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# GLOBAL Aviator

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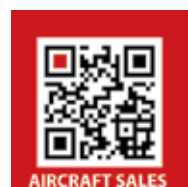
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## Global View



By Owen Zupp

# Just a Country Airfield

It is always worth advancing with one eye cast over one's shoulder.

Whether conducting a flight on a sunny day and checking whether those clouds are closing in behind, or forging a new frontier and choosing to respect the lessons of the past. Hindsight is not merely 20/20 vision, it is a building block provided by those that have gone before.

These building blocks can take many forms; from air crash investigations to a wise old pilot's words of warning in the 'back bar'. Regardless of the means of delivery, credible, respected knowledge is worth its weight in gold and yet it is so often provided free of charge to those that possess the patience to pause, look and listen.

Recently I walked away from the computer keyboard, files and manuals that are the life-blood of my writing. With my family, we drove through along rolling ridges and sun-struck Canola fields until we came upon a small country township. At first glance, it offered the usual sights of a rural setting; livestock, harvesters and main streets that are wide enough to turn a bullock-team. But drive a little through the town and there's more; so very much more.

A few kilometres out of town and over the railway line lies Temora Airport. In the dark days of World War Two this airfield was the thriving home to No.10 Elementary Flying Training School (EFTS). It was here that many of the Empire's pilots of that conflict first took to the sky and earned their wings in the timeless deHavilland Tiger Moth. It was a training scheme that spanned the Commonwealth,

from Canada to South Africa.

As you wander about the airfield, some original barracks and buildings still remain while more modern memorials provide a tribute to those that have gone before. It is a scene repeated at various corners of the globe at small country airfields. Almost forgotten today, they were once pivotal facilities in a world at war. And should you opt to explore a little further, you'll undoubtedly discover some old foundations or a patch of hardstand concealed amongst the grass. Yet in this digital age, this country town still has something very special to offer and some lessons from yesteryear still to heed; for it is home to a very special aviation museum.

It is special because it is a living, breathing museum. The aircraft still fly and the words of veterans are there for all to see upon its walls and through its oral histories. However, it is on the flying days that some real magic happens. Those wondrous aeroplanes that flew in support of the Commonwealth's freedom across the years come to life and fill the skies with sounds and sights that are now so rarely witnessed. Between the dashing fly past of a Spitfire, or the gentle roll of a Gloster Meteor, the words of veterans are there to be heard. Their voices have weakened ever so slightly with the passage of time, but their memories are still crystal clear as they are released once again through the loud-speakers overhead. Men and women who served selflessly in a very different time share their insights with the gathered crowd.

The modern day pilots of these vintage machines offer their expert insights and then it's time for another graceful sweep of the sky by another graceful set of wings.

Back at sea level there are active workshops to view from the gallery, other veteran aircraft to admire and walls and walls of photographs and tales. Many of the specific skills required to keep these aircraft aloft are passed down from engineer to engineer; no longer taught in technical colleges or your regular hangar. It is a pleasure to watch true tradesman at work, preserving and conserving, while the world outside is one of 'new and improved' models and a throw-away mindset.

Then the sound of a Merlin engine catches the ear and all heads tilt skyward, shielding the sun in an informal salute. While modern aviation is dominated by fuel-efficient twin turbo-fans, the air show gives the sky personality; a face and a heart-beat. Graceful silhouettes and magical sounds intermingle with the occasional cloud and the lightest of breezes. And yet even these majestic aircraft are merely inert metal without the people behind them. From those veterans of yesteryear to the professionals of today, it is the people and their passion that breathe the life into these wonderful machines.

And when the display has finished and the Merlin's sigh is replaced by the chug of the tractor putting the aircraft to bed, there are still special moments to be found. As the sun sits lower and the breeze flicks the top of the blades of the long grass, a few keen airmen

seek to grab the last rays of light and skip through the sky one last time. Seated silently where those pioneers once walked, a Pitts stall turns overhead and an RV10 closes the throttle as the 'piano keys' pass beneath. They are new sounds being sung by new aircraft in a new world, saluting the roar of those aircraft that have gone before.

Aircraft and airmen are always well advised to build upon those lessons already learned. The nostalgia of air shows can bring those lessons alive through both men and machines of a bygone time and all the grace that comes with them. And then, once the excitement has passed and the day is nearly done, find a quiet corner and sit down amongst the grass. If you listen ever so carefully you might hear the wind passing through the wires of a biplane, or catch a whisper from those excited youths who were valiant airmen in darker days. Sit back, forget the world as it is and take in what it once was. At a humble country airfield, such a dream is still within your reach.

