

Research and innovation in the field of transport

**Turboprop aircraft : a key player
for regional transport of today and
tomorrow**

Napoli, 12 Ottobre 2005

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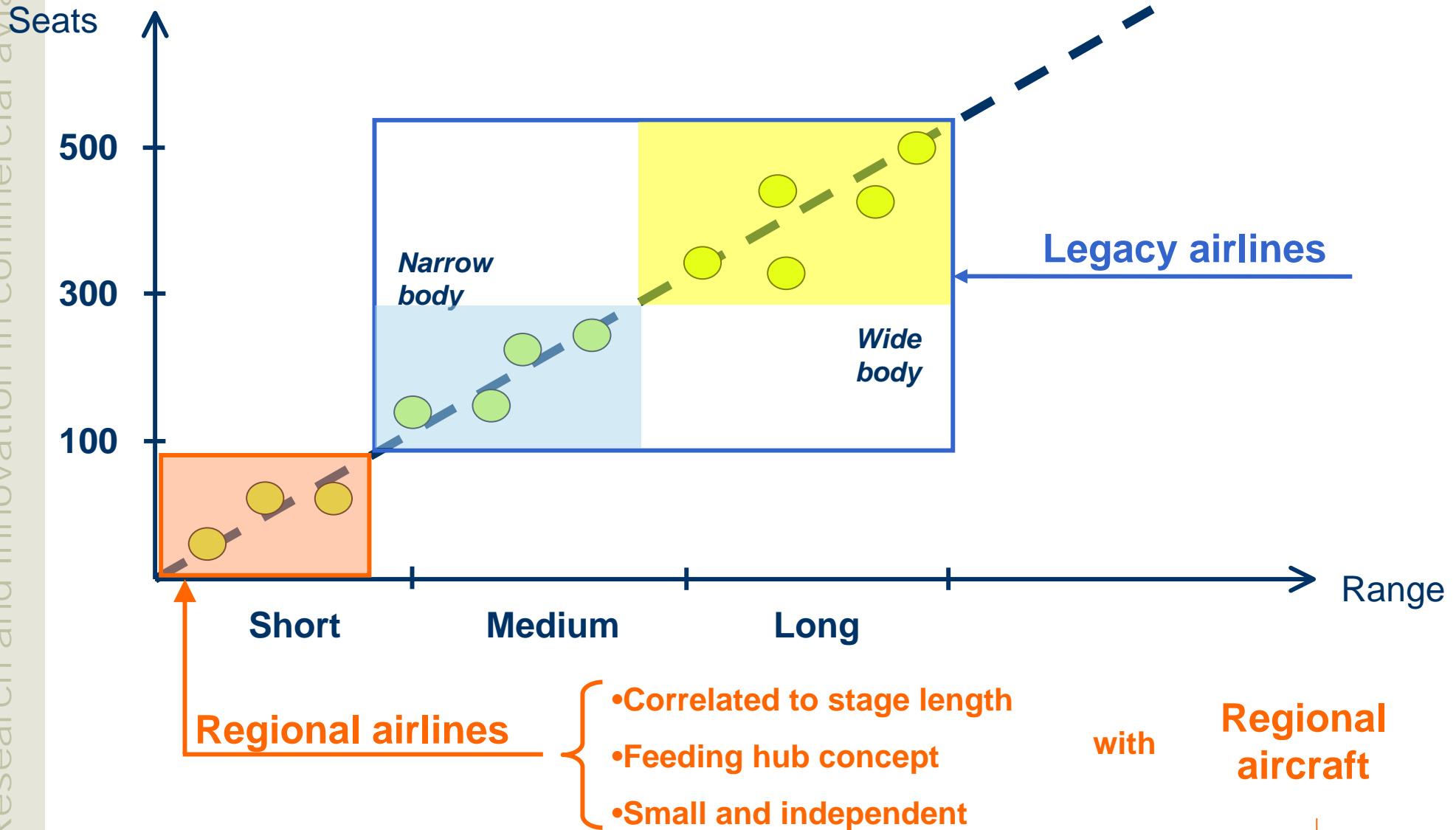
ATR : high tech design

ATR : technology for continuous improvement

The regional air transport : expanding market



What is the "regional" ?



The transport in Europe

Congestion of transports in Europe

7,500 km

Of the road network (10%) is affected by traffic jam every day

16,000 km

Of the rail network (20%) is classified 'bottleneck'

16

Of the major airports record delays of more than 15 minutes for the 30% of the flights.

350000

Flight hours wasted every year in Europe because delays or not optimized routing

A further development of the regional air transport can help to improve the mobility

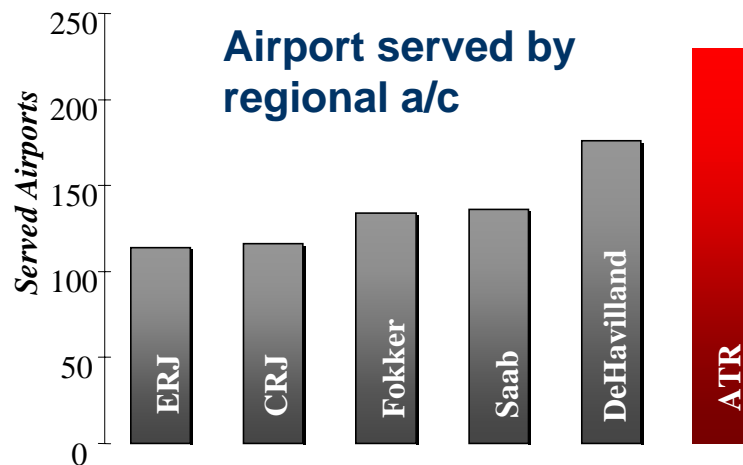
Source: White Paper - European Transport Policy for 2010: time to decide (E.C. 09/2001) - COM (2001) 370

The regional air transport in Europe : Traffic

Monthly departure (up to 90 seats a/c)

