

*EWADE – European Workshop on Aircraft Design and Education
Research and Technology in Aircraft Design – The Role of Italian Industry*

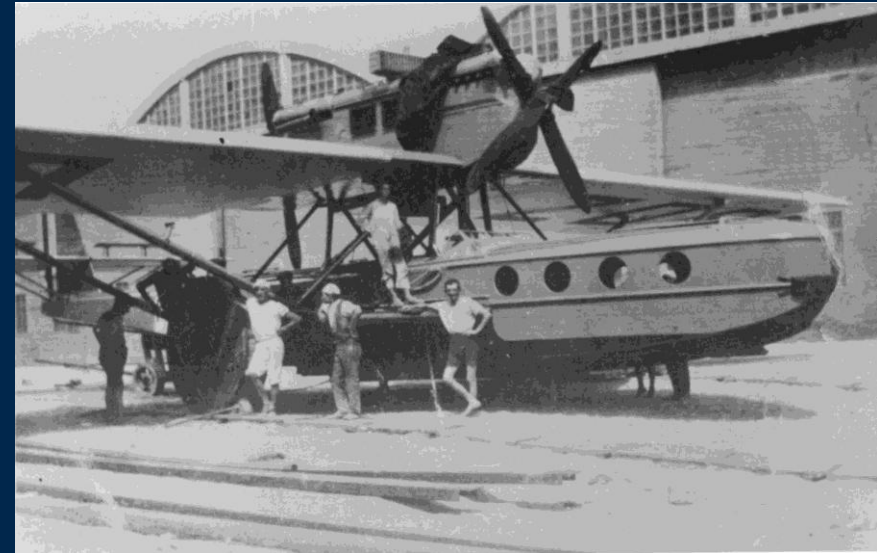
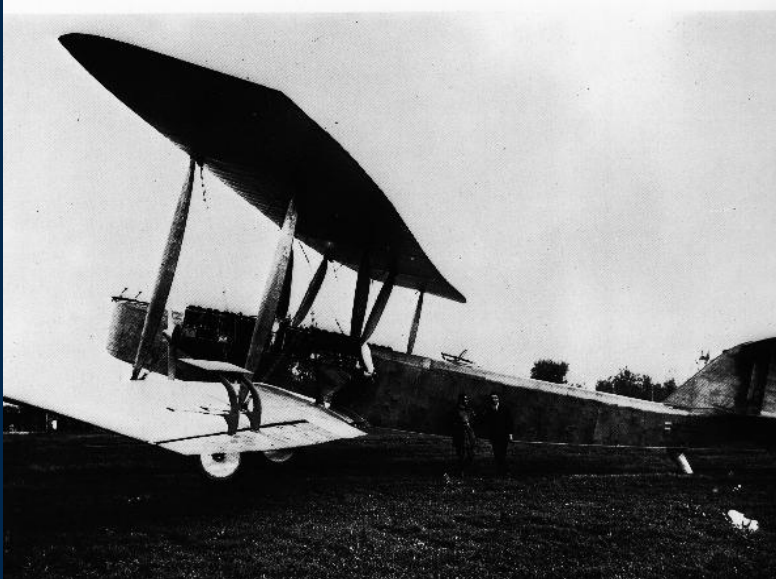


PIAGGIO AERO INDUSTRIES
The Strength of Experience and Innovation
A. Sollo May 25th, 2011

PIAGGIO is the oldest aircraft manufacturer still in activity today

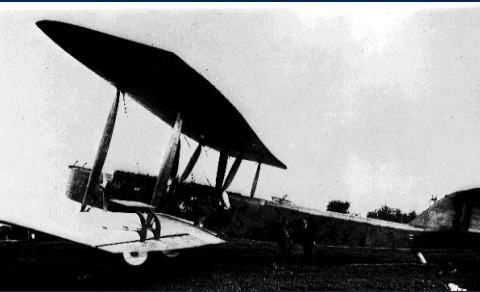


Founded in 1884 as
ship interiors and
furniture
manufacturer



Aviation activities started
in 1915; more than 50
aircraft types designed and
manufactured since then

Historical background



In addition to Airplanes, PIAGGIO was also a pioneer in design and experimentation of rotorcraft, well before Sikorsky's first flights

Piaggio Aero Industries:

Founded in Nov. 1998 by taking over assets and activities of former *I.A.M. Rinaldo Piaggio S.p.A.*



Shareholders

33% Italian Investors

33% UAE Government Agency MUBADALA

33% TATA Sons

Workforce: 1,458 (end 2010) - Engineering 165 people



Piaggio Aero's Core Activity



Aircraft manufacturing



Aero-engines parts manufacturing



Aero-engines MRO



Aircraft maintenance



***P180 – AN UNCONVENTIONAL
OUTSTANDING JETPROP AIRCRAFT***

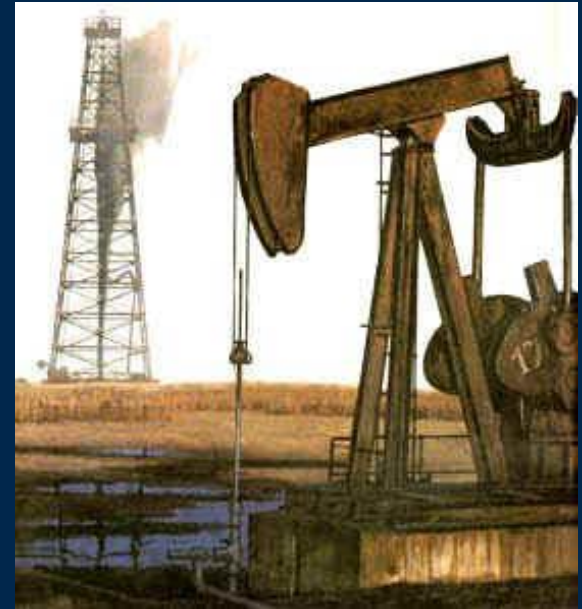
Avanti *II*

P180 – AN UNCONVENTIONAL OUTSTANDING JETPROP AIRCRAFT

Design concept requirements of P.180 have been developed in 70's, during Global Energetic Crisis.

An unconventional design was felt to be the only viable solution for a very demanding challenge:

***DEFINE AN AIRPLANE WITH JET SPEED
BUT WITH TURBOPROP FUEL
CONSUMPTION***



P180 – AN UNCONVENTIONAL OUTSTANDING JETPROP AIRCRAFT

Advanced Aerodynamic

Each component of the P.180 was shaped to slice through the air smoothly.

A single, uninterrupted aerodynamic curve sweeps from the nose to its tail – decreasing drag and improving laminar flow.

This shape, is supported by **Three Lifting Surfaces** which are the keys of the unparalleled efficiency of the P.180.