Owen Zupp has over 16 000 hours of varied experience having first flown as a commercial pilot in 1987. His background includes charter work, flight instruction and ferry flights. Serving as a Chief Pilot, Chief Flying Instructor and an Approved Test Officer rounded off his time in General Aviation before joining Ansett Australia in 1994 as a First Officer on the 737.

He has a Masters Degree in Aviation Management. His writings on aviation have been published both in Australia and abroad. Owen won the Australian National Aviation Press Club's Aviation Technical Story of the Year award in 2006. In 2007 his first book, *Down to Earth*, was published and traces the combat experiences of a WWII RAF fighter pilot.

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## Flying in Africa

by Richard Browne



## Getting Started

I have just completed a wonderful book written by Peter Petter-Bowyer called 'Winds of Destruction'. It relates to his involvement in the Rhodesian Air Force and how he got into aviation and his development along the way.

I found it quite a tug at the old heart because, aside from the fact that it was also my country of birth, it was probably he, and others, who had indirectly influenced my life's path and career choice. Remembering how it all began, when people ask me, I always give the same answer. When you are a young boy, it's a fireman, policeman or a pilot. I can't remember it being any other choices really and subsequently an aviator I became.

I was raised on a farm and the first house I ever lived in was on an airfield, in particular a military base. It was there that as a youngster, I used to move around the aircraft and make friends with the personnel. I suppose being a child I wasn't considered a security threat, unlike nowadays, and so I was left to climb aboard Allouettes, Cessna 337's or Lynx as they were called and also the odd DC3 or "Dak".

Drawing these aircraft came easily to me and I was very conscious of every detail such as the Allouette having dust screens

and upturned exhaust for SAM avoidance and the Lynx with it's twin Browning's mounted above the cockpit between the wings. I had it all down just as it was in real life.

I'd sit on the garden wall and watch the aircraft depart on a mission and then observe them returning, the familiar whine of the Allouettes, which I thought sounded more like a metallic staccato ring than anything else. I loved them and it would fill me with incredible pride that they were 'mine'.

One day, I can't say exactly when as I was young and all the seasons seemed like one mixed-up event of playing with Tonka toys in the quarry or riding my go-kart, an Allouette came in quite close then hovered over the house to eventually set itself down on the lawn at the back. In doing so it knocked over a pottery jar that adorned the piano. I'm not sure why this made an impression on me; perhaps it was because I'd never been close enough to the machines to feel the actual power under its rotors.

Anyway the crew alighted, a pilot and tech, and strolled across to see if there was anything Mom needed and if everything was ok. Dad spent many weeks in the bush and they would check up on us frequently, although not in a helicopter. They had a pot of tea and some biscuits, homemade of course due to sanctions, and then set off again blowing everything over once more.

It was so exciting and right there was probably the most decisive moment of my short life, I was going to become a Pilot. I didn't have a lending as to the discipline yet, helicopters or fixed-wing. They all seemed the same to me and if it could fly, I wanted to be the one to operate it.

I was sent off to school in a separate town from where my folks were eventually living. During those years the roads were too dangerous to drive. Consequently I and my sisters were flown between the two towns in a Beechcraft Baron and, get this, I still remember the pilot's name - Chris. I don't know what his surname was, that was irrelevant, the fact that I got to fly was paramount. It was indeed the finest aircraft I'd ever seen, it smelt of leather and I had to walk on the wing, which seemed utterly important from a young lads social stature.

It was in this town that Dad would often allow me accompany him to his daily Operations HQ. I would be allowed to watch the aerodrome proceedings where I became familiar with some of the local farmers who owned aeroplanes. Jimmy Aitken was one; a guy named Fennel was another. Jimmy's name sticks because he was so friendly and I was allowed to clamber all over his machine. One day he took me in it and he made me look outside the window while the wheels were being extended. I was completely bowled over with this mechanical marvel and couldn't wait to relate the story to my folks. Looking back now, it was single engine and must have been a Cessna high-wing retractable.

I was also introduced to the "Buffalo". A monstrous aircraft with two massive engines and propellers to boot. I still have a photo of the Buffalo somewhere, customary nose down and approaching the runway. I recall being quite concerned with it because it seemed to be off-line with the runway and I was stressed it would land on the grass. Again, looking back, I must have had a perception error as I was standing somewhat off the runways edge. Needless to say the pilot did his thing and the aeroplane touched down on the tarmac.

When I saw my first Hawker Hunter I was in awe, then came a Canberra and I figured life was never going to get better than this, how could it possibly? While I never enjoyed the freedom of interacting with these two types, I saw enough of them in the air to realize my initial thoughts of becoming a pilot were totally justified.