Turboprop : 120,606 departures

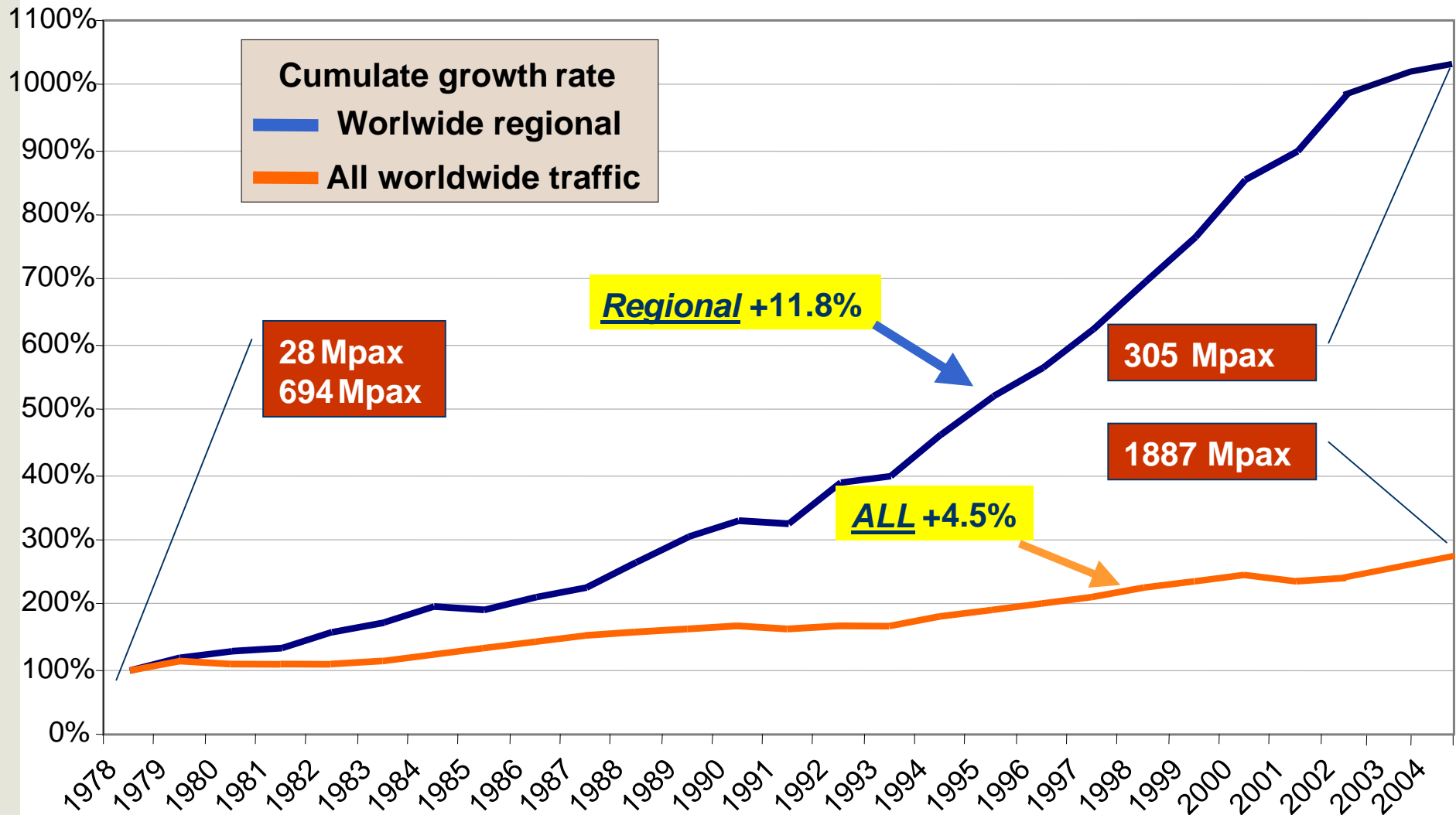
Regional Jet : 71,120 departures



Turboprop routes - year 2003



Regional: the fastest growing market





The regional aircraft : Turboprop and Regional Jet



Regional Market

Evolution of the requirements

Regional infancy

Turboprop Era

Jet-mania

Complementarity

1970-1980

- Small size
- High Frequencies
- Adequate Comfort

1980-1995

- Versatility
- Economics
- Maintainability
- ATR as a main contributor to regional transport boom

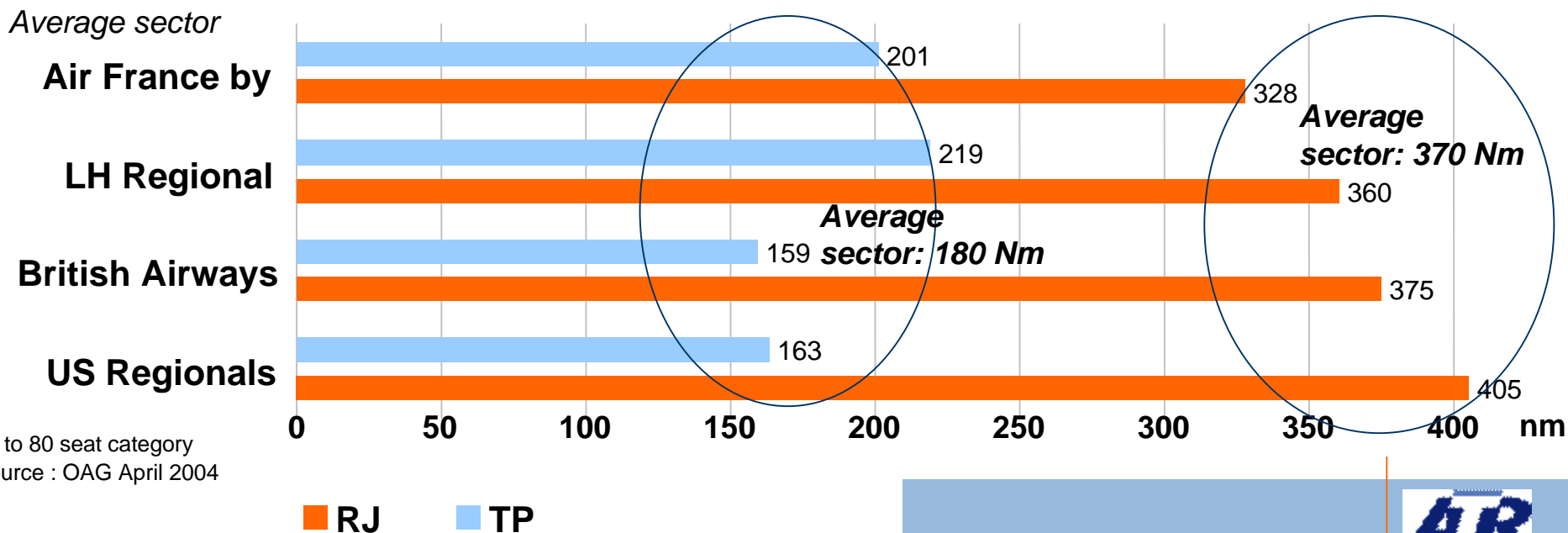
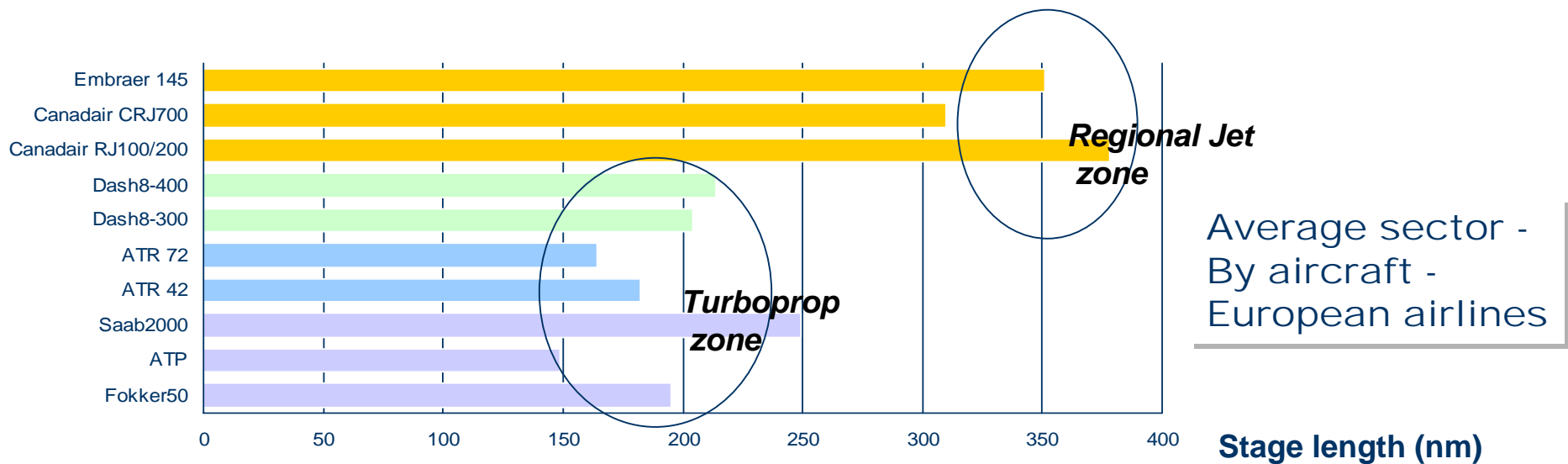
1995-2003

- Speed
- Longer routes
- Enhanced comfort
- Wealthy economy
- Low fuel price

And now on ...

- Returning to the fundamentals
- More and more pressure on costs
- High fuel price, low yields
- Emerging countries
- Environmental pressure

