ATR -600 Series The Latest Generation Turboprop

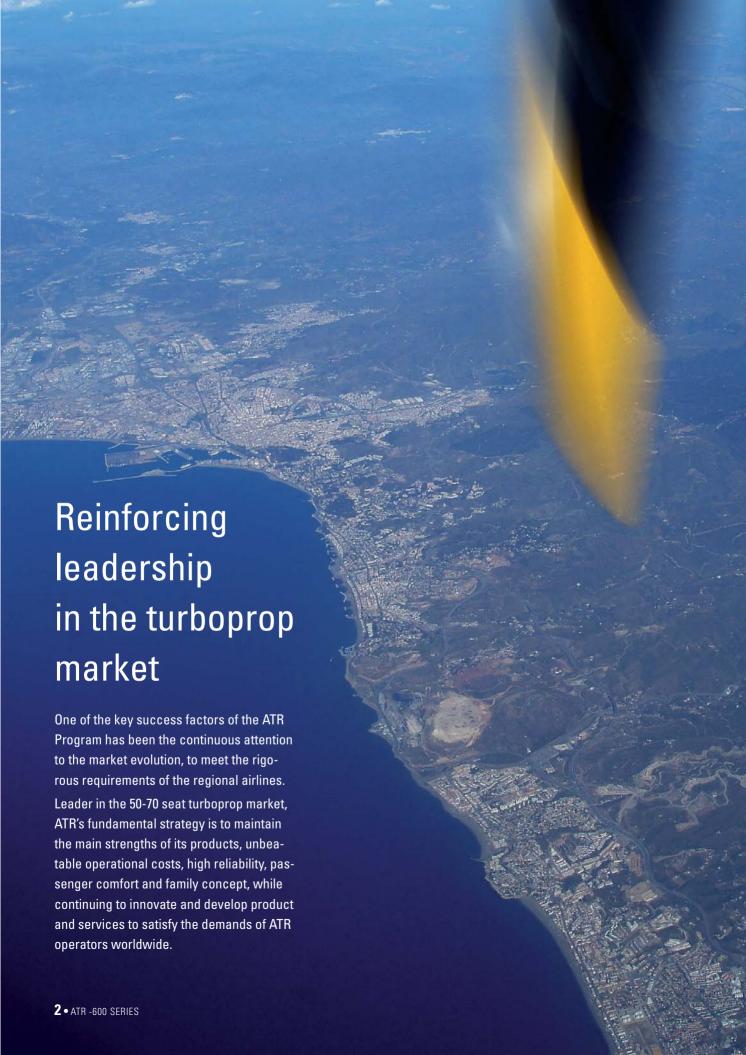














ATR Series -600 **Product Strategy**



n addition to the continuous design changes policy to comply with latest regulatory requirement evolutions, ATR is offering to regional airlines original and advanced solutions, keeping in mind essential drivers:

- Further enhance ATR competitiveness
- Reinforce and optimise operational flexibility
- Contribute to cost reduction initiatives
- Maintain the general ATR design philosophy, in terms of:
- Efficiency
- Easy retrofit
- High maintainability and reliability
- Strong commonality between ATR 500 and ATR 600
 Series
- ATR 42 and ATR 72 : two models, one aircraft
- Unbeatable operating cost





Three main development axis have been identified and will be integral part of the ATR 600 Series evolution:

- Performance enhancement and expanded operational versatility
- Passengers' comfort and appeal
- Technology upgrade



Tailored to Regional Operation

emperature or altitude extremes from the Equator to the Arctic Circle are the daily environment for ATR aircraft.

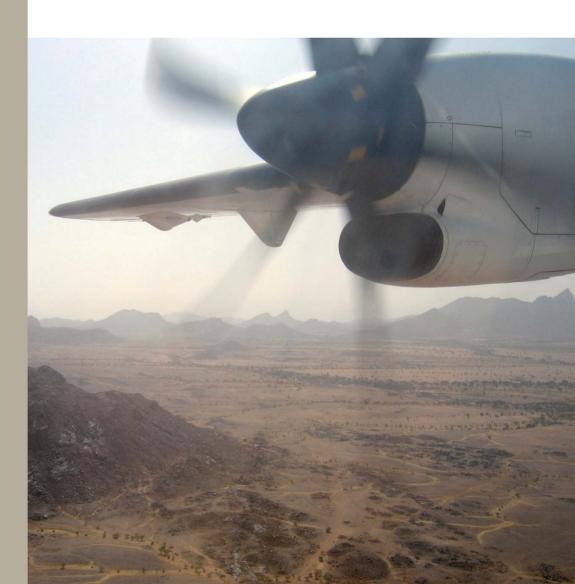
Operated today in all types of climates and conditions. ATR operational flexibit

Operated today in all types of climates and conditions, ATR operational flexibility and versatility are recognized worldwide by regional operators.