Our move to South Africa placed us on a farm in the Eastern Transvaal and it was here that Dad built a 1000m airstrip capable of carrying Kingair and Cessna Citations with ease. These two aircraft would ferry company executives to the farm and it's several guest houses for their weekends filled with trout fishing and relaxed surroundings.

I would always accompany Dad to the hangar to watch these machines perform their graceful arrivals. I knew exactly where to look for them, the same hills they'd always appear out from, where they'd lower their landing gear and the white dust they'd kick up in swirls. I was confused

about the din after the turbo-prop had landed and subsequent investigating revealed that the engines were reversing. This had me confused until one of the pilots, a real gentleman named Derryl Boast explained that it was only the propellers that were reversing and not the engines changing direction of turn. I'm sure I accepted this explanation despite thinking he was pulling my leg. He was to help me on numerous occasions at fixing my motorbike; I thought he was great as were the rest of the pilots at this company called Barair. I owe a great deal to these peers, they not only allowed me to work amongst them but they also carried my sister's coffin at a hastily arranged service in Windhoek.

Dad would only allow me forward to look at the aircraft when the guests were gone. He was ever still the military officer and respect was foremost.

I remember the humming of the instruments in the cockpit, the big lever labelled FLAP, the blades changing pitch with increasing RPM. I knew all the registrations, it was an obsession.

From then on it was written, my life's future pages while still blank had been indelibly etched with aviation ink. I now enjoy a lofty perch because of these influences, human and machine, not a day goes by when I look out the window at the most glorious of all views with thanks and grace.

Little did I realise that in a few short years, I'd be the one flying that Kingair and the Citation for Barair and there Dad would be standing, waiting to meet me. I was so proud and wanted them to be as well. I guess it must have panned out alright because my bars and wings have taken place next to the line of military achievements of each generation of my family.

How does one qualify that you have made the correct career choice and are happy in your daily remuneration strive? I guess for me, it's based on two things. Firstly I simply could not imagine doing anything else and second, most aviators I know, upon leaving work take up a hobby in flying or involve themselves in private flying. Simply put, we cannot stay away. I have never heard my accountant, lawyer or doctor mates say that. •

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LEARJET CHALLENGER GLOBAL

 TIME AVIATION

## Fastjet receive their Foreign Operator Permit from the SA Department of Transport

Ed Winter, Chief Executive Officer of fastjet announced that the company have received their Foreign Operator Permit from the South African Department of Transport. This meant that the final administrative hurdle has been overcome so they were confident that the important and popular Dar es Salaam to Johannesburg route would be on sale soon.

“We expect this to be a particularly popular route, due to the fact that South African Airways has had a monopoly on this route for far too long. We are very keen to offer substantially more affordable fares to customers and further stimulate the potential traffic between these two key African cities, which can only



Ed Winter, Chief Executive Officer of fastjet

have a very positive effect on the critical trade, commercial and tourism industries between South Africa and Tanzania.” fastjet continues to grow in popularity, performance and revenue. As reported recently, June revenue in Tanzania exceeded \$2.2m, which is a 22% increase on the previous month. Fastjet

load factors for the month grew from 68% to 78%, with yield per seat also growing substantially.

Also as previously announced, in June fastjet carried its 200,000th paying passenger including infants.

Ed added – “We believe we are well on the way to becoming the first pan African low cost carrier.” •

## SA Express Airways expand amid much excitement as they launch Durban – Harare service

Proceedings on 28th June commenced with a wonderful dance performance by Zulu dancers clad in South African flags.

We then adjourned to the SAA lounge for the opening address by the SAX CEO Inati Ntshanga. Up next was MEC Mike Mayabhukulu for a provincial overview and planning perspective followed by the Ethekewini mayor James Sithole. Minister of Public Enterprise, Mr Malusi Gigaba gave a good summary of exactly what this new route means to the country and to the province in terms of trade and economic expansion and employment creation nationally and in the Kzn region.

SAX invited guests were then invited into the international terminal

airside to see the new aircraft in its splendid beach livery which was impressive. SAX special guests boarded the CRJ 200 52 seater and the excitement was massive as SZ NHN left bound for Harare.

We managed to have a chat to Minister Gigaba and he is very positive about SAX and SAA stating that he would like SAA to end up with some A380s.

Inati Ntshanga too was very excited about the significance of this mini hub at Durban to SAX operations and stated that there are further expansion routes using Durban as a mini hub which are being looked at this time.

**For more on SAX see [www.flyexpress.aero](http://www.flyexpress.aero)**



Minister Gigaba, centre and Head of SAX, Inati Ntshanga with the crew.

