



>> Aircraft Analysis – ATR 42/72 600 Series

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Being the launch customer of a new aircraft can provide an air carrier with a number of advantages; this can be a significant contribution to the design process, or possibly secure a good deal on the unit price of the aircraft- not to mention the enormous publicity opportunity involved.

As the international media converged on the 2011 Paris air show, it became evident that attention quickly turned to a shiny new ATR72-600 painted in the livery of its launch customer Royal Air Maroc (RAM). The European turboprop manufacturer used the Paris platform to debut its latest product which it claims is now the most advanced turboprop in its class.

ATR launched the ATR42/72-600 programme in 2007 as a progression from the -500 series. In 2009, RAM signed an order worth more than \$125m for two ATR42-600s and four ATR72-600s with options for two additional 72-600s.

In justifying the reasons behind the ATR purchase, Mr. Driss Benhima, president of RAM, said the new ATR derivatives had the most ideal operational attributes for its operations. "We decided to launch a call for new turboprop aircraft and according to the results of our technical,



ATR CEO Filippo Bagnato (right) hands over keys to a new ATR72-600 to Mr. Driss Benhima president of RAM.

economical and exploitation studies, the ATR-600 series proved to be the right choice for us."

The new ATRs will be operated exclusively by regional subsidiary RAM Express. The aircraft are configured with 48 and 70 seats for the - 42 and -72s respectively. "We are using the new ATRs to provide new air connectivity to the regions, enabling them to reinforce their appeal and helping to promote inland tourism," said Mr. Benhima.

A critical factor worth noting is the climatic conditions in North Africa. Operations in desert or near desert conditions can be a problem for an airline, having to take into consideration adverse factors such as extreme temperatures and sand. Turboprops that are able to produce an optimal performance in such hot conditions have an operational advantage.

The design philosophy for the new ATRs supposedly addresses the adversity. The high wing provides an obvious advantage it shields the engines from sand erosion. On some jets with a low wing, sand can cause problems including premature engine wear.

The ATR72-600 obtained European Aviation Safety Agency (EASA) certification in May 2011, a prerequisite for its entry into service. The smaller ATR42-600 is due for certification by the year end with service entry expected in 2012. The list price for a new 72-600 is \$22.7m, which is \$800,000 more than its predecessor, the 72-500. The 42-600 sells for \$18.9m, again \$800,000 more than the -500 version.

ATR say the -600s have built upon the improvements of the current -500 series, which has proved popular with a number of African carriers such as Air Botswana, Precision Air and Air

Algerie. The -500 variants will still be produced concurrently with the newer -600s until 2013. ATR has hinted that 2014 will see the termination of the -500 production run. However, the manufacturer does not want to rule out -500 orders too quickly, in case a -500 customer would want to keep fleet homogeneity.

The most noticeable upgrade on the -600s is an enhanced cockpit equipped with upgraded avionics instrumentation. This includes the latest navigation, recording, autopilot and communications.. The introduction of a glass cockpit comes with a completely new avionics suite.

The rationale behind the commissioning of the new cockpit according to ATR was to provide the crew with the most realistic picture of the in-flight situation, while evolving to cater for the latest navigation and communications techniques that will come over the next decade.

The new avionics replace the Electronic Flight Instrument System (EFIS) with five large liquid crystal displays that comprise of two primary flight displays, two multi-function displays and one engine and warning display. The -600s will be capable of Category IIIA approach, (landing with a decision height of 50 feet) and Required Navigation Procedure (RNP) capabilities. The new avionics are also compatible with

the much anticipated Auto Dependant Surveillance Broadcast (ADS-B) technology.

All the main improvements according to ATR, will provide advantages and performance improvements in terms of weight reduction, reliability, energy consumption and durability. The new avionics suite is developed by Thales Avionics. Within the framework of this contract, Thales developed a flight deck that would considerably simplify work for pilots. Furthermore, the ATR-600s are the first regional aircraft to feature an Avionics Full Duplex Switched Ethernet (AFDX) network.