TP & RJ : complementary roles

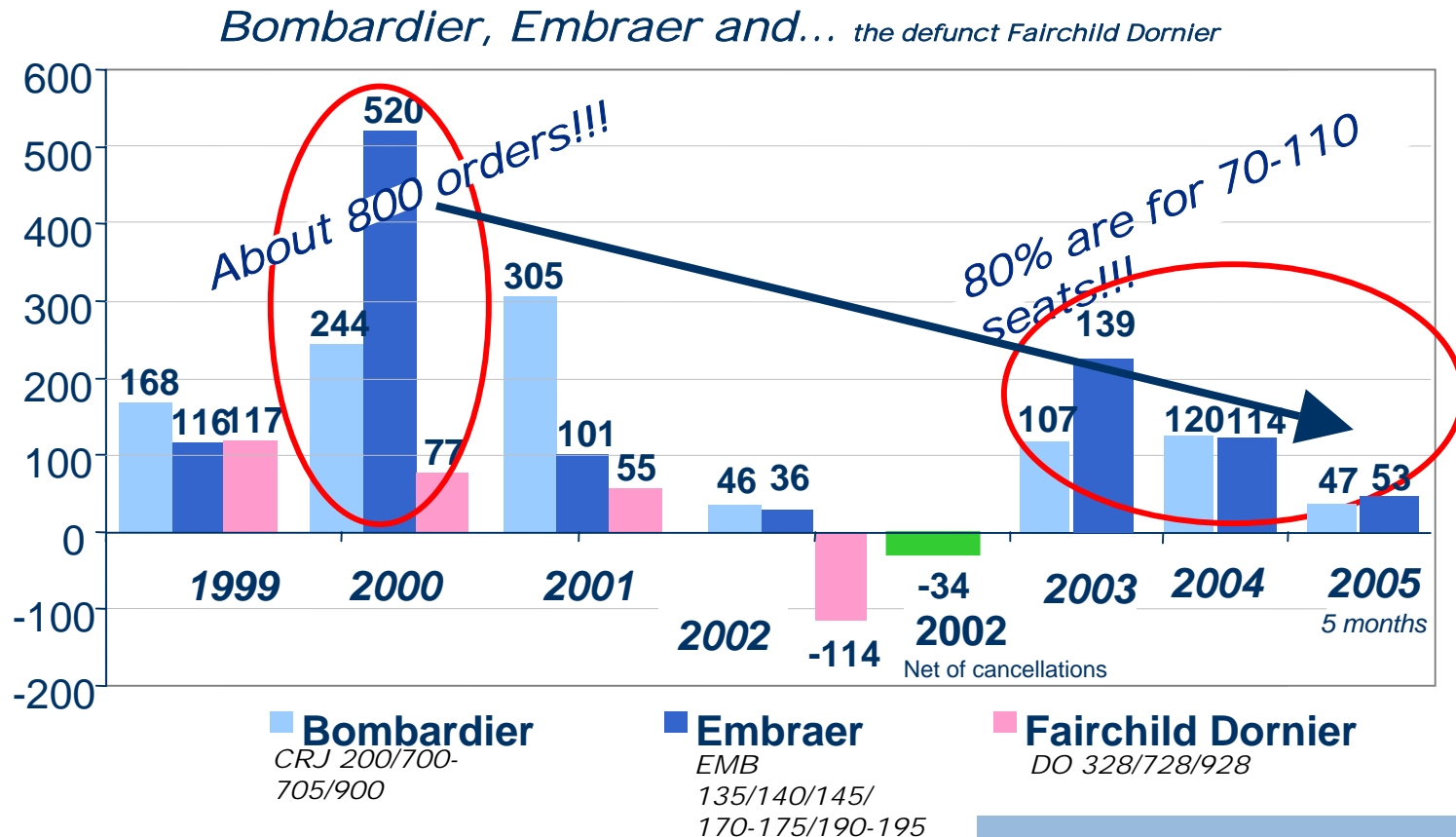


20 to 80 seat category
Source : OAG April 2004

Regional Jet Orders 1999-2005

Regional jet designed when fuel was at \$ 0.20 per US Gal
Today fuel price is \$ 2.00 per US Gal

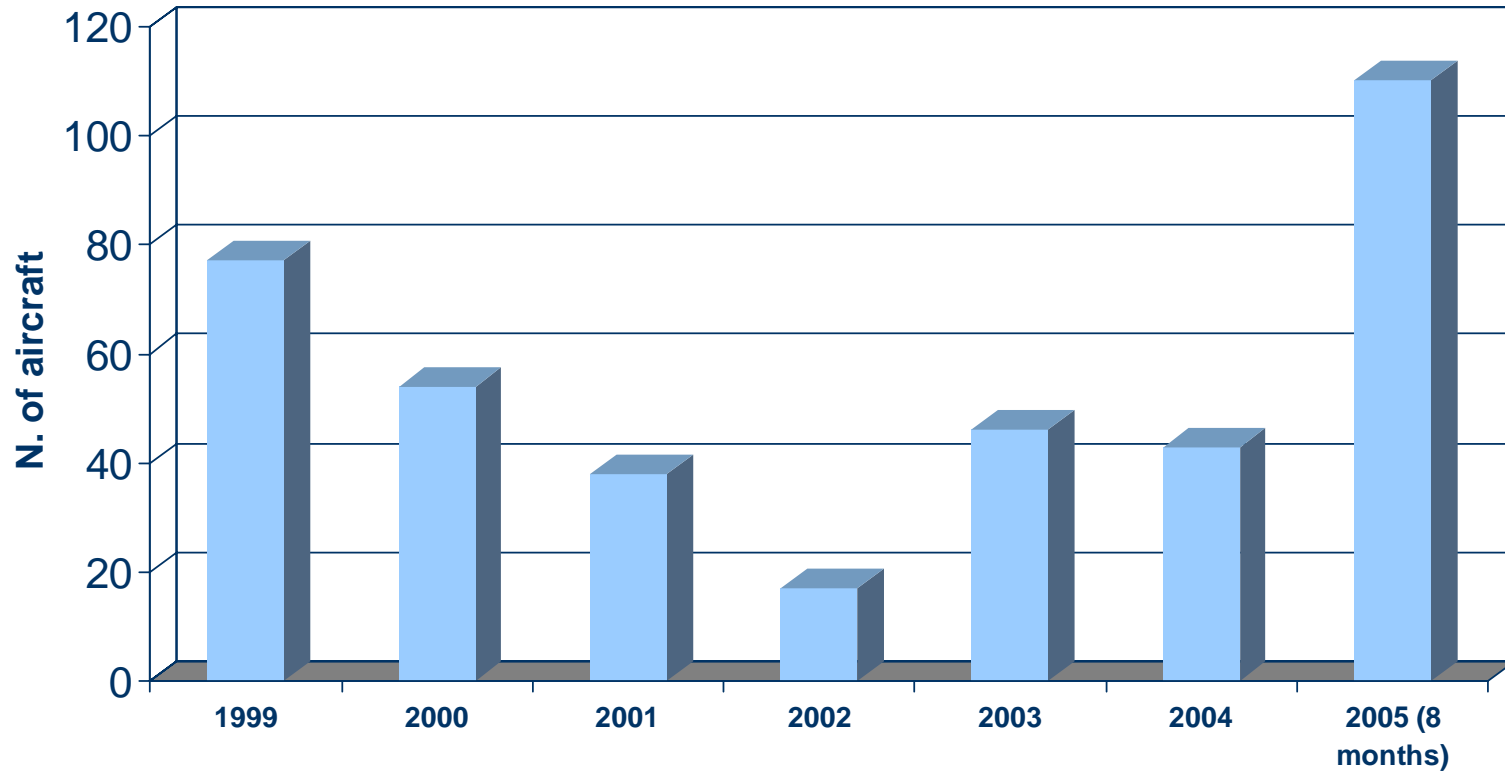
End of the 50-seat RJ Appeal , trend towards larger aircraft