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## Simply drop off your bags yourself 39 baggage machines at Frankfurt, Munich and Hamburg airports

Lufthansa is investing in innovative technologies that provide greater comfort for passengers. Just in time for the summer travelling season, passengers at Frankfurt, Munich and Hamburg airports can now take advantage of the 39 baggage machines and drop off their luggage themselves. Passengers who have already received their boarding pass

by checking in online, via a mobile device or at a check-in machine within 23 hours before departure can simply make their way to one of the baggage machines and send their luggage on its journey themselves without having to queue. Customers can then pass directly through security and go to their gate.

### Here's how it works:

To drop off luggage, it is placed on the belt and the barcode printed on the boarding pass is scanned.

The baggage machine prints a self-adhesive luggage tag, which can be attached to the bags easily. The luggage is then transported by the machine to the airport's conveyor belts and the passenger receives a print-out of their receipt.

This service was tested in Munich and Frankfurt over a number of months last year. Due to the positive feedback from customers and the high level of use, this service has now been expanded. To date, Lufthansa passengers have already

checked in more than 640,000 pieces of luggage via the machines.

### The new baggage machine locations at a glance

**Frankfurt:** 16 baggage machines, 8 in departure hall B, 8 in departure hall A (Terminal 1)  
**Munich:** 19 baggage machines, 13 at the south and 6 at the north side entrances (Terminal 2 Departures)  
**Hamburg:** 4 baggage machines at the end of check-in rows 7 and 8 (Terminal 2). •

## Naikuni feted for 'contribution to air transport business'

Kenya Airways' Chief Executive Officer, Dr. Titus Naikuni, has been recognized in the prestigious Airline Strategy Awards 2013. Dr Naikuni received the 'Airline Business Award', which recognizes

an individual who has made a lasting strategic contribution to the air transport business, during this year's edition of the awards that were held in London during July.

In the citation, the judging

panel, which comprises highly-respected industry professionals including analysts and former chief executives, noted: "During his 10 years at the helm, Dr. Naikuni has steered Kenya Airways on to

## British Airways takes delivery of its first of twelve Airbus A380s

British Airways (BA) has become the tenth operator to receive an Airbus A380 after taking delivery of the first of 12 aircraft on order. BA is the first UK operator of the A380 and will start to deploy its new flagship aircraft on routes from London Heathrow to Los Angeles and Hong Kong.

After a handover ceremony at Airbus' delivery centre in Toulouse with

Keith Williams, British Airways CEO, Eric Schulz, Roll-Royce President Civil Large Engines, Fabrice Brégier, Airbus President and CEO and other senior executives, BA's first A380 is being flown to the UK carrier's home base at London Heathrow where the cabin is being unveiled.

British Airways' chief executive Keith Williams said: "We're delighted to be the first UK airline taking delivery of the A380. It is a great aircraft that has been developed with huge amounts of British engineering ingenuity and we believe it will prove very popular with our customers when it starts





a profitable and stable growth path and established it as one of Africa's leading airlines."

"During the course of his tenure, revenue has more than trebled to \$1.2 billion, passenger numbers have jumped to 3.6 million and the airline's fleet has doubled to 42. Kenya Airways has totally revamped its fleet and become the first carrier in the region to join a global alliance, as well as a leading beacon of private enterprise in a region where state ownership remains the norm," the judges added in part.

Speaking after receiving news of the recognition, Dr. Naikuni said that it was a great honour to be feted by colleagues in the aviation industry from across the world. "I would like to acknowledge colleagues at Kenya Airways and our customers,

whose support has contributed to this recognition," the Kenya Airways CEO added. Among past winners of the 'Airline Business Award' are: Akbar Al Baker, the CEO of Qatar Airways (2012) and Tim Clark, the CEO of Emirates Airline (2011).

Other individuals recognized in this year's Airline Strategy Awards included: James Hogan, the CEO of Etihad Airways in the Executive Leadership category; Carolyn McCall, the CEO of Easyjet in the Low Cost Leadership category and Tewolde Gebremariam, the CEO of Ethiopian Airlines in the Regional Leadership Award category. Ryanair, Turkish Airlines, Lufthansa and KLM were also awarded in the Finance, Marketing, Technology and Environment categories. •

## Air Namibia to introduce Airbus A330-200 later this year

From the 1st of October this year Air Namibia will be introducing a new Airbus A330-200 aircraft to its operation, which will operate Windhoek – Frankfurt daily service.

The new A330 will replace current A340 service. The airline's A330 will be configured in 30 Business Class and 214 Economy Class seats.

The airline concluded that this planned Airbus A330 operation would remain subject to change. •



flying to its first destination of Los Angeles."