An example of the drive for simplicity is the Electronic Flight Bag (EFB). It is a touch-screen display that is readable in all light conditions and it is used for the management of in-flight and ground information. EFB effectively eliminates flight deck paper by providing automated take-off and landing calculations.

The -600 series is the launch platform for the Pratt & Whitney PW127 M engine. It is the enhanced version of the PW127 engine family already installed on the -500s. The engine upgrade supplies, on demand, 5% higher thermodynamic power for operations in hot and high airports. ATR now offers the new engines on any ATR 42-500 or 72-500 that rolls off its assembly lines. The PW127 M also improves the ATRs' one-engine-out ceiling by about 1,000 feet. On the -600s, the extra power will help raise payload weights to address the demands of increasing passenger and baggage size.

An interesting feature of ATRs is that they are not fitted with an Auxiliary Power Unit



A new glass cockpit comes with a completely new avionics suite.

(APU) a mini engine usually at the rear of an aircraft used to generate power while on the ground. Instead, the ATRs are equipped with a propeller brake, commonly known as "Hotel Mode" by pilots. The system stops the propeller on one engine, allowing the turbine to run and provide air and power to the aircraft without the propeller spinning.

The Hotel Mode function provides all the facilities and benefits of an APU without the cost of the added weight. ATR calculations indicate that a typical airline operation can save about \$24,000 per aircraft annually by using a propeller brake rather than an APU; based on weight, acquisition costs, fuel consumption and maintenance.

One of the challenges was improving the interior design; the current -500 series has already been developed with a number of nifty features and is recognised for low interior noise and vibration. ATR and Italian design firm Giugiaro developed the new Armonia cabin for the -600s. It features ergonomic and weight saving seats, 30% wider overhead

bins, LED lighting and optional three-abreast premium class configuration with forward passenger door. ATR indicates that its engineers found a good trade-off between bin volume and headroom.

By the end of September 2011, ATR recorded 145 firm orders and 72 options since the beginning of the year. The company claims to have gained 80% share of this year's regional aircraft market. The value of these orders is estimated at \$4.8bn including options. The ATR backlog is now at 275 aircraft valued at \$6.2bn and represents nearly four years of production.

The acquisition of the new ATR 600s graphically illustrates continuing investment by RAM as it works to compete in a liberalised market. In an attempt to boost tourist arrivals by 1 million a year, Morocco initiated an open skies agreement with the EU in 2006. Local analysts quickly expressed concerns about the impact of increased competition on RAM, especially from the Low Cost Carriers (LCC).

The Centre for Aviation CAPA shows that the LCC market in Morocco doubled in the first year of open skies from 10.9% in 2006 to 22.9% in 2007. RAM

also faces home-grown LCC competition in the form Air Arabia Maroc a cross-border joint venture formed by Air Arabia and Moroccan investors in 2009 which first flew in May-2009 as well as Jet4you, the country's first private LCC, which commenced service in February 2006.

"We cannot get rid of this competition," affirmed Benhima. "We have to face it. We will reinforce our position as a legacy carrier and develop our hub network from Casablanca." However, it seems that reinforcing the carrier's position might be tougher than expected. The recent political issues in the region and terrorist attacks in the country have reduced crucial tourist arrivals.

The drop in passenger numbers came amid proposed job cuts as the airline admitted to continuing losses. Some analysts project losses of around \$100m for this financial year. The staff cuts could equate to more than a quarter of the entire workforce. At the time of the announcement Mr. Benhima said that the redundancies were designed to "turn around and develop the company," which has been in a "critical situation" since the start of the global downturn. He said that RAM would be selling some of its non-aviation assets to fund the cost of the redundancy settlements.

By replacing older aircraft with new ATRs and B787s on order, this should reduce RAM's operating costs. The airline also has several 737-800s on order, allowing the airline to retire its ageing 767s, 737-400s and 500s. The airline has officially announced that it will reduce its fleet size due to its financial situation with some aircraft heading for storage. ■