Structural efficiency, together with an advanced aerodynamic design and state-of-the-art Pratt & Whitney Canada PW100 Series engines, keep fuel burn to a minimum.

Expanding further operational versatility is the objective of ATR, to provide airlines with performance even more tailored to suit regional operations and increase revenues.

Providing exactly what the customer needs in a fast evolving market.



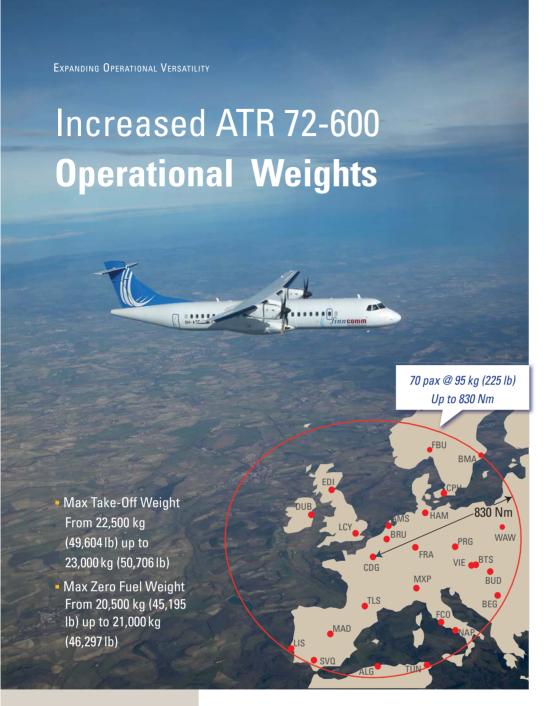
Enhanced Performance

- Increased ATR 72-600 operational weights
- Improved « hot & high » airport performance with PW127M engine
- PW127M multi-rated engine
- Short runways' takeoff performance



and Expanded Operational Versatility





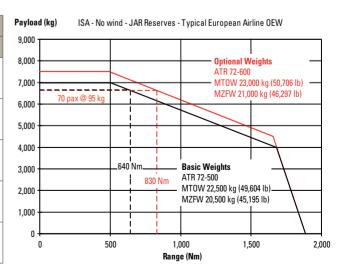
market requirement,
ATR 72-600 is
offered with increased
payload, making the
aircraft even more
attractive, also in terms of
operational range.

- Up to 500 kg (1,100 lb) higher payload for the same range, with additional 5-pax revenue
- or 190 Nm (350 km)
 extended range performance at same payload
 are now available with
 MTOW and MZFW
 increase of 500 kg
 (1,100 lb).

ADVANTAGES

- Higher weights meet new regulations calling for heavier passenger and baggage weight
- Meets airline requirements for high density cabin layouts

	ATR 72-500	ATR 72-600	
		Basic	Optional
MTOW	22,500 kg	22,800 kg	23,000 kg
	49,604 lb	50,265 lb	50,706 lb
MLW	22,350 kg	22,350 kg	22,350 kg
	49,272 lb	49,272 lb	49,272 lb
MZFW	20,500 kg	20,800 kg	21,000 kg
	45,195 lb	45,855 lb	46,297 lb
OEW (Basic)	12,950 kg	13,010 kg	13,010 kg
	28,549 lb	28,682 lb	28,682 lb
Max Payload	7,550 kg	7,790 kg	7,990 kg
	16,645 lb	17,173 lb	17,614 lb



Additional revenues in severe environments : **PW127M**



ithin the scope of providing even better performance and additional payload for the most demanding networks (hot & high airports, mountainous environment), ATR is offering a more powerful engine: the PW127M.