Evolution of Turboprop Orders

50-70 seat - 1999-2005

**New TP orders:
163 a/c in the last 24 months**



new turboprop orders rebound

Turboprop Resurgence Worldwide

ATR Firm orders since January 2005



6 ATR 72-500



1 ATR 72-500



1 ATR 72-500



2 ATR 72-500
1 ATR 42-500



8 ATR 42-500



Turkish Navy

10 ATR 72-500



Air Deccan

30 ATR 72-500



Air Calédonie

2 ATR 72-500
1 ATR 42-500

10 ATR 42-500
52 ATR 72-500
+ others coming soon

ATR, the Majors Favorite



79 ATR

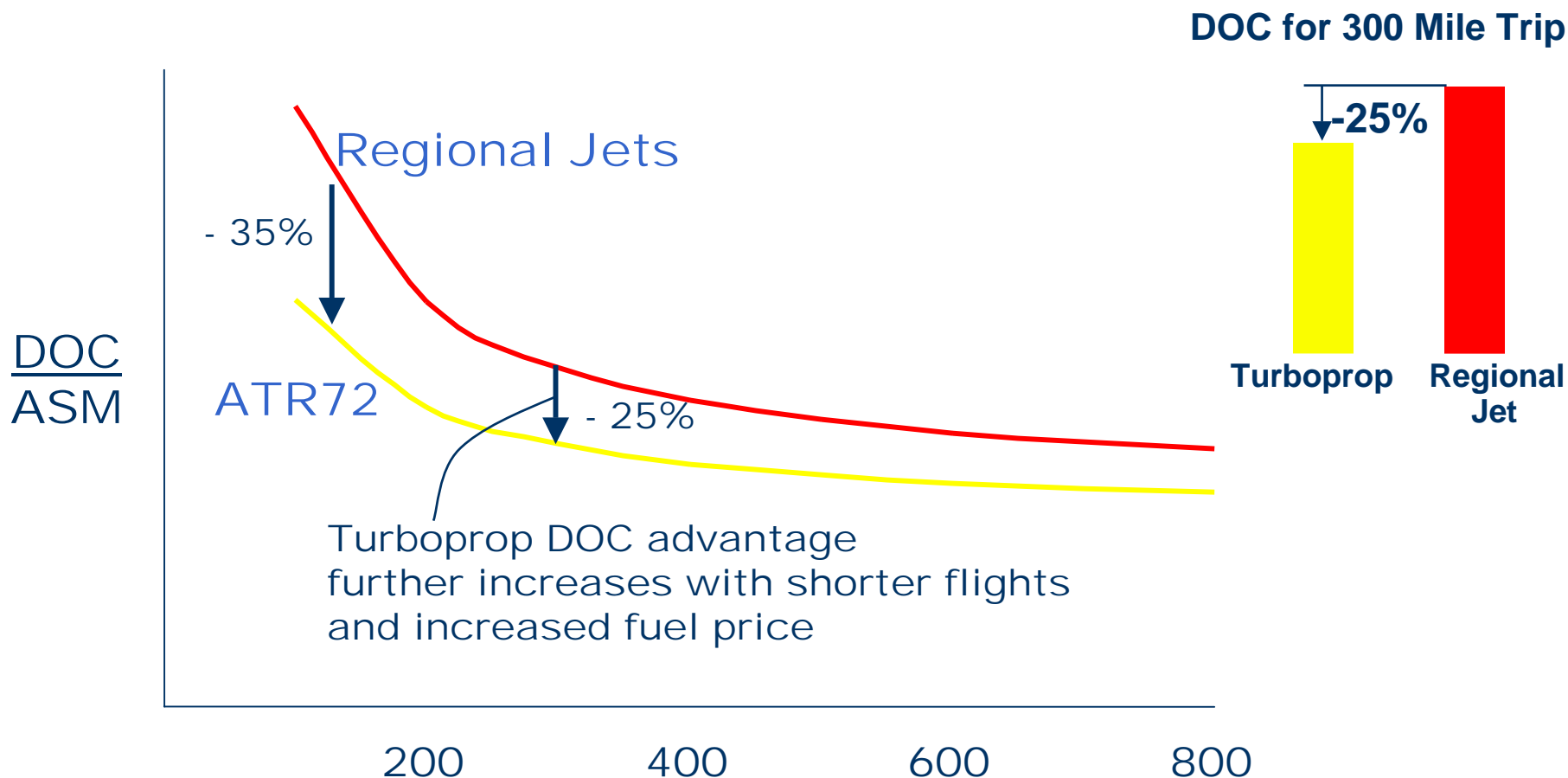


61 ATR



80 ATR

Turboprops A Natural Hedge Against Rising Fuel Prices



The turboprop operating costs are lower than RJ costs irrespective of sector distance, due to: lower costs for financing, fuel, maintenance, airport and navigation fees, crew.



ATR : the reference in the regional transport

Industrial Organization



What ATR Represents Today



- N°5 civil aircraft manufacturer in the world
- N°2 civil aircraft manufacturer in Europe
- 543 M\$ revenue in 2004 (+35% expected in 2005)
- More than 750 aircraft ordered
- More than 120 operators over 70 countries

- 530 Million passengers carried
- About 15M cycles
- 99.6% dispatch reliability

*Every 20 seconds, somewhere in the world
an ATR takes-off !*

ATR : high tech design



SAFETY

ECONOMICS

FLEXIBILITY

COMFORT

ENVIRONMENTAL IMPACT

Technology for SAFETY

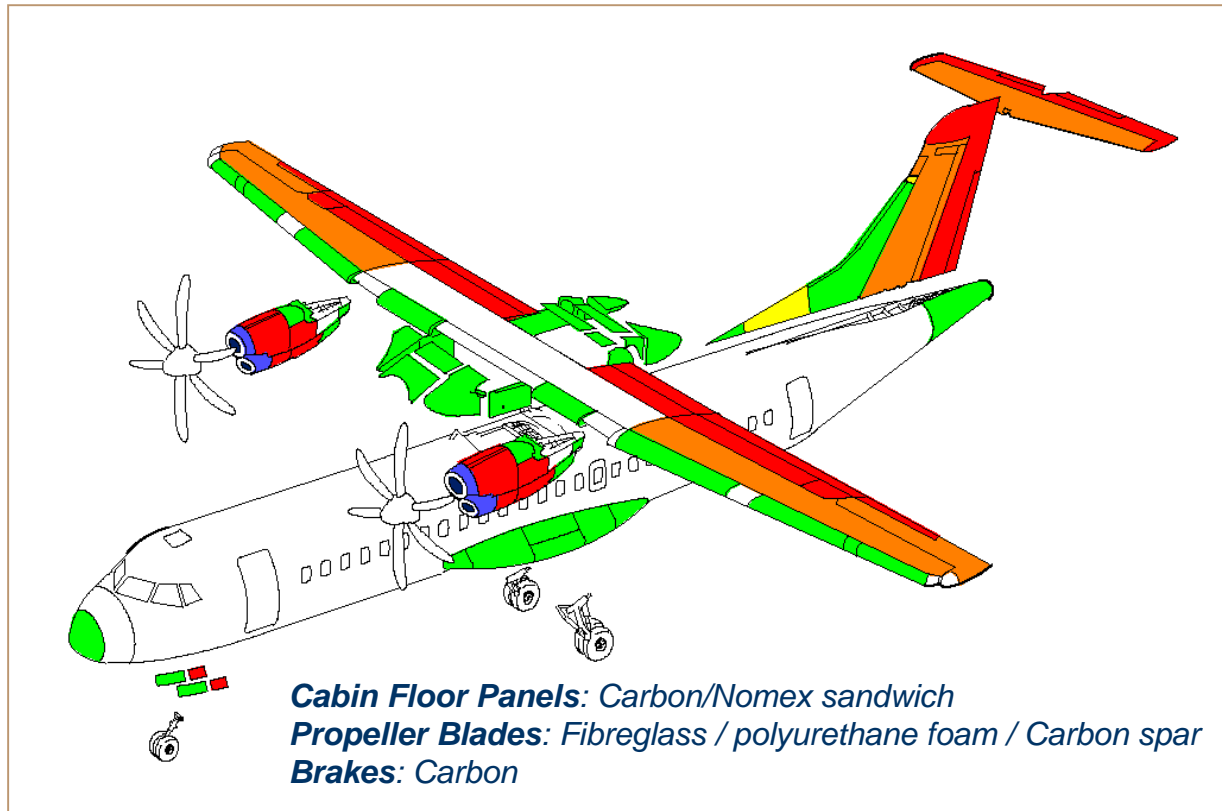


***Same rules apply for regional transport and large aircraft
to ensure the same level of safety***

Technology for *ECONOMICS*

Cost reduction through light structural design and corrosion prevention

About 20% of structure is made in composite, the highest composite utilisation in a regional aircraft