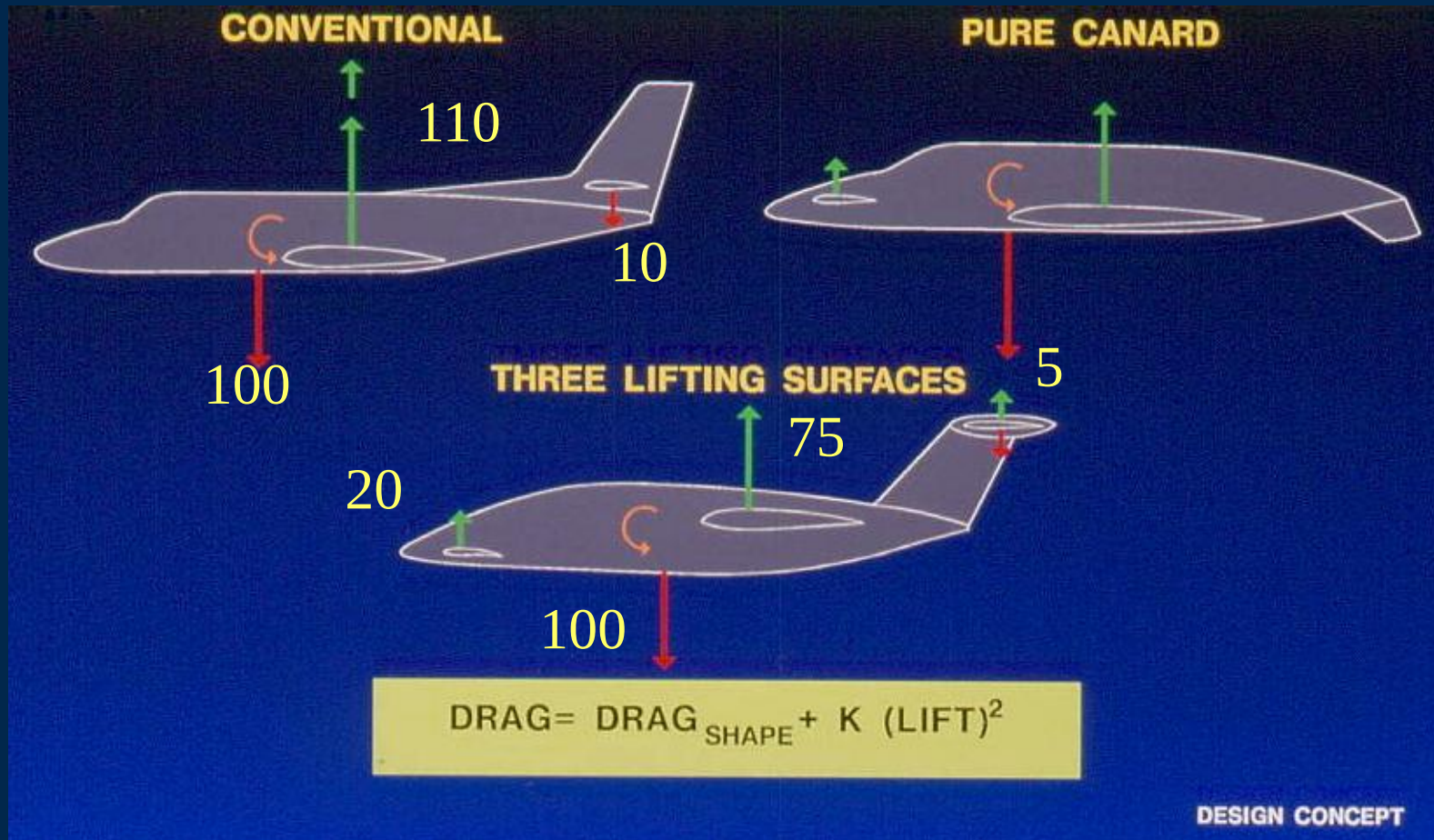
The Pushing Propeller Configuration

an obliged choice to keep laminar the aerodynamic flow over the wing



WHY 3LS CONCEPT?

Can trim aircraft with minimum drag.



P180 – STRENGHT: EFFICIENCY



***P180 CONFIGURATION ALLOW TO
SAVE ABOUT **12% IN TOTAL DRAG*****

FWD.WING ***+7 %***

MAIN WING REDUCTION ***- 6 %***

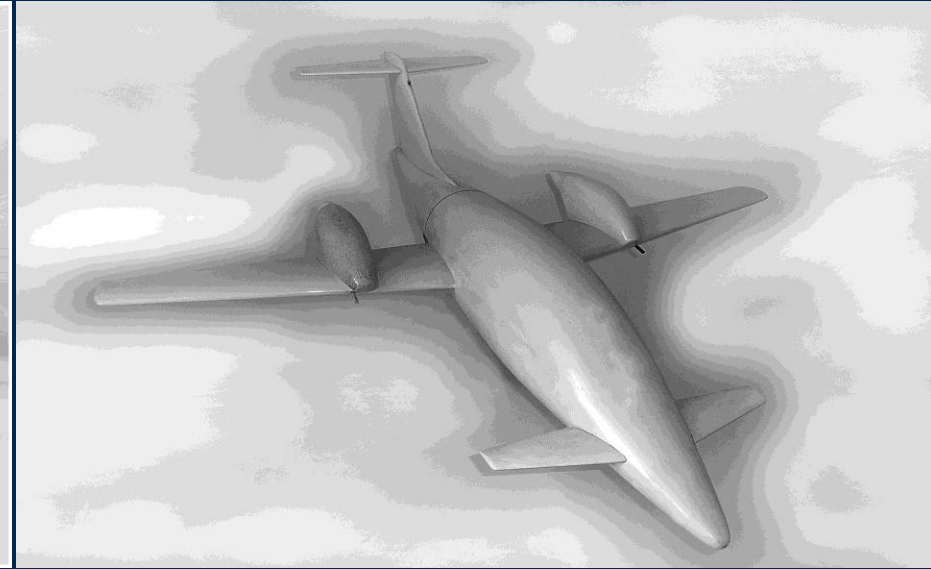
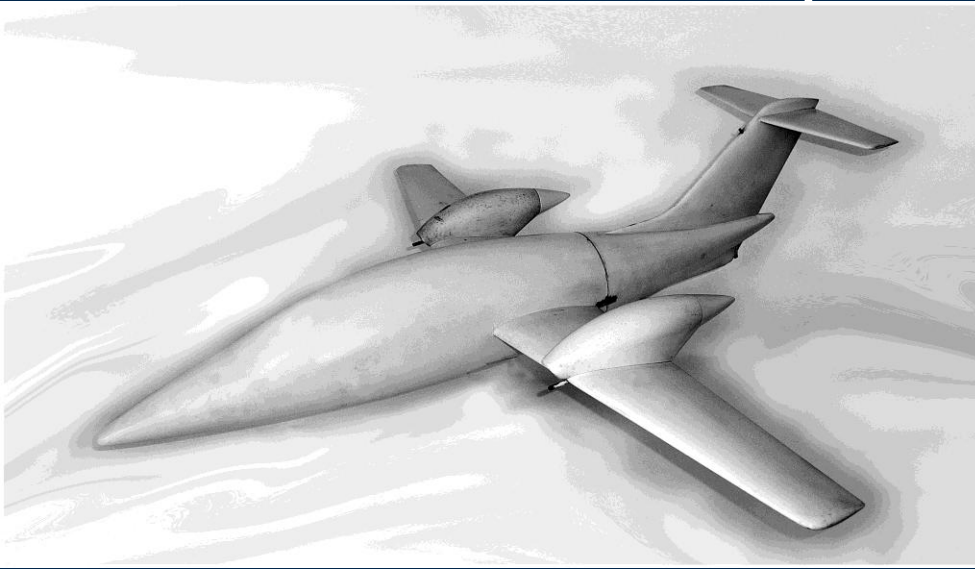
MID.WING + FUSELAGE SHAPE ***- 3 %***

TRIM DRAG ***- 2 %***

LAMINAR FLOW ***- 8 %***

TOTAL ***-12 %***

P180 Avanti Development WT Models



P180 Avanti WT Model



P.180 Avanti - Program's Highlights

4,600 hours of wind tunnel testing

1,500 hours of flight testing

Icing tests at Edwards Air Force Base

First Flight : September 1986

FAA Certification : April 1990



P.180 Avanti - Program's Highlights

Transonic Wind Tunnel Testing

NLF Wing testing



P.180 Avanti - Program's Highlights



Flutter Wind Tunnel Model



P.180 Avanti II Certification



- Transport category including day, night, VFR, IFR operations
 - Europe EASA (CS-23)
 - U.S.A. FAA (FAR 23)
 - Canada DOT
 - India DGCA
 - Indonesia DGCA
 -and many other countries
- Flight Into Known Icing conditions
- RVSM operation requirements
- CAT. II Approach
- Steep approach operations
- P-RNAV



Avanti II

Seating Capacity

Maximum Seating Capacity

9 + 2 crew

Standard VIP Version

7 + 2 crew

Pressurization

Differential

9.0 psi

0.62 bar

S.L. Cabin up to

24,000 ft

7,315 m

Cabin altitude at 41,000 ft

6,600 ft

2,012 m



Avanti II

Powerplant

PIAGGIO
AERO 



Engines

Manufacturer

Pratt & Whitney of Canada

Model

PT6A-66B

Power Each

850 SHP

634 kW

(flat rated from 1630 thermodynamic HP)

Power Loading

6.79 lb/SHP

3.08 kg/SHP

TBO

3600 hours

Propellers

Manufacturer

HARTZELL

Model

HC-E5N

Diameter

85 in

2159 mm

Type

5-blade, constant speed, fully feathering,
hydraulically controlled



Performance

Cruise Performance



Maximum Speed	402 KTAS	745 km/h
Cruise Speed at Maximum Cruise Power:		
At 31000 ft	400 KTAS	741 km/h
At 35000 ft	386 KTAS	715 km/h
At 39000 ft	357 KTAS	661 km/h
IFR Maximum Cruise Range at Maximum Range Power		
At 40000 ft	1470 nm	2722 km
IFR Maximum Cruise Range at Maximum Cruise Power		
At 40000 ft	1420 nm	2630km