The PW127M delivers 5% higher thermodynamic power at Take-Off and Max Continuous ratings.

Owing to new ratings, performance is improved in terms of :

- Take-off weight between 500 kg and 600 kg (1,100 lb to 1.320 lb) when limitations exist
- Single-Engine Net ceiling increased by about 1,000 ft.

TAKE-OFF FROM DENVER

Altitude: 5,333 ft OAT: 77°F (25°C) 64 pax @ 220 lb (100 kg) OEW: 29,650 lb (13,450 kg)

- + 225 Nm with same payload or
- + 5 passengers for the same distance

130 Nm (240 km) range (PW127F) 355 Nm (658 km) range (PW 127M)

IMPROVED MAX CONTI-NUOUS RATING WITH PW127M

+ 1,000 ft Single-Engine Net Ceiling



Multi-Rated Engine Power



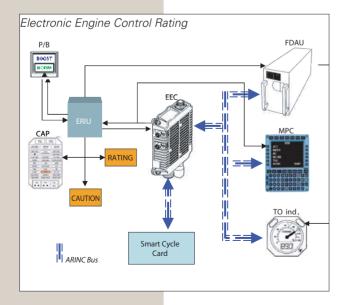
A unique engine hardware PW 127 for three power settings:

- PW127E
- PW127F
- PW127M

Engine rating selected through airframe identification system (EEC multiconfiguration)

Through the 'Flex Operation' concept, two levels of power are available for the ATR 72, allowing either PW127F ratings for standard operations or PW127M ratings for 'hot & high' operations.

As from early 2008, this engine is standard equipment. It is designed to be retrofitable on ATR -500 Series.



Engine Maintenance costs are controlled and optimized thanks to full commonality between the -500 and -600 Series.

PW127M «Flex» Operation Concept

P/B: Push/Button

CAP: Crew Alerting Panel

ERIU: Engine Rating Interface Unit FDAU: Flight Data Acquisition Unit

EEC : Electronic Engine Control

Short Runways

Take-Off Performance

(Reserve Take-Off: RTO 100%)

mproving take-off capabilities on very short runways or in case of near obstacles.

The result of this option is that the ATR 72-600 can be operated profitably from very short runways everywhere in the world, dramatically improving TOW and payload.

	ATR 72- 500 with Standard Procedure	ATR 72-600 with Full RTO Procedure Delta MTOW
Caticlan, Philippines r/w24 30°C, wet runway, Short runway (950 m)	Ref.	+900 Kg (1,980 lb)
London City r/w10 25°C, dry runway Obstacles	Ref.	+300 Kg (660 lb)
Lugano, Switzerland r/w19 Icing cond., dry runway Obstacles	Ref.	+300 Kg (660 lb)

TOW Improvement is function of runway characteristics and atmospheric conditions

Profitable operation from London City Airport

with ATR 72-600



Due to full RTO takeoff procedure, the ATR 72-600 can carry up to 70 passengers on a 300 Nm (550 km) sector (RW10, no wind, dry runway, 10°C).

ATR 72 aircraft have 6° steep slope approach capability, allowing operations at airports with difficult access







Enhancing Comfort & Appeal



Matching Passenger Expectations

TR benefits from the widest cabin in the turboprop market, providing maximum passenger space and setting high standards of comfort.

New style interiors offer more baggage room and feeling of space.

The new smooth, soft lines of the ceiling and cabin side panels, re-shaped and re-designed to offer passengers more space and light, create an harmonious and balanced environment where traveling is a pleasure.



The 'Super Elegance' Advanced Cabin Concept

The ultimate Comfort Efficiency combination

new cabin styling with advanced commercial furnishing specification will be available on ATR models in order to provide Customers with enhanced comfort. space and appeal.



hese changes are included in an evolving cabin definition, called "Super Elegance".

New seats. To satisfy the most demanding airline and passenger expectations, new type seats are offered, wider and light weight concept, combined with outstanding low maintenance features, meeting the latest requirements of cost conscious airlines (ergonomically designed to ensure «lasting comfort, greater knee/skin clearance to maximise comfort in high density configuration, superior machined structure and fewer parts to reduce cost of ownership, generous under-seat clearance).