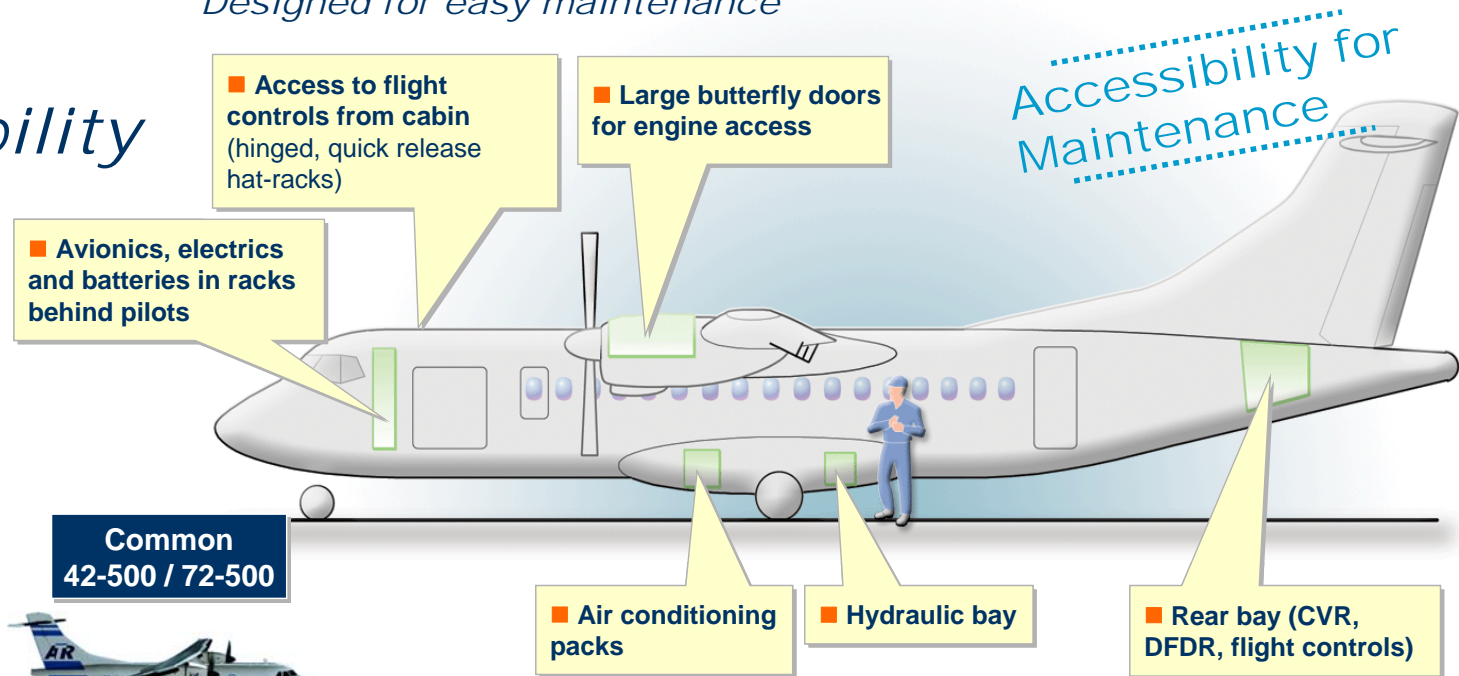
ATR 72-500 *Composite Materials*

- Carbon/Nomex sandwich
- Carbon monolithic structure
- Kevlar/Nomex sandwich
- Kevlar/Nomex sandwich with stiffening carbon plies
- Fibreglass/Nomex sandwich

Technology for *ECONOMICS*

Maintainability

Designed for easy maintenance



**Common
42-500 / 72-500**

- Cockpit Layout
- Avionics
- Engines
- Propellers
- Hydraulic systems
- Electric systems
- Fuel system
- Air Conditioning Packs
- Flight Controls
- Passenger Cabin
- Nose Landing Gear

*Common
Type Rating
(CTR)*



Commonality

Pilots: The difference course between ATR 42-500 & ATR 72-500 is only 3 hour ground course.
Spares Inventory: About 90% of common spares in Part Numbers

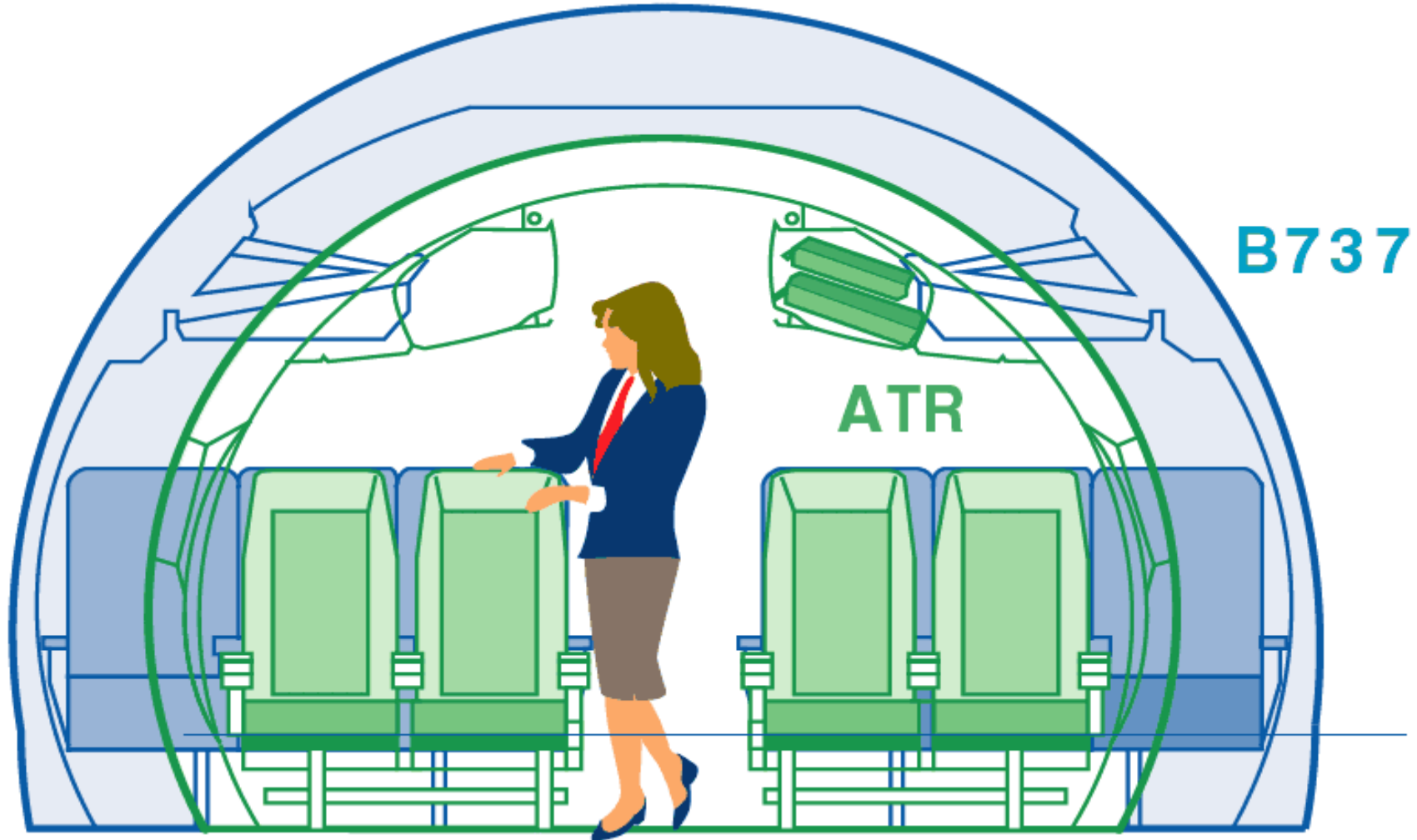
Technology for *OPERATIONAL FLEXIBILITY*



- Capability on very short runways (800 - 1,000 m)
- Unpaved runways certification (laterite, soil, gravel, grass)
- Narrow runways operations, down to 14m width
- ETOPS capability
- Operations from airfields located at up to 11,000 ft altitude
- Extreme cold weather certification (-52°C)
- Cargo transport

