped
- Quick Installation and Removal
- Weight Savings
- Improved Materials for Fire Safety

FIRST VIDEO ENTERTAINMENT SYSTEM IN ITS CLASS

CRAFTING DISTINCTION...

WE HAVE INTERIOR AND INDUSTRIAL DESIGN CAPABILITIES

Airline Image Concept

- Logo Design
- Interior Development
- Uniform Design
- Exterior Markings

New Interior Design

Current Flammability Requirements

Interior Product Design

THE CUSTOMER WILL REMEMBER

INTERIOR AND INDUSTRIAL DESIGN OFFERS

Custom Tapestry Designs for Forward and Aft Facing Interior Surfaces
Choice of Textile Suppliers (QPL)
Textiles Meet All Current Flammability Requirements
Tapestries Are Available in Various Weights and Materials

THE TURNAROUND SOLUTION

MAXIMIZING GROUND HANDLING EFFICIENCY

GROUND HANDLING CHARACTERISTICS

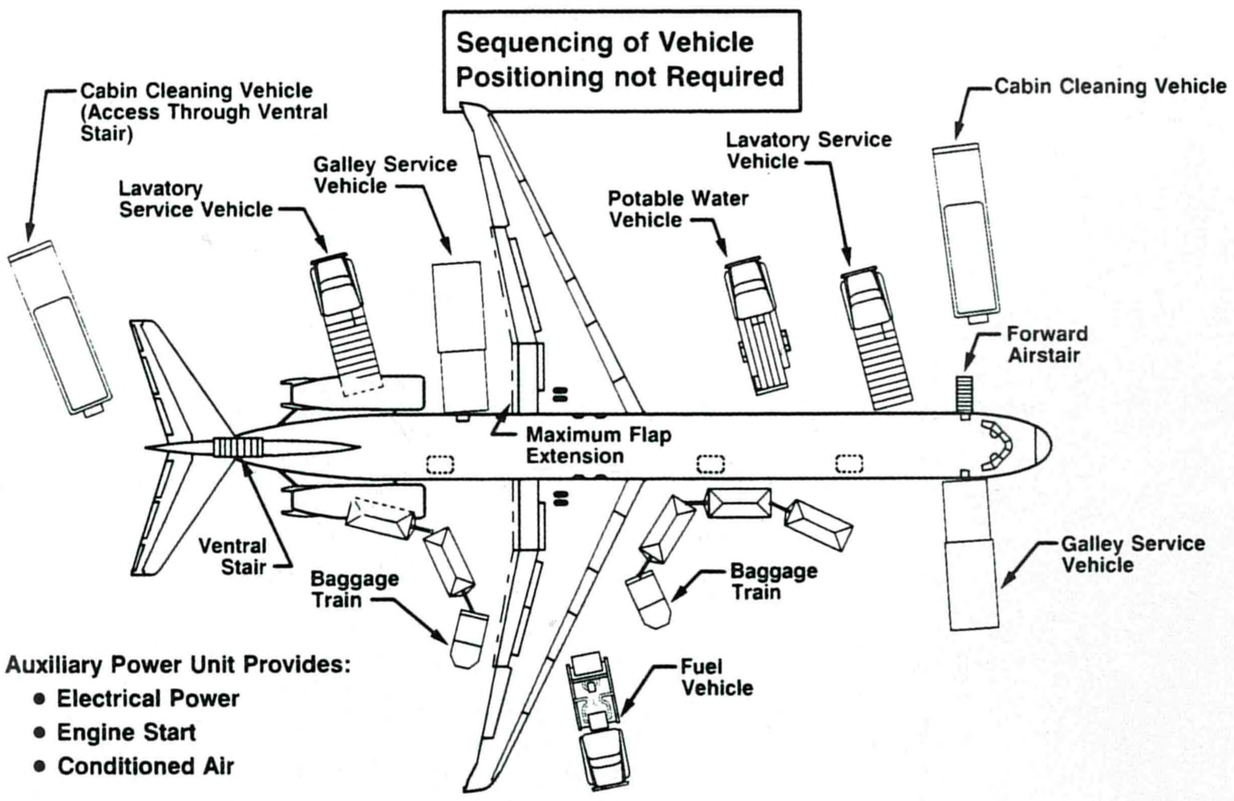
Self-Sufficient

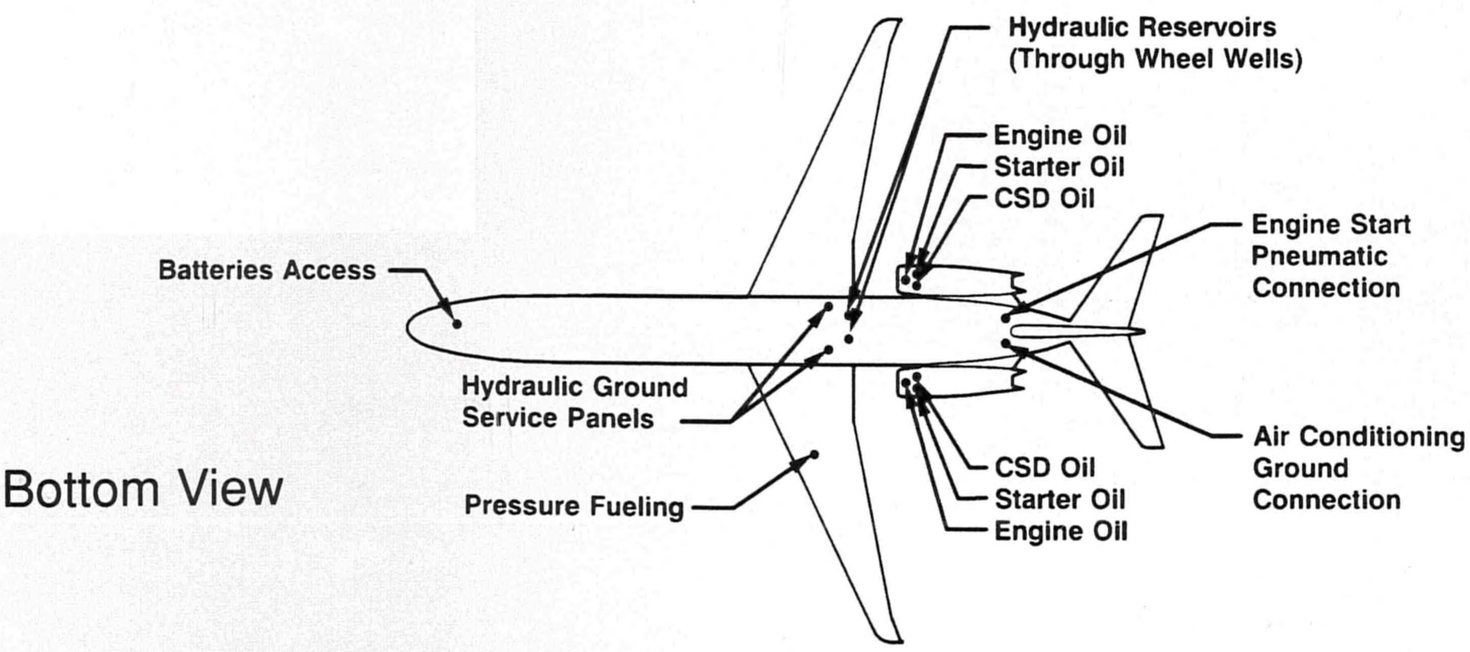
- APU for:
  - Engine Start
  - Electrical Power
  - Air Conditioning
- Forward Airstair
- Ventral Stair