 Restyled bins with higher volume efficiencv (+ 10 %) and more spacious providing a



large opening for easy and quick carry-on loading and unloading

• Allowing up to 70% of passengers to stow an IATA standard roller bag

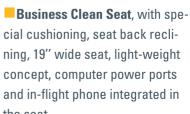
configuration, featuring a businessclass specific configuration with

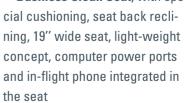
2 classes



appropriate seat and environment, cabin divider, win-









mitting the use of a Jetway (on option)

- New materials for side-wall and ceiling panels
- More spacious service and entrance area



LED Lighting

Cabin lighting based on LED technology for warmer and more agreeable atmosphere with soft and diffused lighting.

THE RIGHT COMBINATION OF:

- Low heat
- Low failure rate
- Low maintenance
- Low weight & volume
- Low power
- No radio emissions

WITH:

- High efficiency
- High reliability
- Much longer life

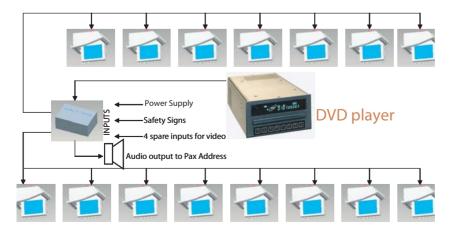
LED: Light-Emitting Diodes

In-Flight Entertainment (IFE)

System



o respond to market needs and evolving requirements coming from passengers and operators, ATR is now offering an IFE system for a more attractive passenger cabin.



MAIN FEATURES

- Integrated in PSU
- 5" screen
- Up to 18 screens in basic configuration
- Motorised
- Low weights
- Low maintenance





Technology Development





Flight safety and aircraft maintenance optimisation are two of the major requirements coming from Operators and Airworthiness Authorities.

Leadership is not only market share, but mainly technology at the service of low operating cost and high reliability.



NEW PRODUCTS LIPGRADES

- Multi-Purpose Computer (MPC)
- ACARS
- Paperless cockpit (EFB)
- Integrated Aircraft Centralized Maintenance System (ACMS)
- New Avionics Suite with Glass Cockpit

Multi-Purpose Computer

(MPC)

- The innovative concept for system equipment monitoring
- Upgradeable solution for flight safety and aircraft maintenance optimization
- Compliant with both current and foreseable future airworthiness regulations

Performance monitoring

MPC FEATURES

1 single computer for:

- APM (Aircraft Performance Monitoring) providing crew awareness of in-flight aircraft behaviour
- EHS (Enhanced Surveillance) required by March 2007, for aircraft parameters acquisition and transfer to transponders
- ADS-B (Auto Dependent Surveillance Broadcast) for aircraft parameters acquisition and transfer to transponders

Maintenance

- Aircraft Centralised Maintenance System
- QAR (Quick Access Recorder) allows to record FDR parameters on a PCMCIA card
- G-Meter records flight and landing vertical accelerations without FDR reading
- Maintenance/BITE monitoring availability of BITE messages in the cockpit; provides recommendations in plain text
- ACMS (Aircraft Conditions Monitoring System) for aircraft parameters analysis for troubleshooting purpose
- FDEP (Flight Data Entry and Printout) simulation (FDAU interface) plain text FDEP page in Computer Display
- Engine Parameters Processing and Downloading [under development]



Multi-Purpose Computer - APM

ncreasing pilot situation awareness, safety enhancement through real time acquisition and trend monitoring of aircraft parameters and computation of Minimum Speed according to aircraft configuration.

APM - Aircraft Performance Monitoring

This system is unique in the aviation industry, with the benefits of enhancing aircraft safety and protection, acting on crew awareness:

- Real time acquisition of flight data and aircraft parameters
- Computation of theoretical performance according to flight conditions
- Comparison between actual and theoretical performance (weight, speeds, ...)
- If discrepancy, alert and warning are delivered to crew









APM

The Man/Machine Interface Concept

Cruise Speed Low

The indicator illuminates when cruise IAS¹ is lower than the expected value

Degraded performance

During climb, cruise and descent, it alerts the crew that:

- Performance is being degraded
- QRH² procedures must be applied
- Increase Speed

The indicator flashes as soon as minimum icing speed is reached and the aircraft speed has to be increased.