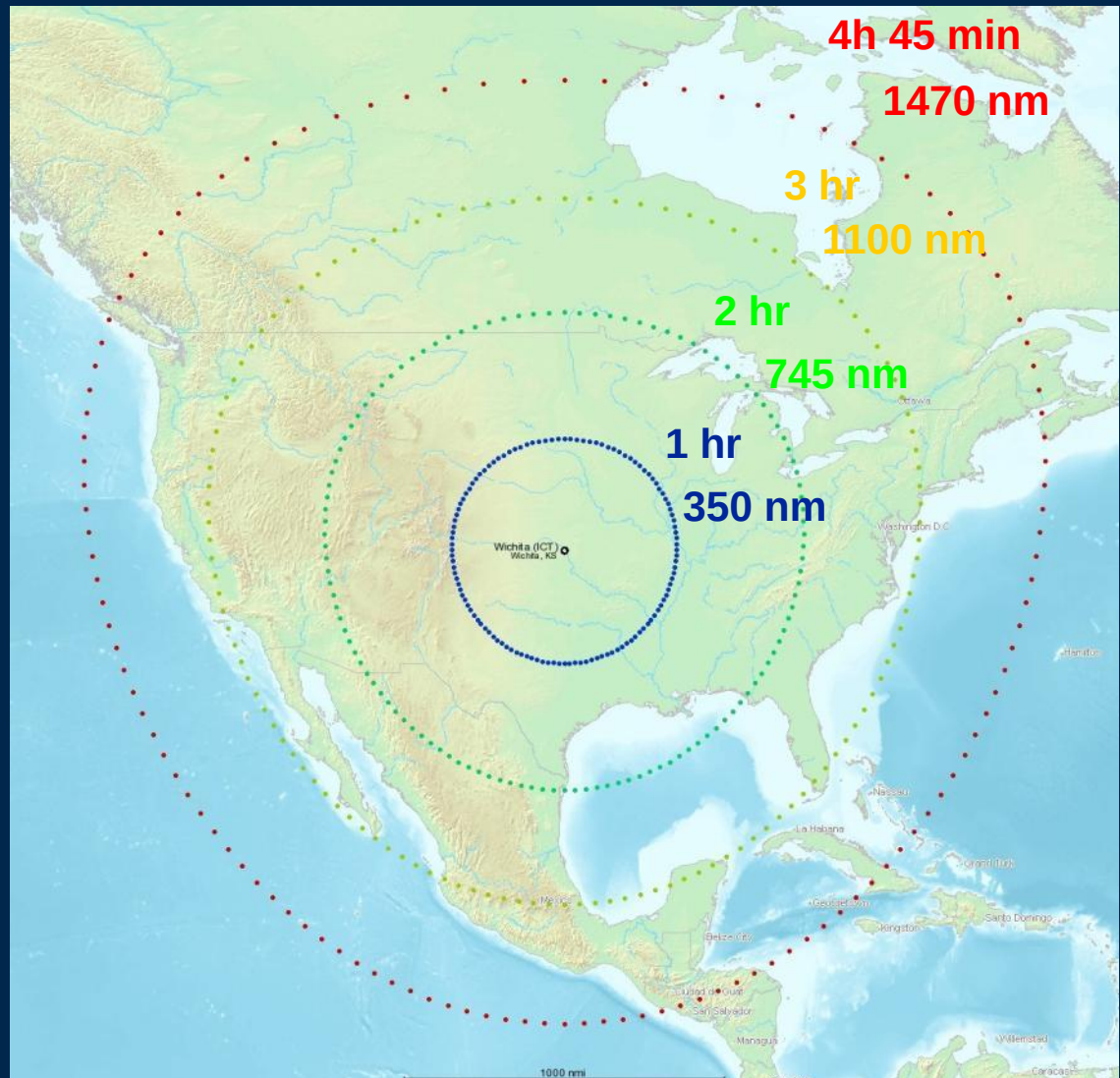
Range From Wichita (ICT), KS

Avanti II

Mission conditions:

- 1 pilot + 5 passengers
- ISA – Zero wind
- NBAA fuel reserve
- Includes taxi, climb, cruise & descent

	CRUISE	FUEL	FL
— High speed	800 lb	310	
— High speed	1,530 lb	310	
— High speed	2,075 lb	350	
— Long range	2,200 lb	400	

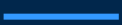


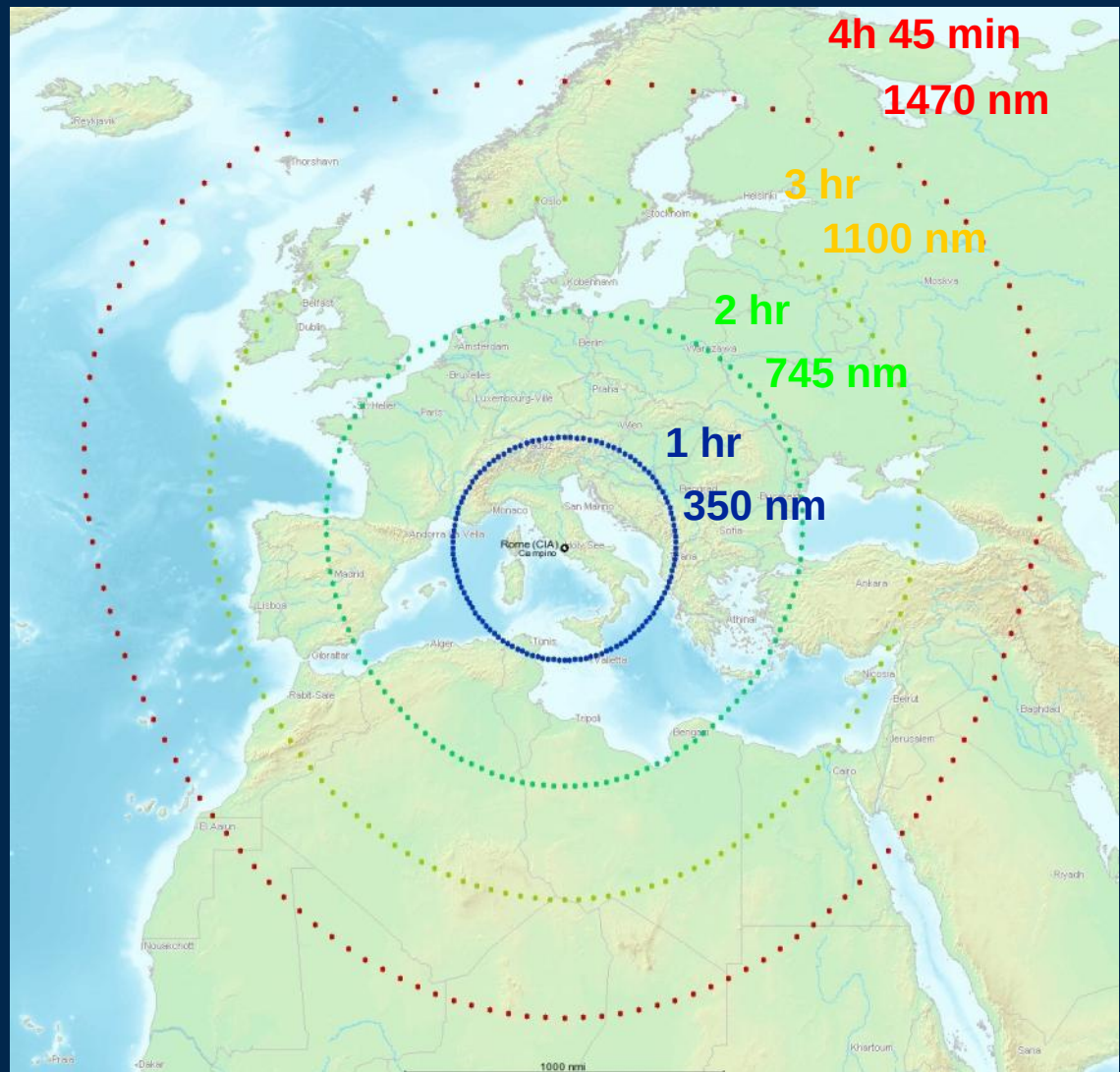
Range From Rome (CIA), IT

Avanti II

Mission conditions:

- 1 pilot + 5 passengers
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	CRUISE	FUEL	FL
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Avanti