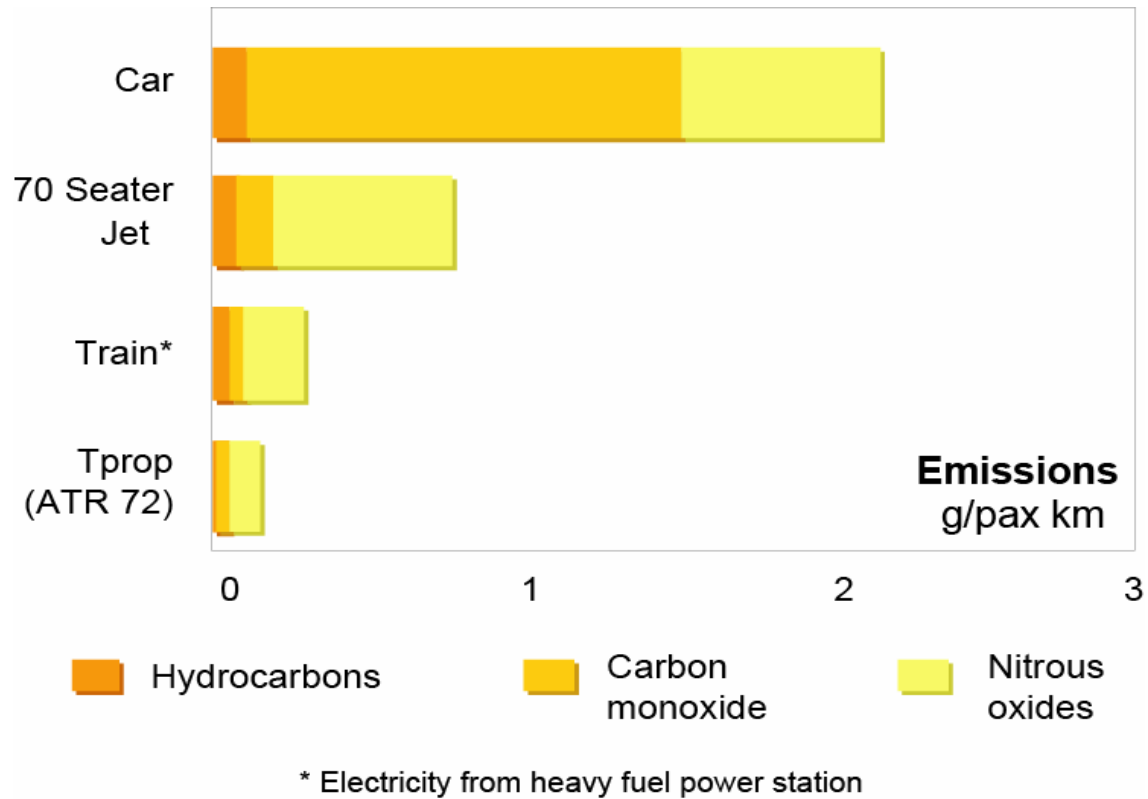


Technology for COMFORT



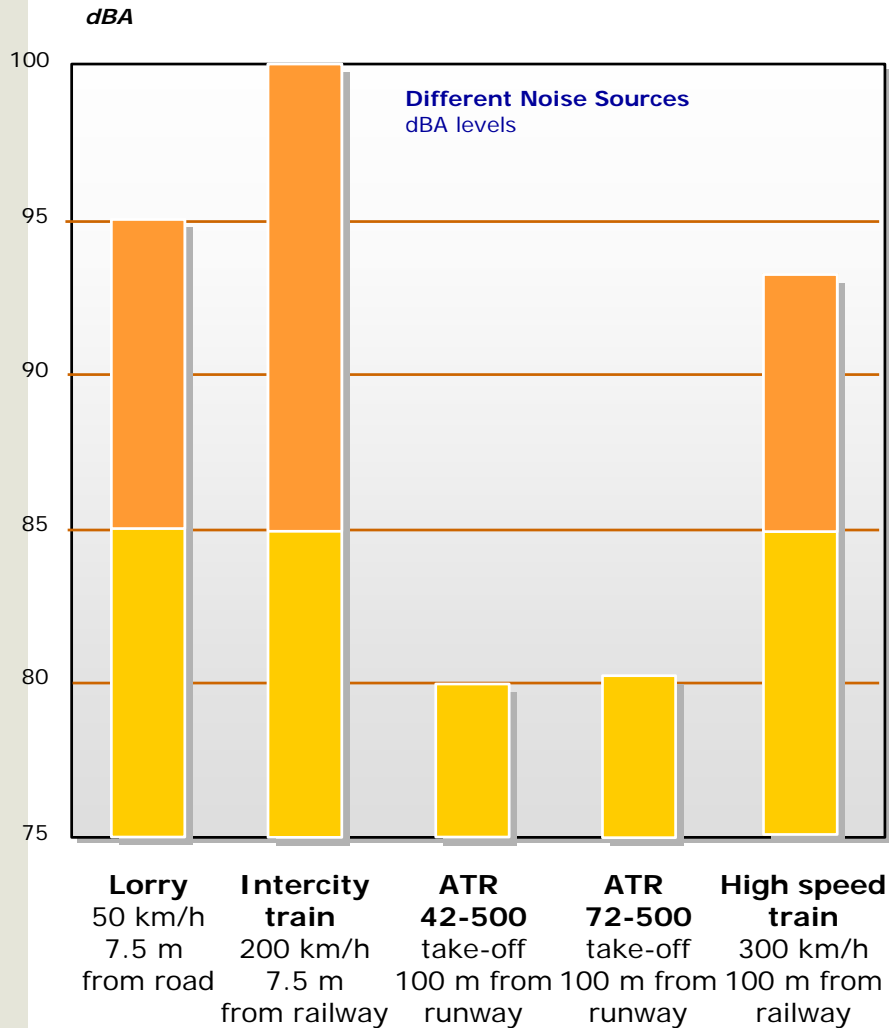
Same Comfort as on board a 737

Technology for ENVIRONMENTAL IMPACT

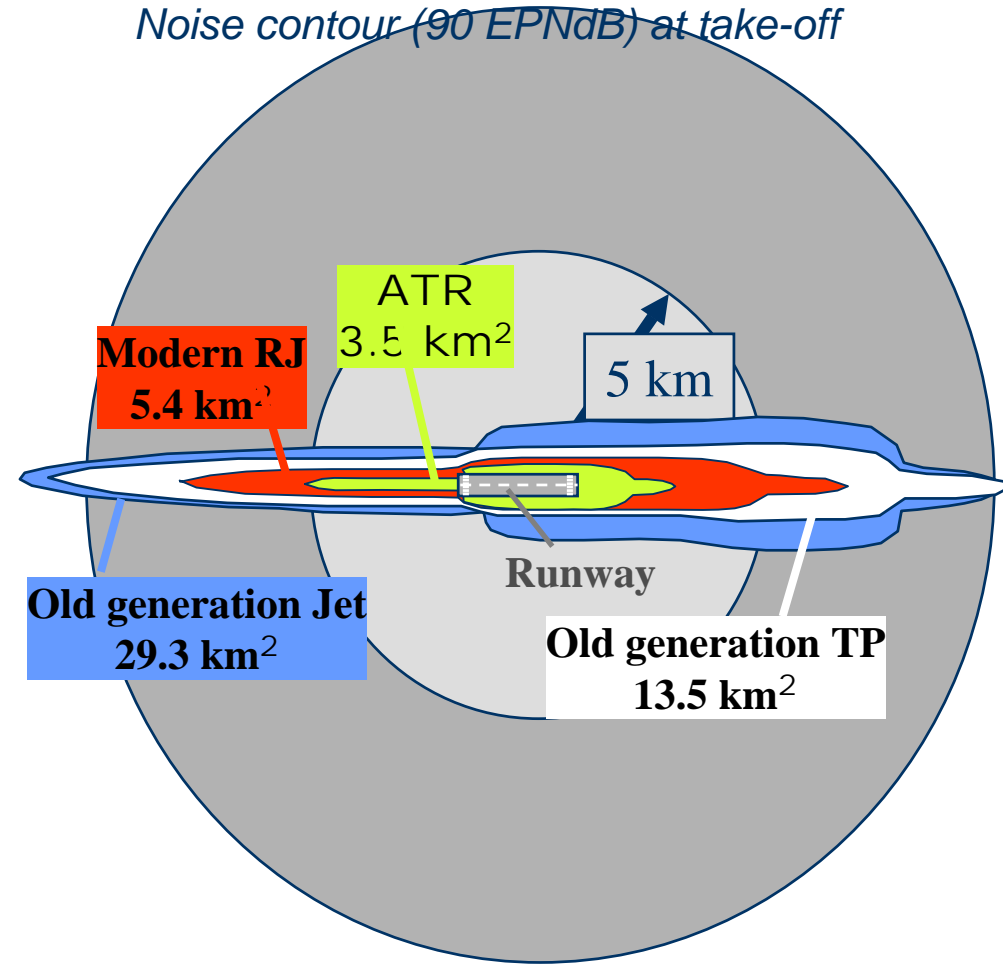


- ATR turboprop aircraft, recognized as the most fuel efficient aircraft in their category, maintain distinctive advantages with respect to other modes of transport such as road and rail, also in terms of pollutant emissions.