- Gives evidence to the crew of « severe ice » effect on the aircraft performance
- Alerts the crew about compliance with the minimum required IAS (Indicating Air Speed)
- Shows evidence of external conditions encountered as proof of compliance of timely procedure application

Three significant indicators placed in front of the pilot and the co-pilot display this information in the following way:

Draws pilot's attention	Indicates minimum speed	Helps pilot to justify
CRUISE SPEED LOW DEGRADED PERF	INCREASE SPEED	 Record all alerts in FDR Refer to existing procedures after a 'Degraded performance'

Multi-Purpose Computer

Other Features

EHS - Enhanced Surveillance

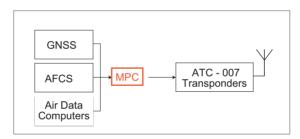
WHY?

- European regulation for down-linking aircraft parameters:
 - Roll angle Selected attitude Vertical rate True air speed Indicated airspeed True track angle Ground speed Magnetic heading, for Air Traffic Control purposes
- Required by March 31th 2007 (TGL 18 → NPA 20-12a)

HOW

 The MPC acquires, formats and sends parameters required by the ATC to the transponders.

Note: Transponder -007 required (standard fit in production)



EHS Architecture

FDEP Replacement

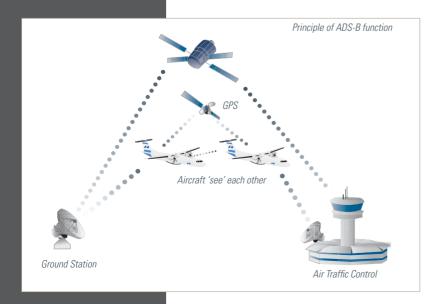
WHY?

To improve Man/Machine Interface

HOW?

- FDEP is removed
- MCDU has a FDEP page in plain text





ADS-B : Automatic Dependent Surveillance Broadcast

- To make aircraft data available to other ADS-B capable aircraft and ATC Centers
- To improve aircraft situational awareness and knowledge

ACMS -Aircraft Condition Monitoring System

WHY?

Addition of more functions specified by ATR or operators maintenance staff
 Capable of doing complementary aircraft parameters analysis

HOW?

- Use of acquired parameters
- Use of a ground station (for customization by operator)



ACMS Capabilities

QAR - Quick Access Recorder

WHY?

 Operators request to carry out specific flight analyses

HOW?

- Recording of all Flight Data Recorder (FDR) parameters on a PCM-CIA card
- MPC delivered with a 256-Mb card
- May store up to 1Gb i.e.
 more than 2,200 flight hours in 64 words per second (wps) FDR
 - or more than 500 FH with a 256 wps FDR

both intended

BITE WHY?

- To make available BITE data reading and/or analysis tools in the cockpit
- To give recommendations in plain text

HOW?

- Get access to existing BITE data in the relevant computers
- Read BITE messages through a MCDU BITE page



MPC - Multi-Purpose Computer **Main Operators Benefits**



- One single computer able to manage various functionalities
- All available for retrofit

Improve Crew Situational Awareness and Knowledge

- Improve knowledge of both internal and external environ
- Alert crew about aircraft performance degradation
- Enhance traffic management and improve safety

Optimized Solution

- Combination of different functions into one evolving unit
- Allows to add new functions without a complete new equipment

Effective Maintenance

- Maintenance information centralized and directly available on a single display
- More accurate diagnoses and recommendations
- Anticipate maintenance tasks

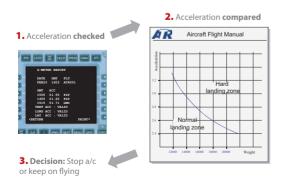
G-Meter

WHY?

- To be able to read aircraft flight and max landing vertical accelerations, without Flight Data Recorder reading
- To avoid a lengthy immobilization of the aircraft by making a FDR analysis

HOW?

- Access and reading through an MCDU1 G-Meter page
- Storage of max vertical acceleration in the PCMCIA card



It is based on the Aircraft Condition Monitoring System (ACMS) function of MPC, and on the current functions of the Multi Function Computer (MFC), allowing failure source identification. It does not require additional equipment, but only a software evolution.

Flight Data Acquisition Unit (FDAU) data accessed through MPC to create:

- Engine reports for trend monitoring
- Reading engine parameters exceedance report, avoiding a lengthly immobilization of the aircraft, by making a FDR analysis.