Take-off, Landing, Climb Performance



**Take-off Distance over 50 ft obstacle
(S.L., ISA) 3262 ft 994 m**

**Landing Distance over 50 ft obstacle
(S.L., ISA, no reverse) 3282 ft 1000 m**

Rate of Climb (S.L., ISA)

Both Engine 2770 ft/min 844 m/min

One Engine 670 ft/min 204 m/min

Service Ceiling

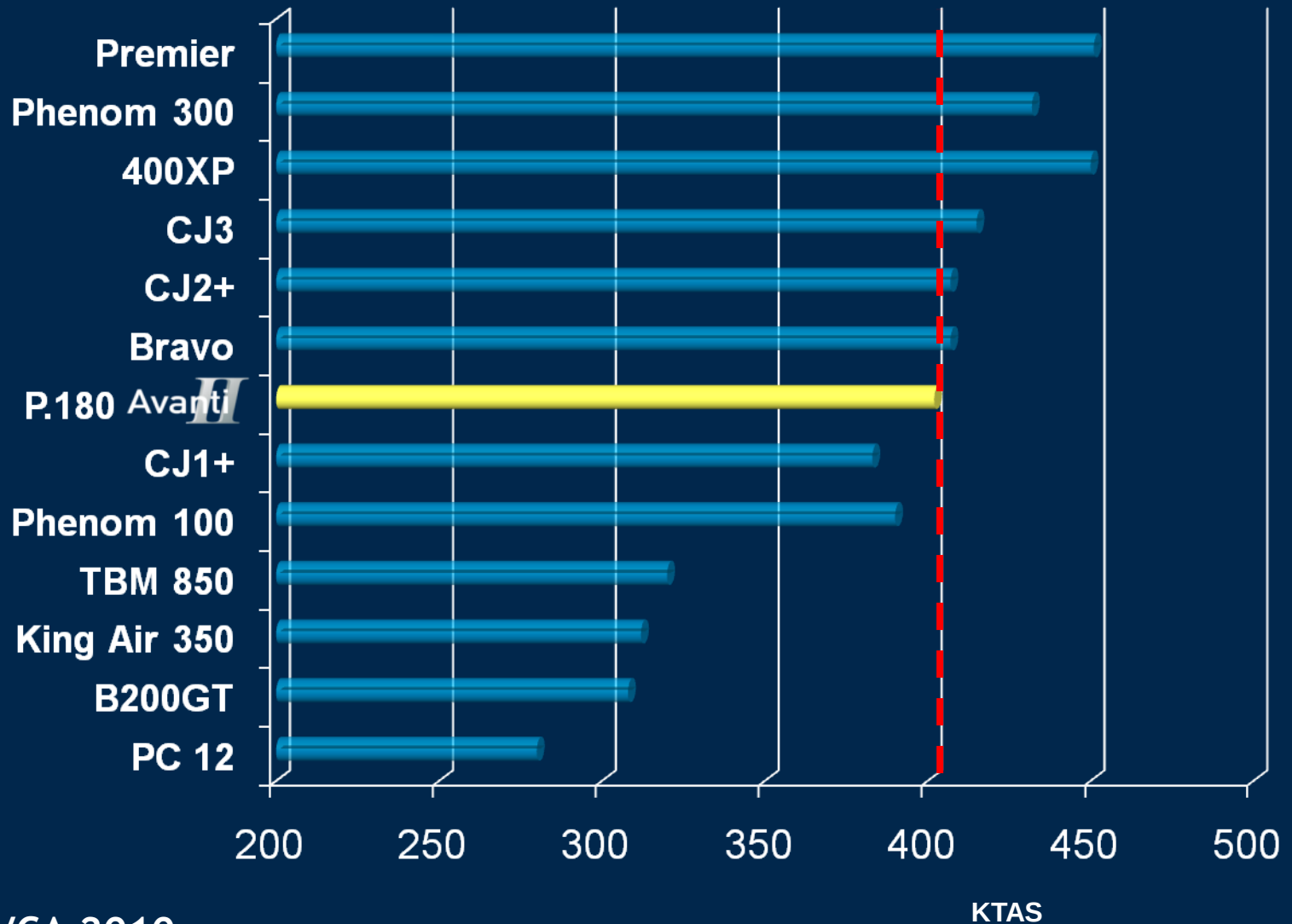
Both Engines 39400 ft 12009 m

One Engine 23800 ft 7254 m

(T.O. @ MTOW of 11550 lb)