"It is a very proud moment for everyone at Airbus to see our A380 in the livery of British Airways, one of the world's most pioneering airlines. With this new flagship in their fleet, the British carrier opens a new era of long-haul flying and offers its passengers an all-new travel experience", said Airbus President and CEO, Fabrice Brégier. "It is a special day for UK industry too, as a significant proportion of this amazing aircraft was designed and built at Airbus'

UK sites in Filton and Broughton, as well as at our many partners' facilities across the country."

All BA's A380s will be powered by Rolls-Royce Trent 900 engines. Airbus currently has 262 firm orders for the A380, from 20 customers.

The A380 is capable of flying 8,500 nautical miles or 15,700 kilometres non-stop, carrying more people at lower cost and with less impact on the environment. The spacious, quiet cabin and smooth ride have made the A380 a firm favourite with both airlines and passengers,

resulting in higher load factors wherever it flies.

The A380 also provides vital extra passenger capacity without increasing the number of flights, and is therefore part of the solution for sustainable growth at congested airports.

To date, 40 million passengers have already enjoyed the unique experience of flying on board an A380. Every five minutes, an A380 either takes off or lands at one of the 30 airports where it operates today and the network is constantly growing. •



## Lufthansa receives award for its first class lounge

Top rankings for Lufthansa at the **World Airline Awards 2013** in the categories **Best First Class Airline Lounge, Best Western European Airline and Best Transatlantic Airline**

Over the past ten months, 18 million passengers from over 100 countries have participated in the world's largest aviation passenger survey and have recognised Lufthansa's First Class lounges as the best in the world. The airline has also been voted "Best Western European Airline" and "Best Transatlantic Airline". Dr Reinhold Huber, Senior Vice President Product & Marketing, received these prizes on Lufthansa's behalf at the World Airline Awards, hosted at the Paris Air Show in Le Bourget.

The Lufthansa First Class Terminal at Frankfurt Airport received top marks in the survey, with the First Class Lounges at the hubs Frankfurt and Munich were also highly ranked by customers. According to the assessing

institute Skytrax this reflects the high standard and service of the facilities. The fact that Lufthansa was awarded best airline in Western Europe and on transatlantic routes was a clear sign that Lufthansa standards were satisfying customers, Skytrax stressed.

"We are working hard to make our customer services even better and even more comfortable. These awards are further confirmation of the investments we have made in the passenger experience and in our employees' training. With our exclusive First Class Terminal in Frankfurt, we offer a tailored premium service on the ground – we are delighted that our guests appreciate this," said Dr Reinhold Huber. "We are investing around one million euros a day in the refitting of our new Business Class alone. We have made significant improvements to our in-flight meals and have opened a large number of new lounges on the ground. We are currently in the process of expanding our entertainment service, and innovative products such as FlyNet – which we are the only airline worldwide to offer on long-haul flights – round off our range of services. We have a clearly defined goal: to become the first Western Five Star Airline by 2015. We still need our fifth star in Business Class to get there, and that is what is driving us forward," Huber added.

This customer survey was handled by the airline quality assessment institute Skytrax, an aviation specialist. The study examined over 40 different customer satisfaction and service quality issues for each airline. It focused equally on the airlines' in-flight experience and their airport services. Skytrax has carried out this independent study every year since 1999. •



## Bombardier C-Series

The Bombardier C-Series, is a family of narrow-body twin-engined medium-range airliners that are being developed by the company. Models include the 110-seat CS100, and the 130-seat CS300. These were initially named C110 and C130, respectively. In certification documentation, the C-Series family is designated Bombardier BD-500, with suffix -1A10 for the CS100 and -1A11 for the CS300. This new C-Series jet, which offers 110-seat and 130-seat versions, competes with the Boeing NG 737-600, 737-700, A318 and A319 and Embraer 195. Bombardier claims the C-series will burn 20% less fuel per trip than these competitors.

In November 2012, Bombardier announced that the 110-seat CS100 would take its maiden flight in June 2013 and enter service in 2014 Q2. The 130-seat CS300 is to follow six months later.

During the demise of Fokker, Bombardier considered purchasing that company in order to gain access to the Fokker 100-seat short-haul aircraft. They eventually decided against a purchase and ended discussions in February 1996.

The Bombardier BRJX, or "Bombardier Regional Jet eXpansion", was a project for a larger regional jet than the Canadair Regional Jet. Instead of 2-2 seating, the BRJX was to have a wider fuselage with 2-3 seating, and underwing engines. It was projected

to seat 80 to 120 passengers, abutting the smallest narrow bodies, like the 2-3 MD 80/ Boeing 717 or the 3-3 A318 /737-500/737-600. The project was shelved by Bombardier in favour of stretching the CRJ 700 into the CRJ 900.