Multi-Purpose Computer

Other Features

Integrated ACMS (Aircraft Centralized Maintenance System)

This system can offer additional functionalities, for example:

- On-line Troubleshooting Aid, through:
 - Interrogating on line the ATR TS data bank
 - Selecting the most probable scenario
 - Identifying suspect LRU¹
 - Validating customer experience.

1: LRU: Line Replaceable Unit



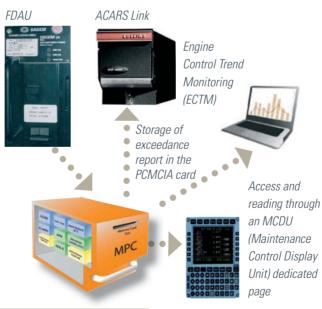
OPERATORS BENEFITS

- Automatic Pilot Flight Report
 - In flight/on ground data link when combined with ACARS
- Improved Maintenance
- Reliable system monitoring
- Effective troubleshooting
- Improved Dispatchability

Flight report

- Faulty LRU¹ identification
- Minimum Equipment List (MEL) management

Engine Parameters Processing & Downloading



- Engine parameters exceedance available without Flight Data Recorder (FDR) reading
- Data access and reading through dedicated MPC function
- PCMCIA card storage report
- Report files available for download via VHF network through ACARS

OPERATORS BENEFITS

- Will replace or integrate DMT tool for creating data directly usable for ECTM reports
- No aircraft hardware utilisation
- Engine files erected on PCMCIA card and/or will be downloadable with ACARS.



ACARS - Aircraft Communications Addressing & Reporting System

- Up/down-loading digital data via VHF network
- Customisable with dedicated tools
- Improved communication between aircraft, Operator's base and ATC (Air Traffic Control)

MESSAGE TYPES

- Position reporting
- ATIS report
- Pre-departure clearance
- Passenger service
- Take-off data
- Emergency report
- Delay report
- Fuel status
- Engines report



OPERATORS BENEFITS

- Faster and more accurate information flow
- Enhanced flight safety
- Increased operational efficiency
- Improved passenger service
- Reduced crew workload
- Reduced maintenance and operating costs

■ EFB - Electronic Flight Bag

Provides flight crew with a paperless cockpit, replacing the current paper-based documentation

Pilots will have at their fingertips moving maps, graphical weather forecasts, terrain mapping and a variety of aviation data and functions.

EFB FEATURES

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



Integration in the cockpit

A multi-function tool for the modern cockpit





he ATR avionics have been improved and developed during recent years essentially to face required regulatory evolutions, in connection with new required functionalities:

- FM immunity, 8.33 KHz radio, B-RNAV, ACAS, **TAWS**
- HF, ACARS, ...

Regional air transport's dramatic evolution and continuous requirements for advanced state-of-the-art technology turboprops, are now the drivers for further ATR avionics upgrading.

The new avionics suite will modify significantly the display of the main information and data required by the pilot to achieve his main tasks: operate, navigate and manage.

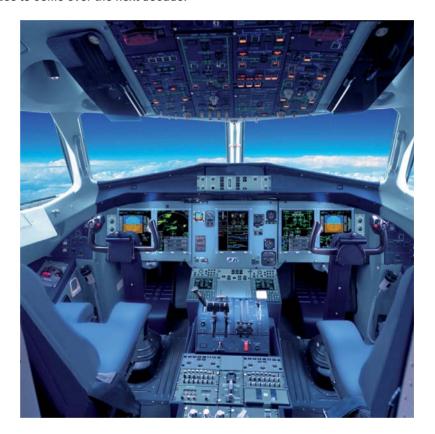
This will simplify the cockpit dramatically and allows pilots to focus only on the most pertinent information.

All these changes will improve situational awareness and customise the man-machine interface to enhance safety.

ATR -600 Series **New Avionics Suite**

The most modern Glass Cockpit in the regional aircraft market

The major design objective of the new avionics' suite offered on the ATR -600 Series is to provide the crew with the most realistic picture of the in-flight situation and with the most comprehensive aircraft systems displays. It is also to ensure that today, with an evolving concept, we cater for the latest navigation and communication techniques to come over the next decade.