Speed Comparison

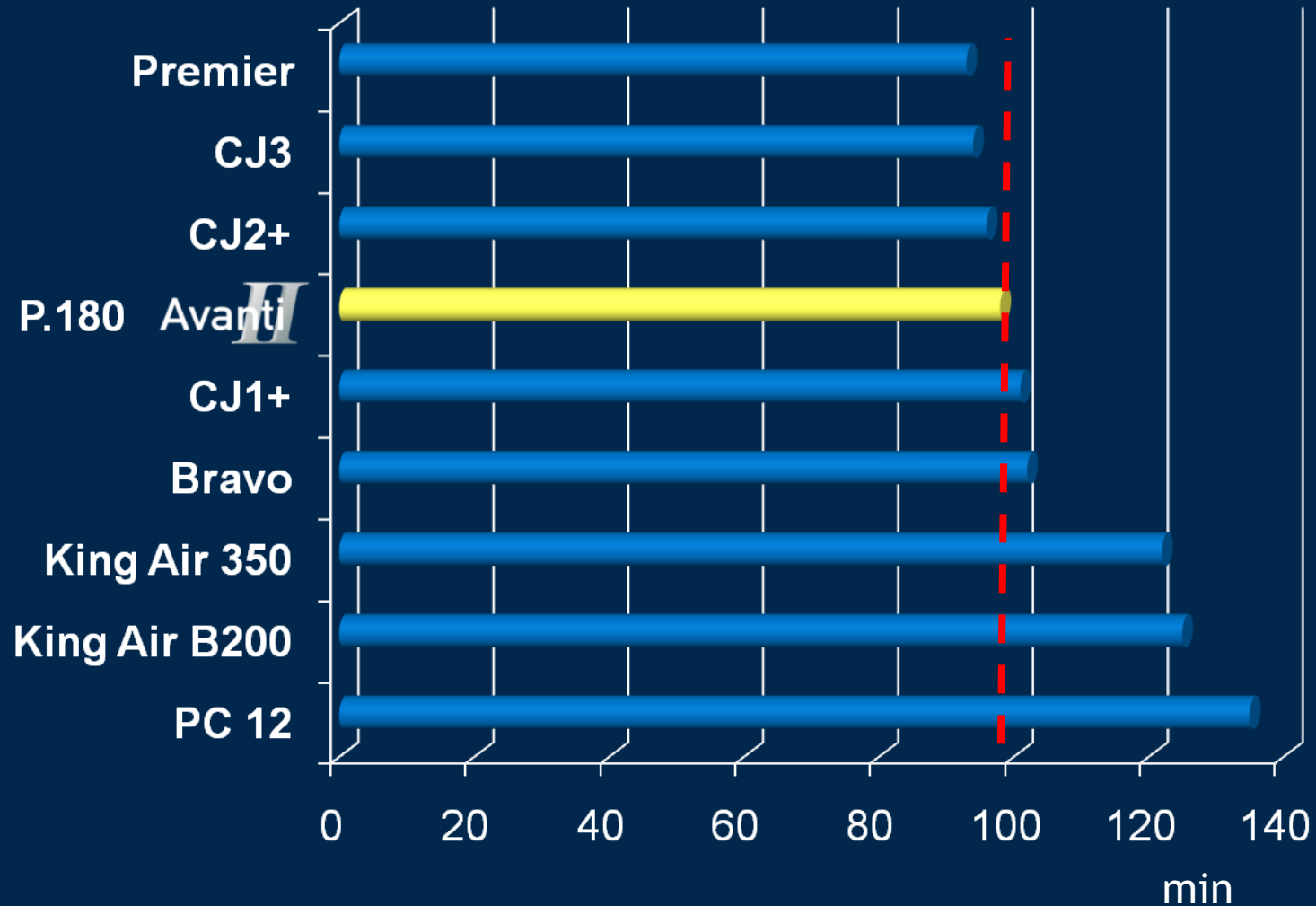


Source: B/CA 2010

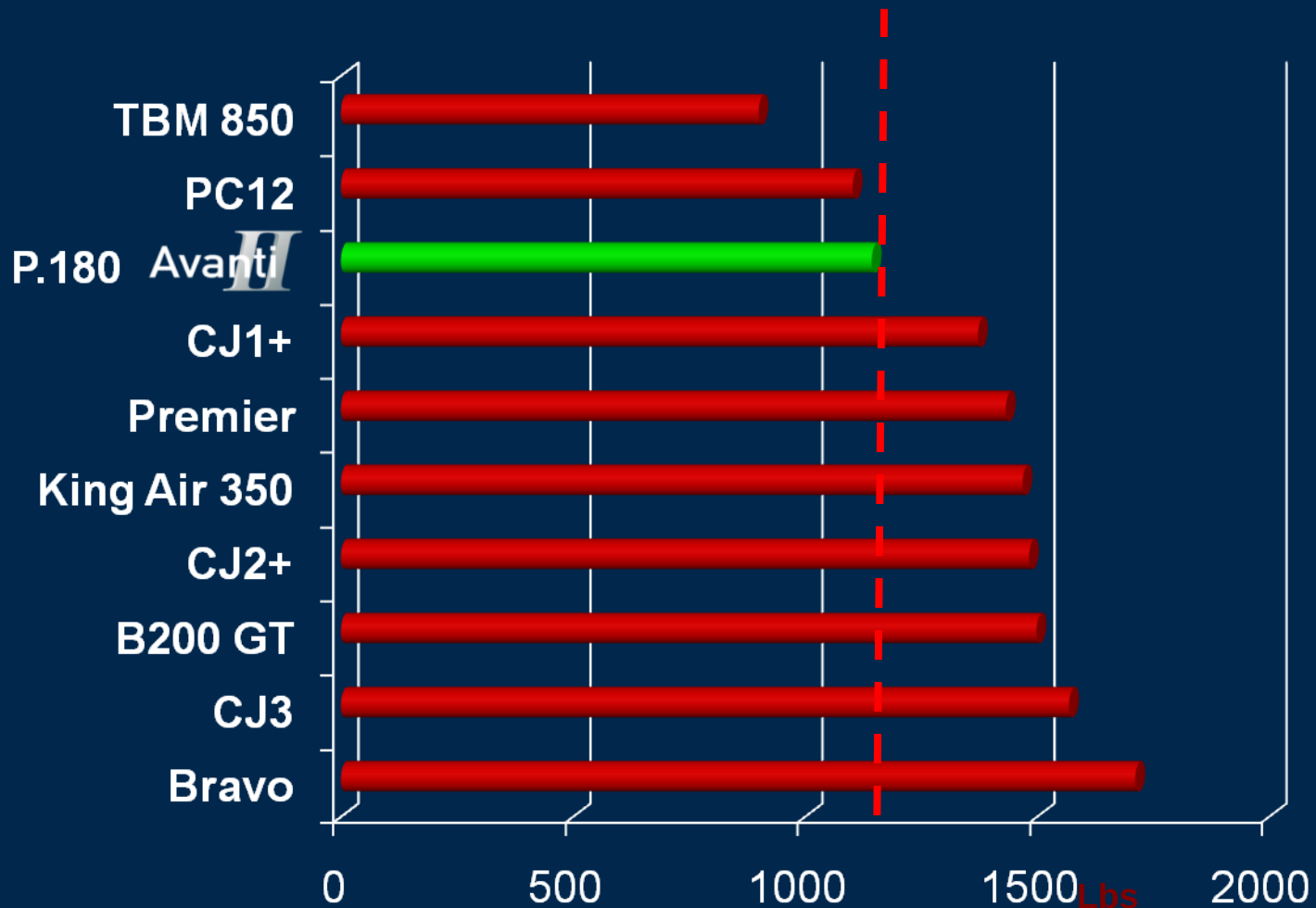
A.Sollo

EWAD NAPLES May 25th, 2011

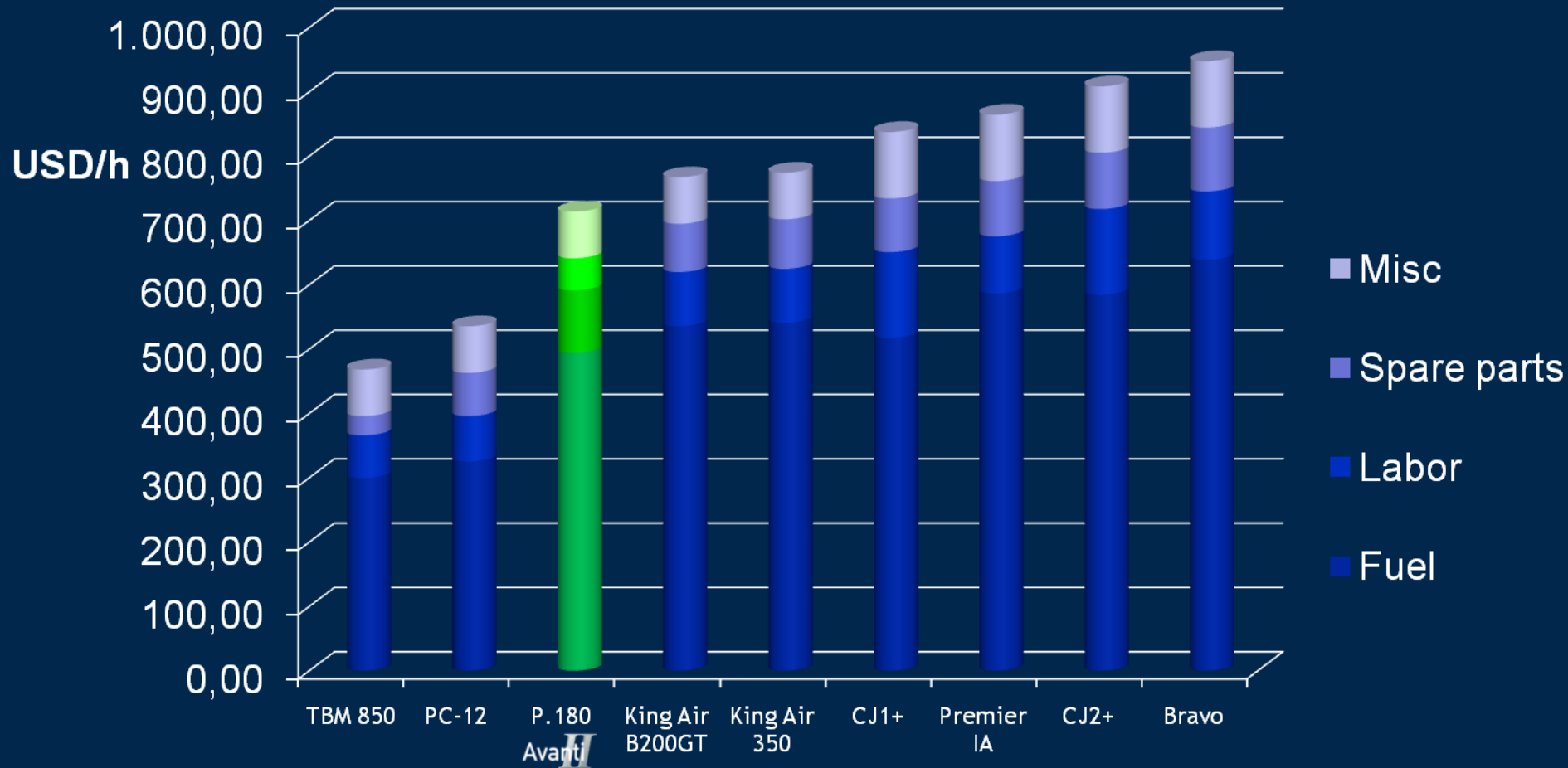
Flight Time - 600 nm trip



Fuel Consumption - 600 nm trip



DOC Comparison



P180 – STRENGTH: JET LIKE SPEED

P180 BETWEEN B200 AND CJ2+

The P180 Avanti is comparable to a Jet rather than a turboprop and offers the fuel consumption economy of a turboprop!