Meanwhile, the 72-seat Embraer E170 came to market (production began in 2002), followed by the 110-seat E-195. Both models were widely adopted, and Bombardier had no product to compete with them in that capacity range.

### Development

In July 2004, Bombardier announced the development of the C-Series family of airliners to replace the cancelled BRJX project. The C-Series would be larger than the current CRJs, and capable of carrying 110 to 130 passengers. For the first time, Bombardier would be competing directly with the smallest airliners from Boeing and Airbus. At the time, Bombardier expected the aircraft to be available by 2013.

In March 2005, Bombardier's board decided to promote the plane to airlines to gather advance orders. Two models were announced: the C110 with layouts from 100-125 seats, and the C130 with layouts from 120-145 seats. The C-Series would feature new, more fuel-efficient engines and a higher percentage of composite materials in its fuselage, a strategy similar to that used on the widebody B787 and the A350

The new aircraft would seat passengers in a 2-3 arrangement in coach and a 2-2 arrangement in business/first class, similar to the Boeing 717. With the 2-3 arrangement, 80% of the seats would be aisle or window seats, contrary to 'middle' seats (seats set between two other seats). The aircraft would have under-wing engines. The C-Series' fuselage was designed to give enhanced seating comfort for passengers, with features like broader seats and armrests for the middle passenger and larger windows at every seat to give every passenger the physical and psychological advantages of ample natural light.

In May 2005, Bombardier secured agreements with the Federal Government of Canada, the Provincial Government of Quebec, and the Government of the United Kingdom for support and loans for the C-Series project. The Canadian government has committed US\$350 million in financing; the British government has committed US\$300 million. The program will cost about \$3.5 billion, and Bombardier will share the cost with suppliers and governments.

The fuselage was to be built in China by Shentang Aircraft Corporation. Final assembly of the aircraft was to be at an airport outside Montreal. Substantial portions of the aircraft were to be constructed at Bombardier facilities in Belfast, Northern Ireland.

On 31 January 2006, Bombardier announced it would not go forward with plans to develop the C-Series after it had failed to secure significant orders to that point. It stated that it would keep a small team of roughly 50 employees working on the C-Series marketing plan, and would include other risk-sharing partners in the program. With the C-Series on hold, Bombardier announced on 18 February 2006 that it would begin work on the 100-seat CRJ 1000.

The C-Series cabin will feature large, rotating overhead storage bins, allowing each passenger to stow a sizeable carry-on bag overhead. Compared to the cabins of current in-service narrow body aircraft, the C-Series is to provide airlines with the highest overhead bin volume per passenger and a wider aisle that would allow for faster boarding and disembarkation of passengers.

The C-Series aircraft contain 70% advanced materials comprising 46% composite materials and 24% aluminium lithium which allows for a 15% lower seat-mile cost and a significant reduction in maintenance costs. Computer software design tools were used on the project, including, and similar technology that was employed in the Learjet 85 programme. •



## BOEING Business Jets (BBJ) recently displayed their BBJ 3 for the first time

The airplane, based on the 737-900ER, was fitted out with its custom VIP interiors at Jet Aviation in Basel, Switzerland. The BBJ 3 is currently for sale, so the exterior remains "green" or unpainted, ready for a livery to be selected by a new owner.

The range of the BBJ 3 exceeds that of other business jets in its class. It can fly 4,900 nautical miles; more than 1,500 nautical miles (3 hours) farther than its direct competitor.

The BBJ 3 range advantage is the reason why it has outsold its direct competitor by seven-to-one according to Capt. Steve Taylor, president, Boeing Business Jets.

The aircraft also features lower cabin altitude, pressurizing the cabin at 6,500 feet versus 8,000 feet of other business jets. This allows BBJ passengers to arrive at their destination relaxed and refreshed without feeling jet lagged.

The cabin interior is finished in a bright, high-gloss sycamore wood, with hand-crafted marquetry woodwork integrated in the entrance panel. It features a large main lounge and a smaller area for staff, a dining room and a bedroom suite with a queen-sized bed and bathroom with a shower.

Jet Aviation has completed the interiors of two dozen Boeing commercial and private aircraft since 1978.

The BBJ 3 can carry 38 passengers and eight crew members. It has a large cargo area that holds 230 pieces of luggage.

To date, seven BBJ 3s have been ordered. Three are in completion; four are in service. Another BBJ 3 was scheduled to enter into service on June 1. •



*Best in its Class!*



Duty Time proposed by EASA. During a Parliamentary Hearing in the EU Transport Committee held recently, the parties were still unable to reach common ground as concerns the issue. With controversial new regulations allegedly to be put under vote in the EU Parliament already in H2 2013, time for discussions and amendments has almost run out.