Galley Service Doors at Forward Right Location and Aft Left Location

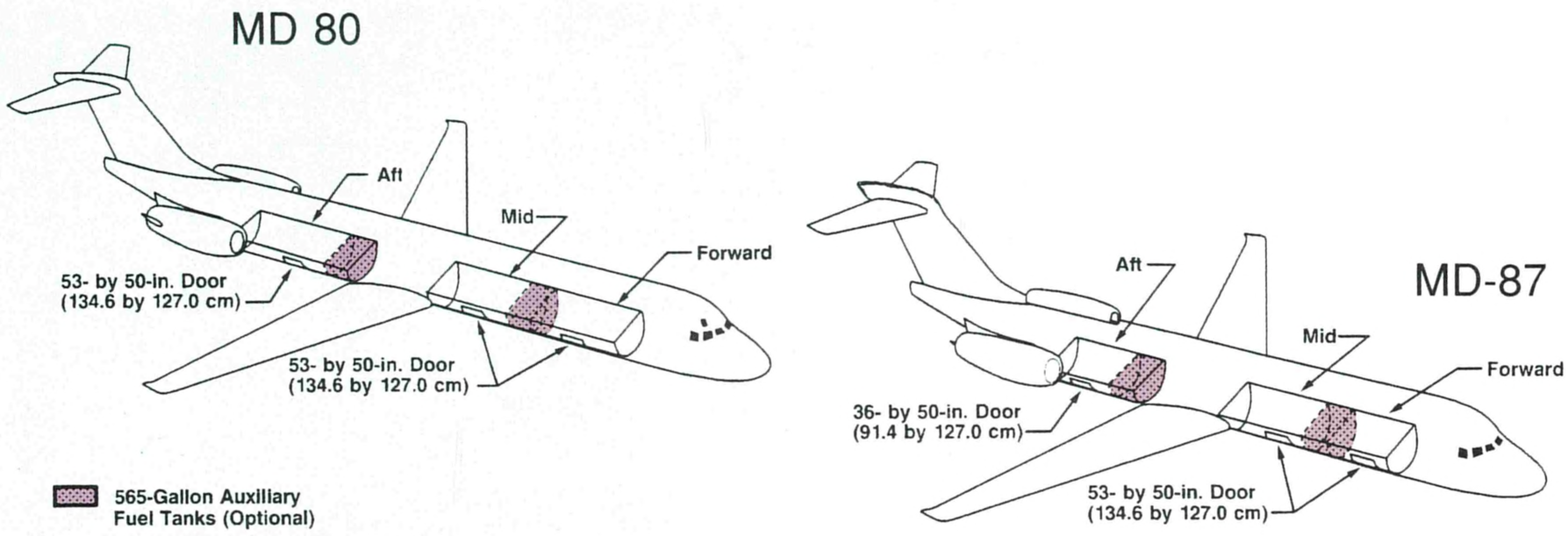
Convenient Maintenance and Service Point Locations

No Interference between Ground Handling Equipment and Engine Nacelle





PROVIDING MULTIPLE LOADING ACCESS



Compartment	Capacity		Capacity	
	ft^3	m^3	ft^3	m^3
Forward	464	13.14	252	7.14
Mid	346	9.80	376	10.65
Aft	443	12.54	310	8.78
Total	1,253	35.48	938	26.56

With Supplemental Fuel Option				
Compartment	Capacity		Capacity	
	ft^3	m^3	ft^3	m^3
Forward	434	12.29	252	7.14
Mid	253	7.16	253	7.17
Aft	326	9.23	190	5.40
Total	1,013	28.68	695	19.71

Note: Cargo Capacity Differences Due to the Addition of Two Optional 565-Gallon Auxiliary Fuel Tanks in the Cargo Bay

THE MD-80 SOLUTION

- UNCOMPROMISING SAFETY
- PROVEN DESIGN PLUS IMPROVED TECHNOLOGY
- THE TOUGHEST AIRFRAME IN THE INDUSTRY
- TECHNOLOGY YOU CAN COUNT ON
- PROVIDING THE FINEST IN COMFORT
- MAXIMIZING GROUND HANDLING EFFICIENCY

MD-80

THE MD-80 SOLUTION

The material presented in this document is provided to acquaint you with the general characteristics of our products; it is not an offer and does not constitute a commitment, a warranty, or a representation. PRINTED IN USA 1/91 B-19547

MCDONNELL DOUGLAS

3855 Lakewood Boulevard, Long Beach, CA 90846-0001