Technology for ENVIRONMENTAL IMPACT



Noise contour (90 EPNdB) at take-off

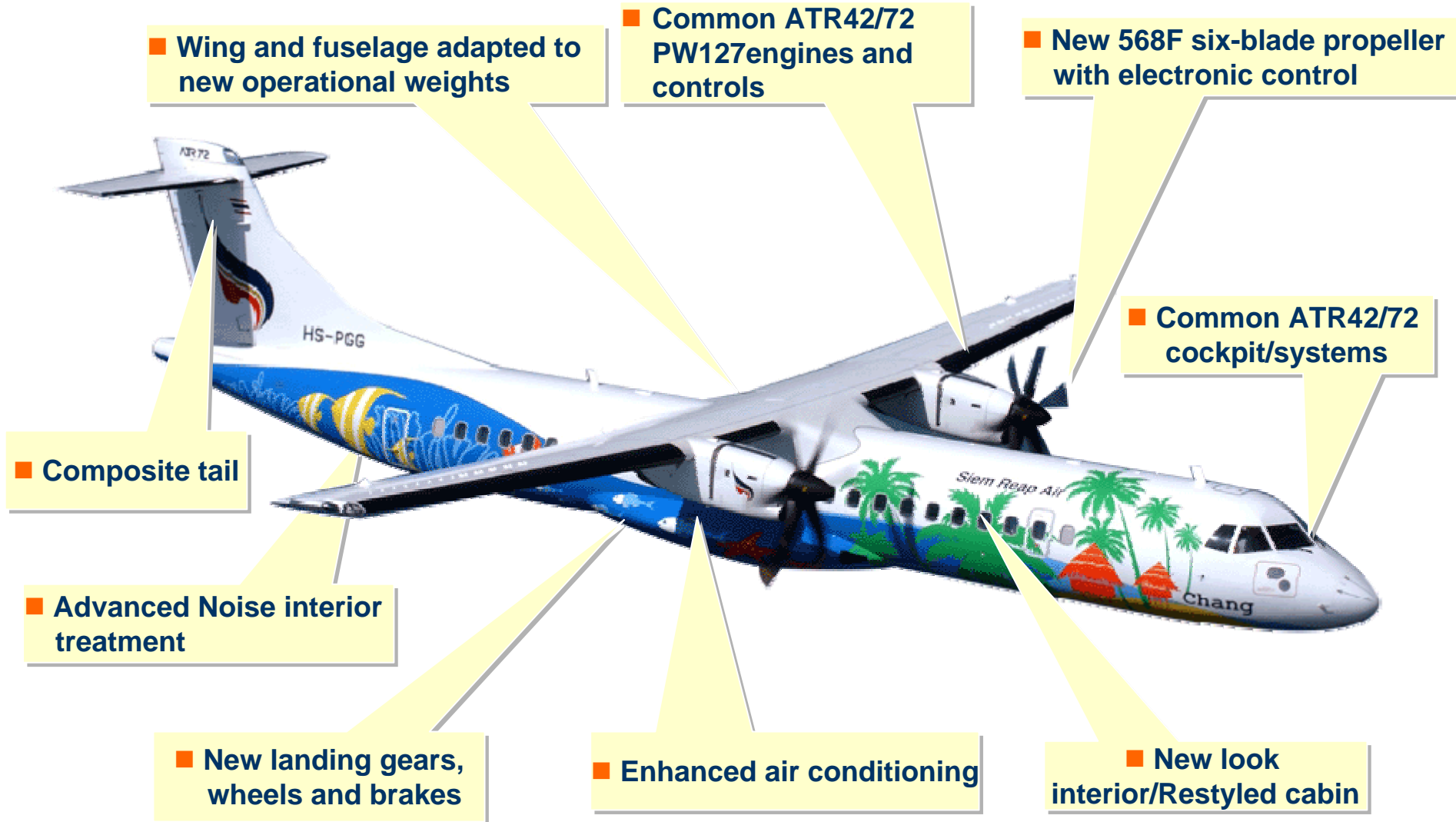


Sources : Economic Commission "Green Paper" - ATR - Aviation International News

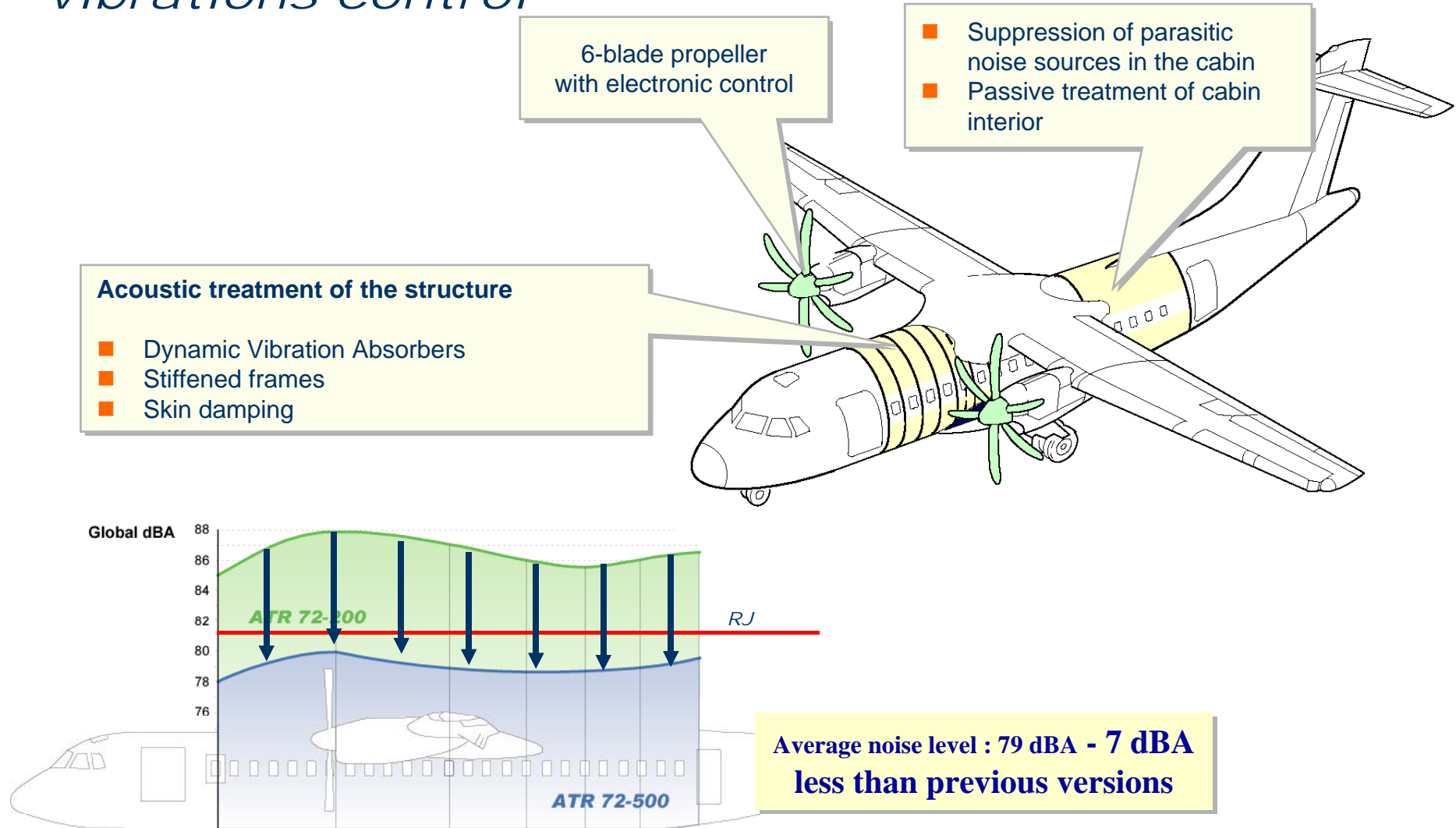
ATR : technology for continuous improvement



ATR 500 Series: The Latest Technology



ATR product evolution : internal noise & vibrations control



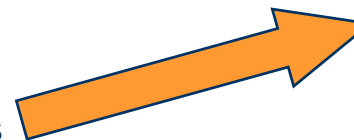
Flight deck



Ergonomy – AIRBUS philosophy

Electronic Flight Bag (EFB)

Electronic charts; Aircraft manuals
Checklists; Performance calculations
Customer dedicated application



Multi Purpose Computer

>> Developed to increase pilot situation awareness and enhance safety through the Aircraft Performance Monitoring (APM)

The APM is a unique feature in the aviation industry.