Fatigue in the cockpit and among the cabin crew members is undoubtedly the topical issue. The figures indicate that over a half of European pilots tend to experience fatigue whilst on duty.

In some countries the figures are as high as 90%. With regard to the current situation, the recent EASA's initiative to review flight and duty time limitation is loudly saluted. Unfortunately, it seems that the proposed amendments may still be a little bit too harsh on pilots.

A Pan-European pilot union - the European Cockpit Association (ECA) - along with the European Transport Safety Council (ETSC), the British Airline Pilots' Association (BALPA) and a set of other industry organizations have been continuously raising their concerns that the new flight

time limitation rules might not resolve the fatigue issue after all. For instance, EASA suggests the reduction of night flights from 11 hours 45 minutes to 11 hours maximum, but the industry representatives claim that the overnight duty should not exceed the 10-hour limit. The latter opinion is based on various scientists' recommendations, including those stated in the MOEBUS report, a special Scientific and Medical Evaluation of Flight Time Limitations. Furthermore, an 11-hour long night shift has also raised certain concerns within some of the EU member states. For example, the British Parliament's Transport Committee has stated that 'the proposed 11 hour duty period at night for pilots flies in the face of scientific evidence. It should be reduced to a 10 hour maximum.'

Another point of the discord between the industry representatives and the authorities is the flight duty period (FDP). The new regulations may lead to a situation when pilots are forced to land an aircraft after 20-22 hours of being awake, which includes 14-15 hours of FDP, 4 hours of standby, and additional time between the one when a pilot wakes up and the one when he actually reports to duty. Another related issue is standby. Critics of the new regulations point out that even home standby may 'interfere with a normal sleep pattern' and thus it should be at least partially included in the FDP limitations. Otherwise home standby may last for days, potentially triggering sleep disruptions.

Critics of the new EASA proposals are referring to both the relevant scientific studies and actual current situation in the community of pilots. However, one should bear in mind that these proposals are also aimed at unifying the flight and duty time standards across the entire EU. At some point, the proposed standards may be lower in comparison to those already adopted in certain member-states. But considering the majority of other countries, the new regulation will actually assist in bringing the standards to a new higher level. Furthermore, should the EU Parliament be persuaded to vote against the EASA's proposal, it may take years until there will be another opportunity to bring Europe's defragmented flight duty regulation under common principles. Needless to say, the new regulations might not be perfect, and in time they should and will definitely be improved whilst taking into account the opinions of all stakeholders. But meanwhile it is vitally important to make the first move. •



## The new Flight Time regulations to be put under the EU parliament vote keep raising concerns for pilots

On 18th June, the representatives of the European aviation authorities and airlines as well as aircraft crews gathered to yet once again discuss the new regulations on Flight and

## ATNS announces new CEO

The Air Traffic and Navigation Services (ATNS) Board has announced the appointment – with immediate effect - of Mr. Thabani Mthiyane to the position of Chief Executive Officer, following a rigorous and thorough recruitment process and subsequent approval by the Cabinet.

Mr. Mpho Mamashela, Chairman of the entity's Board of Directors, said that Mr. Mthiyane has extensive technical and operational experience in all aspects of Air Traffic Management.

"He shares the same values and commitment to our business and industry as our Board and fully understands the needs of our stakeholders. He also has the right credentials and skills to take ATNS forward" stated Mr. Mamashela.

In congratulating Mr. Mthiyane on his appointment, Mr Mamashela said the Board has noted Mr. Mthiyane's dedication



Mr. Thabani Mthiyane.

and commitment to his work, and most importantly, the staff's support during his recent interim acting term.

"Our ability to stay committed, passionate and focussed as a company is what will take us into the next twenty years, as we forge new frontiers in the area of air navigation

service provision and steadfastly continue to play our part in ensuring safer African Skies for all." concluded Mr. Mamashela.

Mr Mthiyane is currently serving as the Civil Aviation and Navigation Services' (CANSO) Africa Region Chairperson. His career is notable for the contributions he made in the technical, technological and operational spheres of aviation.

He holds a BEng (Hon) Mechanical Engineering (University of Pretoria), BSc Eng in Electrical Engineering (University of Natal) and a National Diploma in Electronic Engineering (Technikon Natal). He is completing his World Executive MBA through the George Washington University, Washington.