B200



P180



CJ2 +

P180 – STRENGTH: JET LIKE SPEED

THE P180 TRADES WITH COMPETITORS

Typical Mission



	600 Nm Mission (4pax)		
	B200	P180	CJ2+
Fligh time [h.min]	2.13	1.44	1.35
Fuel Used [lb]	1327	1092	1458
Average SR [nm/lb]	0,452	0,549	0,412
Cruise altitude [ft/100]	290	350	410
Est. Cruise speed [KTS]	279	356	390

FUEL SAVING vs Jet PER YEAR ON CURRENT P180 FLEET
≈ 12,000 TONS

(Calculated over 180 a/c fleet on 500 F/H per year)

P180 – STRENGTH: COMFORT

The P.180 offers a cabin with spaciousness and **comfort that can be found only in aircraft costing up to twice as much.**

The cabin is over 6 feet wide and 5 feet 8 inches tall. That's over **a foot wider and taller than the best-selling business jet** and provides P.180 passengers with ample room to stand up and move around freely.

Besides, the pusher engines direct sound toward the tail of the aircraft, leaving the P180's cabin virtually **free of power plant noise.**

Jet-like Cabin Comfort

1.75 m
(68.9 in)

1.85 m
(72.8 in)



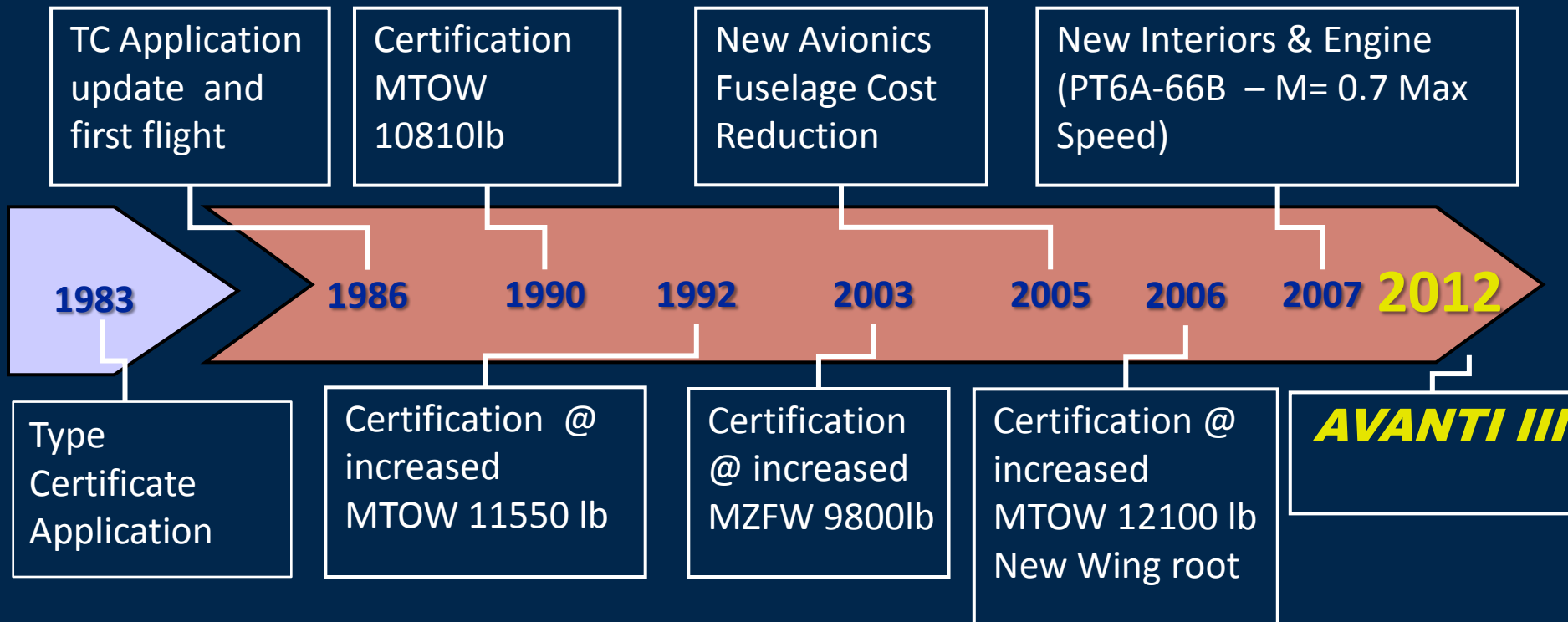
Cabin Comparison



Avanti *II*



P180: a continuous design and product improvement



**Rockwell
Collins**

ProLine 21

Avionics

Avanti II

STANDARD EQUIPMENT

No. 3 10" x 8" LC displays
Flight Management System FMS-3000
Global Positioning System GPS-4000A
Attitude Heading Reference System
Wx Radar w/ Turbulence Detection

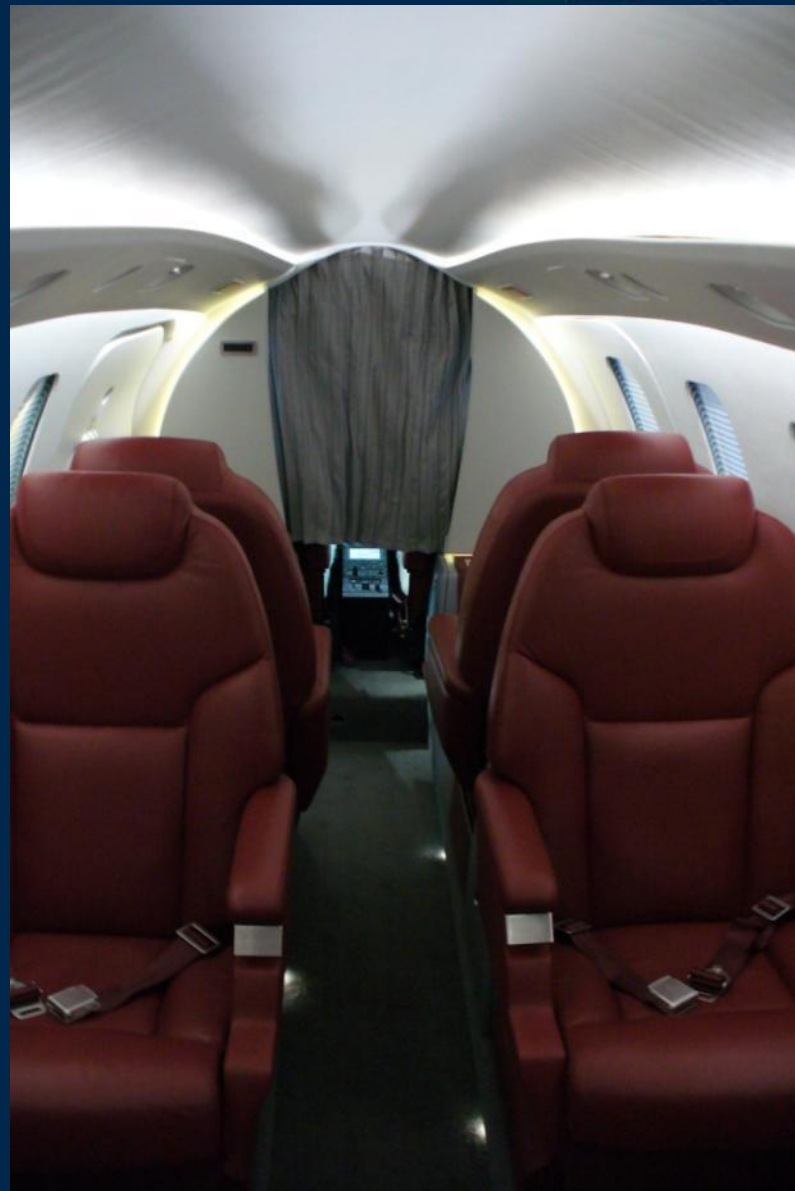
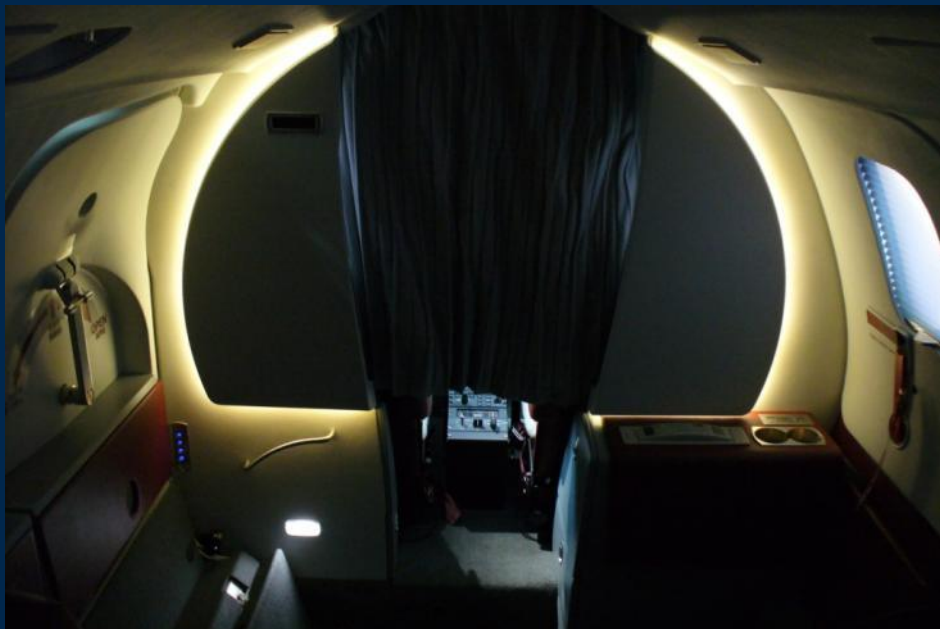
TCAS I; TAWS-B