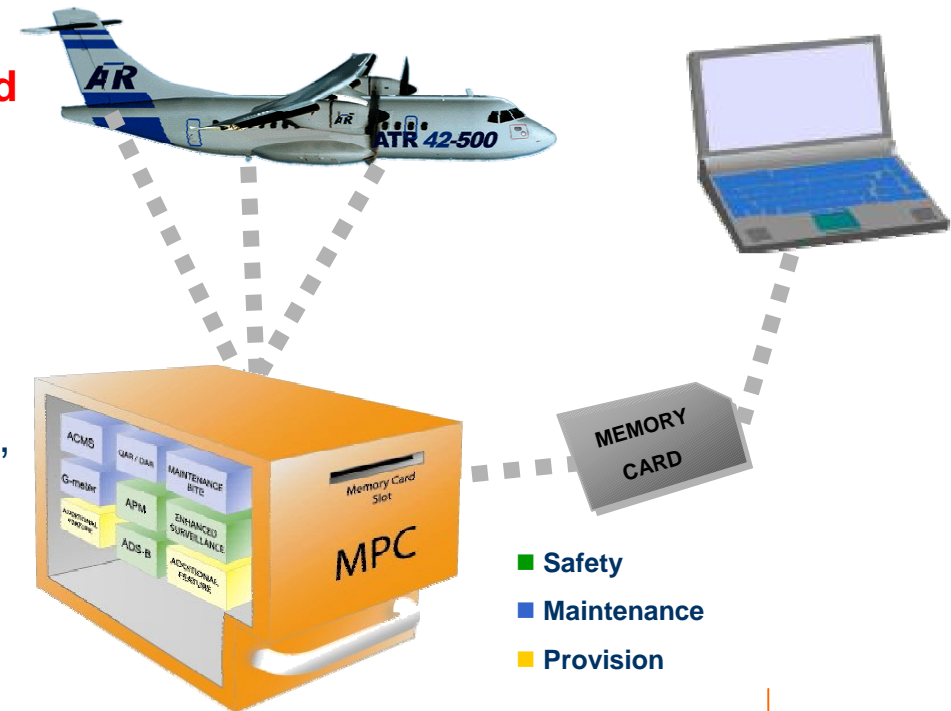
It carries out:

- Real time acquisition of flight data**
- Computation of theoretical performance**
- Comparison between theoretical and real performance**

If the situation becomes degraded, alert and warning are delivered to the crew.

Other functions :

Quick Access Recorder,
ACMS (Aircraft Condition Monitoring System),
G-Meter,
Enhanced Surveillance,
Maintenance BITE Monitoring



Fuel Tank Safety – SFAR88

July 17th 1996, a 747-100 broke-up after take off from JFK resulting in 230 fatalities.

SFAR N°88 requires TC holders to perform a Fuel Tank Safety Review

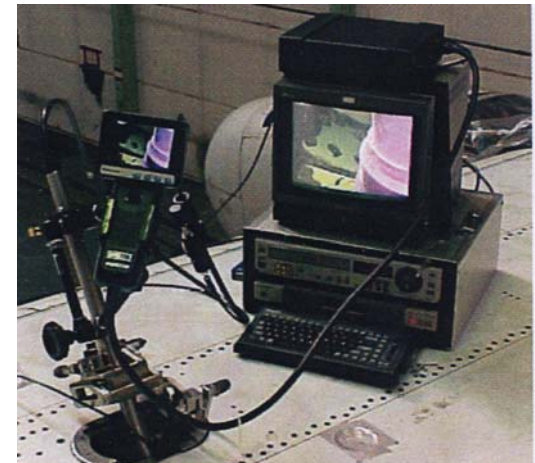
Fuel tank: Design Change

- **Fuse adapters (with dedicated fool-proofing) to protect:**
 - ◆ fuel level detectors
 - ◆ thermistors
 - ◆ temperature sensors
- **Current limitation device to limit current in “low/high” level detectors.**



Fuel tank: Maintenance Inspection

Development of a Specific Video Tool approved as alternative means for Detailed Visual Inspection program.

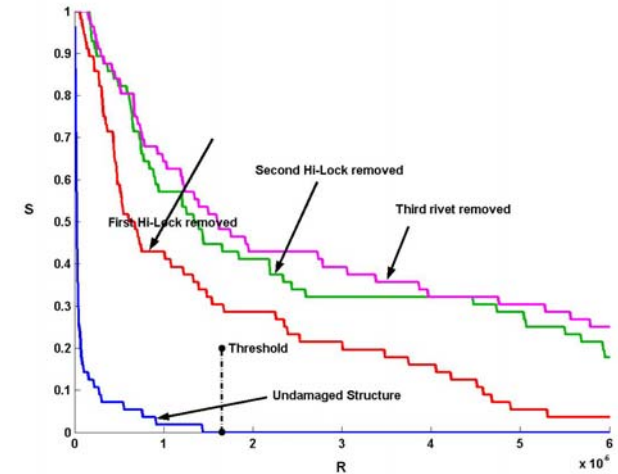


Structur Health Monitoring System

This technique can be the base of a development of an automatic “Health Monitoring System” to identify and localize a structural damage in real time, improving the safety and reducing maintenance times and costs.

The proposed new method determines a “**Damage Index**”, based on vibrations measurements, to identify and quantify a damage on:

- Structural components,
- Fuselage reinforced panels
- Composite panels.



Tests are made in collaboration with
University of Naples “Federico II”
Department of Aeronautical Engineering

Cabin Evolution 1/2



NEW Elegance cabin on -500 series



Cabin Evolution 2/2



New LED lighting instead of neon tube
Enhanced cabin atmosphere
Reduced maintenance costs

LCD 5" screen used for:

- safety procedures
- advertisement
- flight information
- any silent entertainment...



Security Onboard

Reinforced Cockpit Door



Video Surveillance System



FAA Regulatory requirements

FAR25 (design requirements for new aircraft after 15 January 2002)

Installation of a reinforced door complying with anti-intrusion and anti-penetration standards

- **Cockpit door camera**

Integral view of the cargo compartment. Improves unauthorised intrusion surveillance

- **Cabin camera**

- **Cargo compartment camera**

See the person access to cockpit

Extended Life

Objective:

Extend economic life of the aircraft by increasing of airframe from 70,000 cycles to 105,000 cycles

This would represent, with an average yearly utilization of 2,500 flight, a service life of about 40 years.

Reinforce the Residual Value of the first and latest generation ATR

Offers a “second life” (cargo operations) to the first generation ATR



Conclusions (1/2)

There is no place for « static » product in aviation.

An aircraft manufacturer is always moving on in order to comply with new requirements coming from :

Operational needs (airports/routes with several constraints)

Passenger comfort (higher pax weight and baggage load)

Economics (maintenance cost, fuel consumption)

Environmental issues (external noise and emissions)

ATR, the leader in the turboprop industry is continuously working to offer a front-runner technological product.

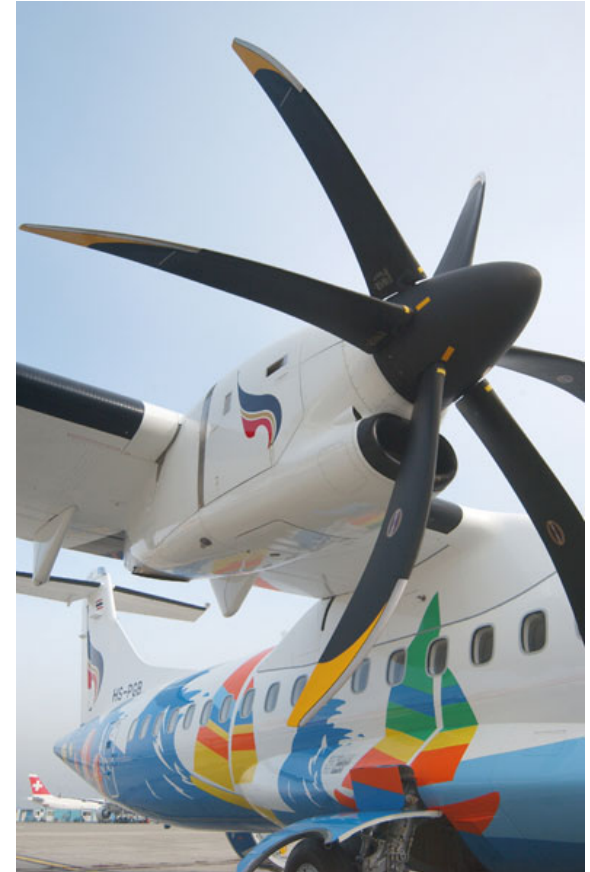
Conclusions (2/2)

The new coming product evolution will further enhance the ATR concept :

Technology for simplicity

Performance for economics

Comfort for passenger appeal



Thank you for your attention