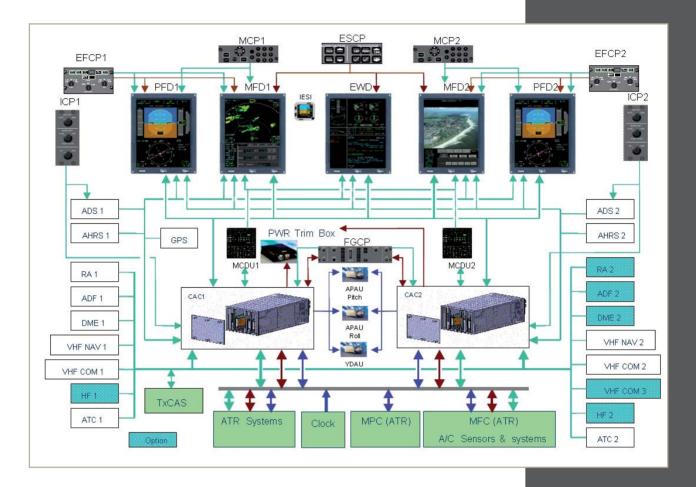
Simplified, integrated LCD advanced functions will enhance safety, reliability, handling for pilots, while contributing to maintenance cost savings and weight reduction.

The cockpit will be designed in order to replace most of the present instruments by five 6" x 8" LCD displays composed of:

- 2 Primary Flight Displays (PFD),
- 2 Multi-Function Displays (MFD),
- 1 Engine & Warning Display (EWD)

ATR -600 Series will be also capable of Category IIIA approach (landing with a decision height of 50ft), in addition to GPS capability for Non-Precision Approach 0.3Nm.

General System Architecture



ATR -600 Series aircraft: Advanced solutions and superior performance compared to previous generation Glass Cockpit in terms of:

- Operations and Situational Awareness
- Maintenance
- Performance
- Technology



Easier **Maintenance**

- On-Wing SW and Database high-speed upload via standard Data-loader (A429/ Ethernet) or Flashcard
- Centralized Maintenance with Plain English fault report
- Raw Maintenance data displayed on MFD
- Engine Run Up pages
- Aircraft Configuration management via software pin-prog to manage options
- Enhanced BITE operation thanks to latest THALES development on recent programs
- Maintenance operation (BITE read out) possible on failed Core Avionic

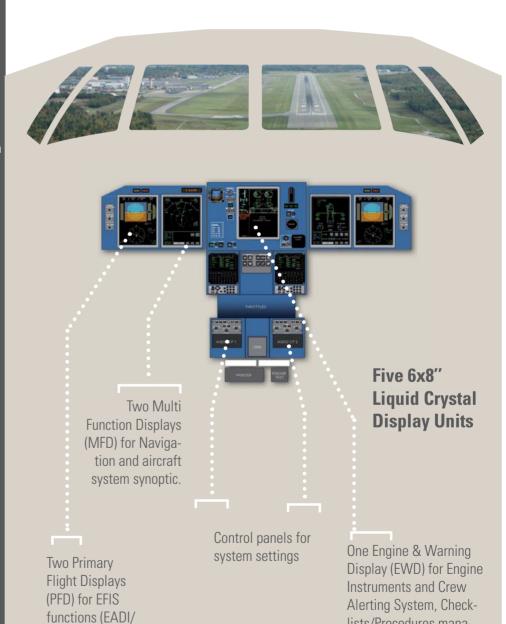
No reset required to retrieve data allowing improved isolation and identification of failed item thus reducing NFF and allowing product future improvement

Reset of one embedded application without resetting the HW module on CAC

EHSI)

ATR -600 Series: **Flight Deck General Architecture**

Latest Integrated Modular Avionics Technology certified on the A380 program



lists/Procedures mana-

gement and permanent

data.

Five 6" x 8" LCD Units

2 Primary Flight Displays - PFD

PFD's integrate multiple conventional instruments:



Simplified, integrated LCD advanced functions enhance safety, reliability, handling for pilots, while contributing to maintenance cost savings and weight reduction.