IFIS Flight Information System

RVSM approved

Cat II approach capability

AirCell SATCOM



New Cabin Interiors



P.180 Special Missions



P180 – Special Mission



Maritime Patrol Version Study Proposal for Italian Coast Guard

P180 AVANTI II MPA

MISSION SENSORS & EQUIPMENT

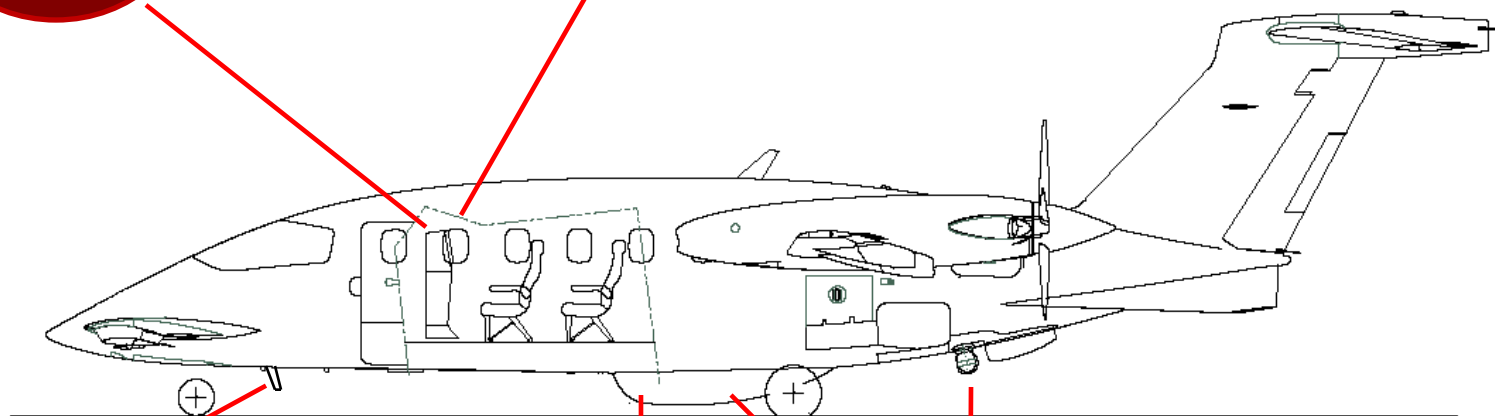


Operator Console + MMS



AIRBORNE TACTICAL COMMUNICATIONS:

- V/UHF/HF
- SATCOM



AIS Transponder



**Direction
Finder**



EO/IR Turret

Ground Surv. & Maritime Patrol

360° radar

EWADN NAPLES May 25th, 2011

FLIR System for Italian Navy





FLIR System
Operator's Console

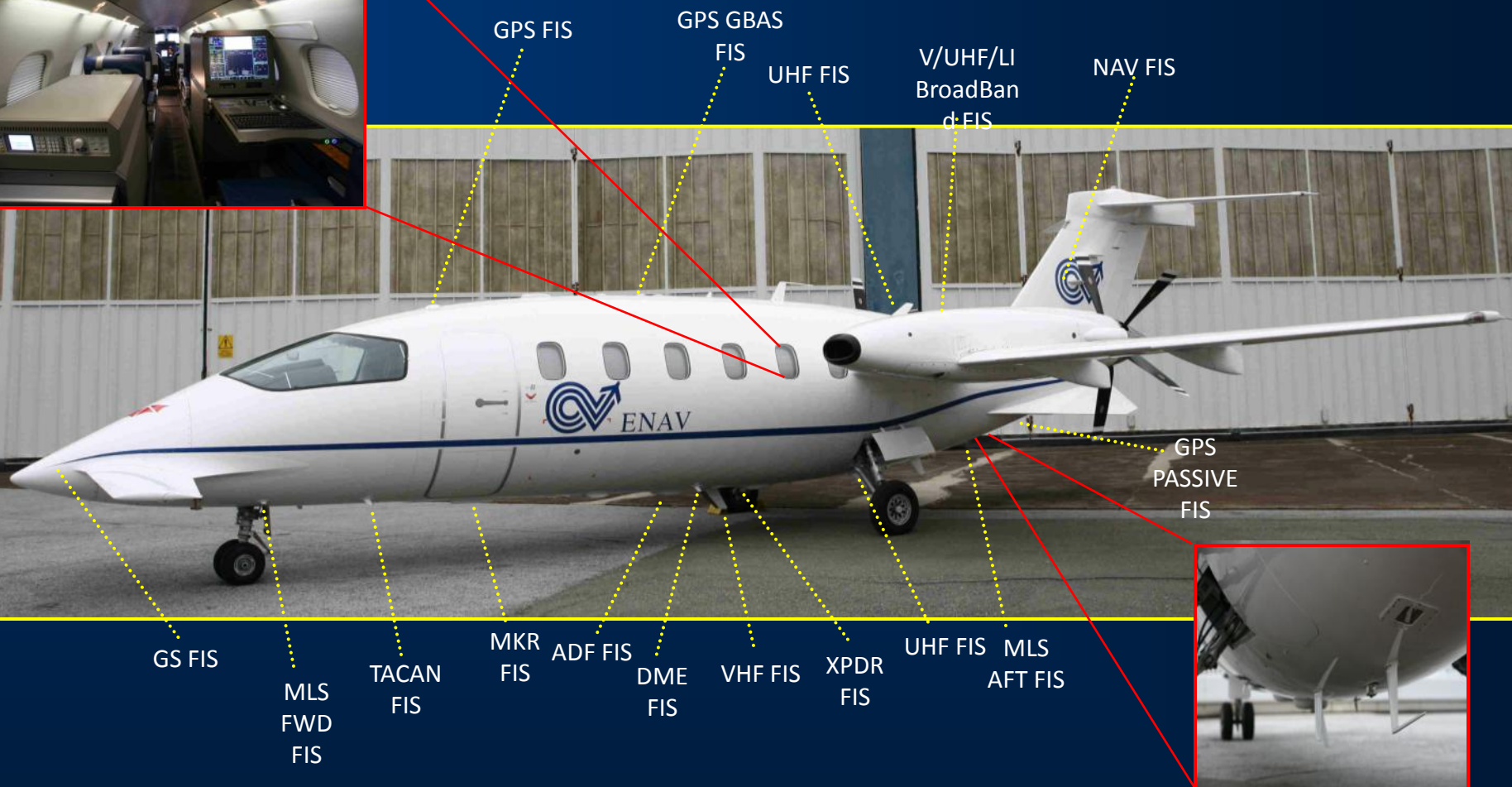
Special Missions



Flight Inspection

P180 Avanti II Flight Inspection

Automatic Flight Inspection System



Camera Update System
&
Laser Altimeter

P180 Avanti II Flight Inspection

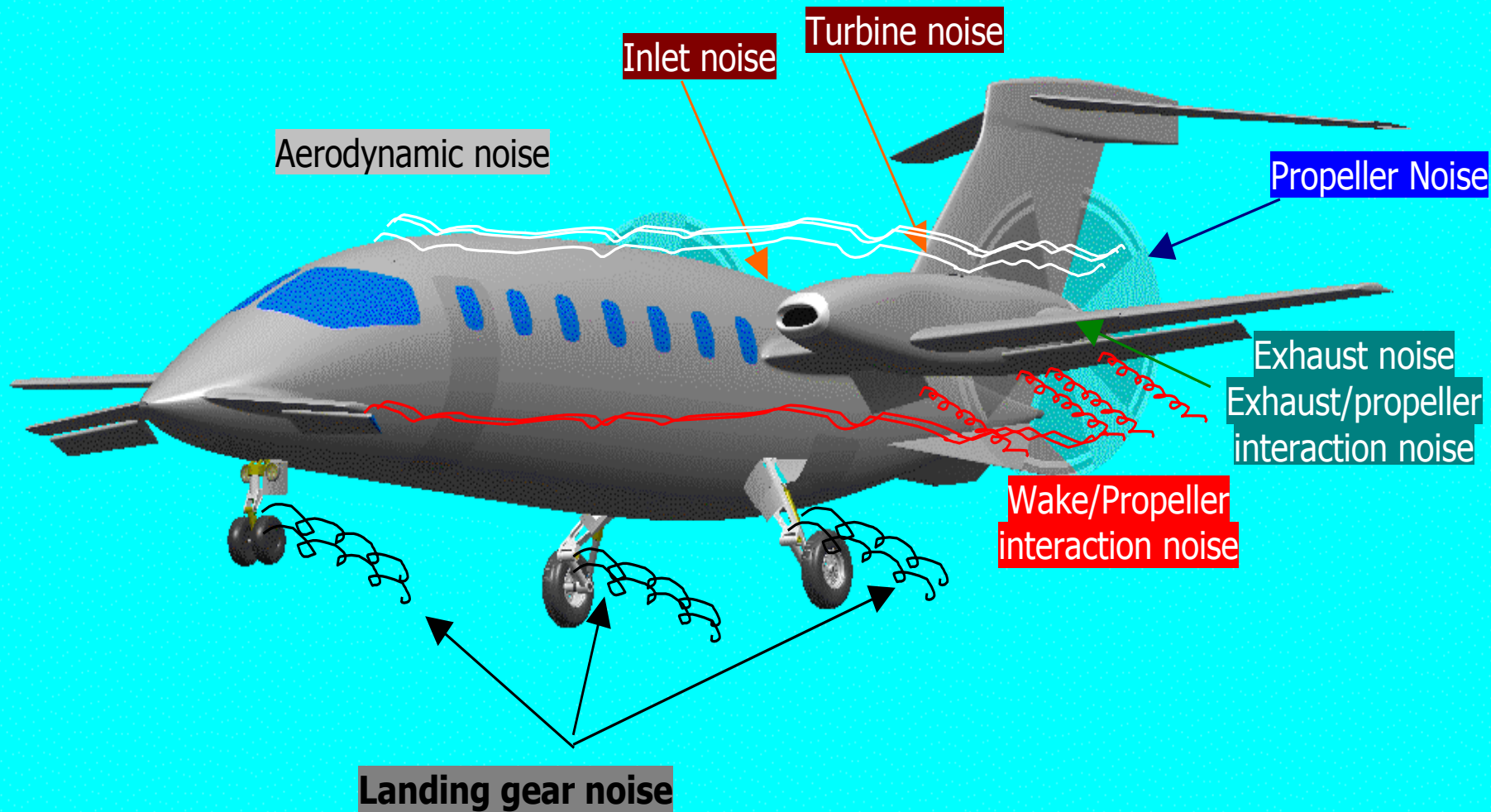


P180 – AVANTI III

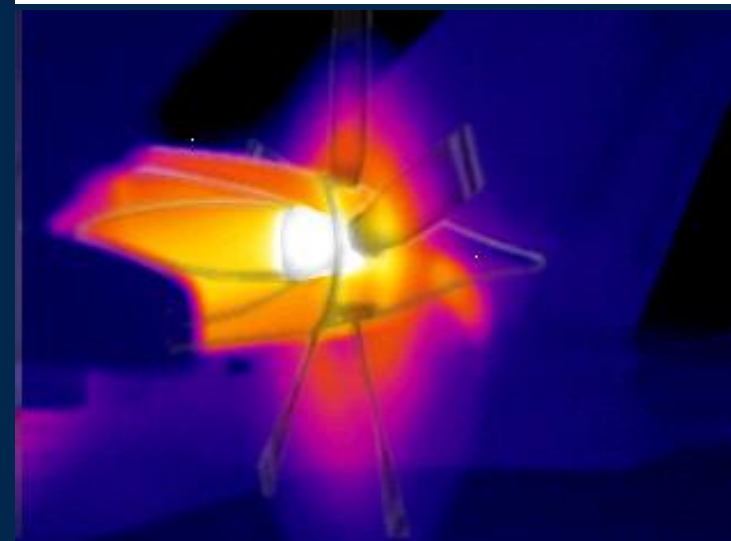
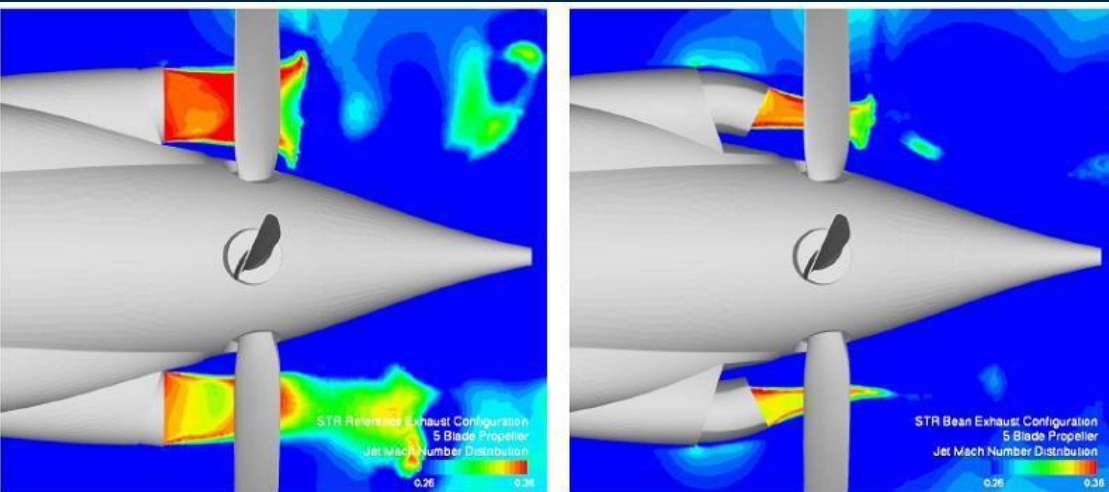
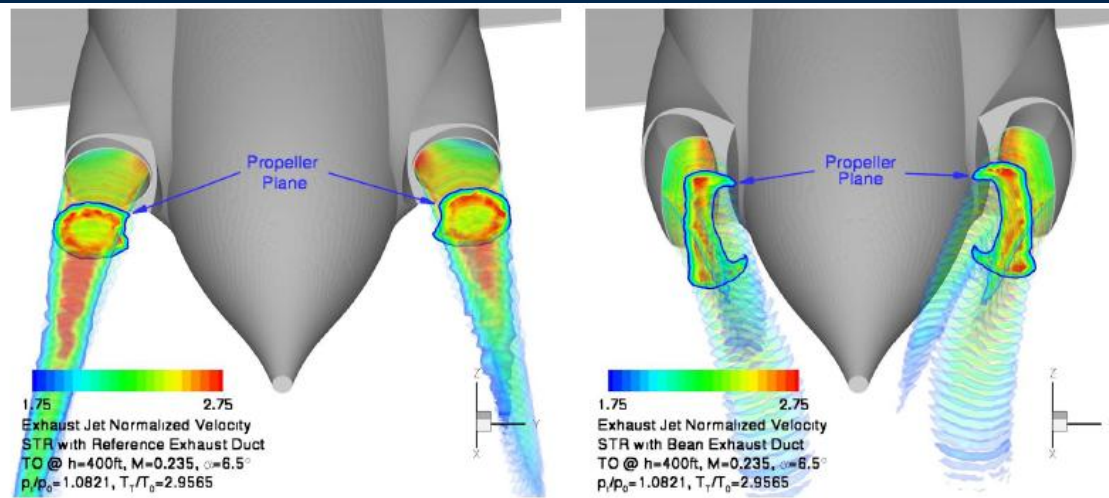


The new **AVANTI III** will embody additional features for further product and performance improvement:

- Additional fuel tank for extended range
- New Airconditioning System for passenger comfort improvement
- New Steering
- New low noise propellers and exhaust



P180 – AVANTI III – New Propeller



***THANKS FOR YOUR
ATTENTION***