→ EADI on top

- Digital ASI
- Radio altitude
- Lateral & vertical deviation
- FD guidance

→ EHSI on bottom

- Bearing pointers
- TAWS or WSR data

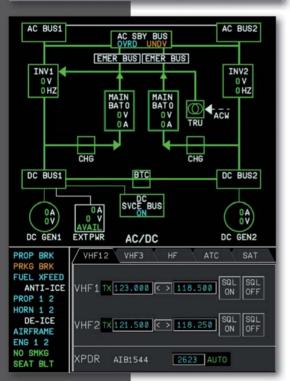
- Speed trend
- Managed/selected speeds
- Rolling barometric altitude display
- → Vertical speed
- Flight mode, icing conditions annunciations

Rolling Air Speed Indicator with speed bugs

- V-speeds
- Low and over speeds

TECHNOLOGY DEVELOPMENT





2 Multi-Function Displays - MFD

MFD's integrate multiple sensors:

→ Navigation display

- Actual & selected heading
- Bearing pointers
- FMS data
- Navaids
- TAWS or WXR image
- TCAS data

- System and utilities pages
 - Cabin
 - Electric
 - Hydraulic
- Engine
- → Video (optional)
- → Memo panel
- → Radio management

■ Engine & Warning Display - EWD

- → Primary engine parameters
 - Flight controls position indication (Trim, Flaps)
- → Crew Alerting Panel
- → Emergency, Normal and Abnormal procedure display
- → Permanent data (TAT, SAT, Gross Weight, Fuel on board...)



Superior Performance compared to previous generation Glass Cockpit

The new technology available on ATR -600 Series aircraft features advanced solutions and superior performance compared to previous generation Glass Cockpit. These may be recognized in all operational domains.

Improved Operations and situational Awareness

- → RNP 0.3 ready with path for lower RNP
- → Cat IIIA operations with decision height down to 50 ft, no need of additional hardware such HUD
- → Provision for Vertical Situation Display
- → Provision for ADS-B with CDTI
- → Airport Moving Map function
- → WAAS capability

→ Easier Maintenance : Centralized Maintenance System

Better performance

- → 30% lower P/N count
- → Improved MTBF, 15% cockpit Direct

Maintenance Costs reduction

Growth capability



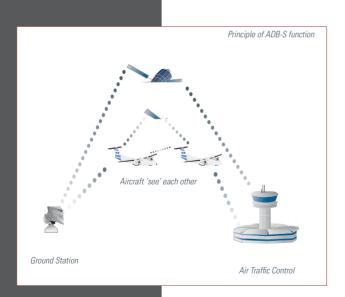


ATR-600 Series with RNP 0.3 AP Capability

The benefits of RNP

- → Shorter routes, resulting in reduced fuel consumption, emissions of CO2 and NOx
- → 15-20 kg fuel savings per RNP approach
- Complete landings in a broader range of weather conditions
- → Improved minima compared to existing non-precision approaches
- → Improved access to airports and safety

→ ADS-B - Automatic Dependent Surveillance - Broadcast



- To make aircraft data available to other ADS-B capable aircraft and ATC centers
- To improve aircraft situational awareness and knowledge
- To enhance ATC surveillance currently provided by radars
- To replace primary/secondary ground radars

 Note: No firm certification basis available today; on-going
 experimentation.
- MPC acquires, formats and sends required parameters to transponders

Note: Transponders to be upgraded to -108

Glossary

ACAS: Aircraft Collision Alerting System

ADS-B: Automatic Dependent Surveillance -

Broadcast

ASI: Air Speed Indicator

ATC: Air Traffic Control

CDTI: Cockpit Display of Traffic Information

DME: Distance Measuring Equipment

EADI: Electronic Attitude Director Indicator

EGPWS: Enhanced Ground Proximity Warning Sys-

tem (or TAWS, OACI designation)

EHSI: Electronic Horizontal Situation Indicator

MTBF: Mean Time Between Failure

NFF: No Fault Found

RMI: Radio Magnetic Indicator

RNP: Required Navigation Procedure

TAWS: Terrain Awareness and Warning System

TCAS: Traffic Collision Avoidance System (or

ACAS, OACI designation)

VSI/TRA: Vertical Speed Indicator/Traffic Resolu-

tion Advisory

WAAS: Wide Area Augmentation System

WSR: Weather Surveillance Radar

WXR: Weather X-Ray

ATR -600 Series Never Ending Innovation