Mr Mthiyane is a registered Professional Engineer and is also a member of the South African Institute of Electrical Engineers (SAIEE). •

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Paris Air Show 2013:

# Attendance down, orders up

The Paris Air Show celebrated its 50th edition with a sharp decline in attendance but neither this nor the bad weather conditions slowed down the orders announced during the show: 1250 orders of commercial airplanes for 150 billion US dollars. By themselves, Boeing and Airbus made a clean sweep with 900 firm orders, purchase commitments and MOUs.



Above: Pride of the French Air Force: *trouille de France* and A400M.





Above: Alphajets lined up.



Main pic: The Patrouille de France Alphajets in front of the A380.

Demonstration flights by the Airbus A380 and Boeing 787 and the announcement from Boeing regarding its 777X were not enough to detract from the undoubted star of the show: the Airbus A350XWB which made its first public flight, a short flyby before returning home to the Airbus test platform. According to Boeing the 777X will be the largest and most fuel-efficient twin-engine jet in the world, with



20 per cent lower fuel consumption and 15 per cent lower operating costs than today's 777.

Also popular was the comeback by Russian aircraft when Sukhoi presented a spectacular display by the Su-35, making its first appearance in Europe, while Antonov brought back its AN-70 after almost a decade of tests and modernization.

A number of new aircraft as well

as a number of concept machines were unveiled during the week with companies vying with each other for orders and interest. Amongst these were unmanned UAVs by Piaggio and Selex who presented their P.1HH, an unmanned aerial vehicles (UAV) built with the same shape as the manned P180 Avanti II. It is a 6 ton UAV set to compete against the other medium altitude long endurance (MALE) craft. Sagem and Thales displayed their respective UAV, the Patroller and the Watchkeeper, with a new configuration. Cassidian, Dassault Aviation and Finmeccanica announced their intention to join up to design a new generation MALE.

In terms of general aviation, General Electric unveiled the GE9X, a 46 ton thrust engine with fuel consumption reduced by 10% in comparison to the former GE engine. This "pinnacle of engineering" will undoubtedly be the future engine dedicated to Boeing, who chose GE as an exclusive partner for the 777X development.

Environmental issues, noise and consumption form part of the study and research in the general aviation world. Safran and Honeywell unveiled their EGTS, an electric



## First Thales A400M Full Flight Simulator Ready for Training

The first A400M Full Flight Simulator (FFS) designed and built by Thales for Airbus Military received European Aviation Safety Agency's qualification for training on the 7 June at Airbus Military International Training Centre in Seville.

This qualification is a key enabling milestone that allows Airbus Military to start to train A400M flight crews for their complex missions in a safe environment.

The Full Flight Simulator utilises aircraft hardware and software that represents the initial configuration of the A400M aircraft cockpit and simulates the ground and flight operations of the aircraft in various natural and tactical environments. It includes an enhanced field of view visual system that is capable of supporting training in all aircraft manoeuvres, including air-to-air refuelling and low level tactical operations. A six degrees of freedom motion system, on-board and off-board instructor stations and a record and replay system to aid crew briefing and debriefing is also provided.

As new aircraft data is made available, Thales and Airbus Military teams are also working to obtain Level D certification for this simulator.

Peter Hitchcock, VP Avionics, Thales UK, says: "Thales is the leading provider of training solutions for Military Aircraft with contracts to provide A400M Full Flight Simulators and Flat Panel Trainers to Spain, France, Germany and UK. We are proud to offer our long-standing experience to help train pilots for this exciting and highly capable new aircraft". •



Above: Safran Silvercrest, a new engine scheduled for 2017 dedicated to business jets that will reduce fuel consumption by up to 15%.



Above: Dassault Aviation presented its work on a large stand with the models of the current airplanes, here the Rafale B.

green taxiing system placed on the main landing gear that allows a significant gain of fuel, almost 4% per flight. The EGTS will be efficient in 2016. EADS presented the E-FAN, a twin seat electrical plane dedicated to private pilots, scheduled to be produced in 2017.

With regards to the helicopters, high velocity and contra-rotating propellers are now seen most frequently. Eurocopter displayed the X3 on static and Kamov

presented its Ka-52 in flight during the first days of the show. Mick Maurer, CEO of Sikorsky, said during the Paris Air Show that contra-rotating rotors are obviously the future and stated that a version of the X2 will be developed for a civilian use.

The engineers at UK-based aerospace firm AgustaWestland are already focusing on tilt rotor aircraft, having recently developed the intriguing commercial-use AW609. It also seems that some 18 months ago, they began secretly test-flying what has now been publicly unveiled as being the world's first electric tilt rotor airplane. It's known simply as Project Zero.

The technology demonstrator aircraft was reportedly designed and built over a period of just six months. It made its first unmanned tethered flight at the company's Cascina Costa facility in Italy, in June of 2011 and has since been flown several other times in 2011 and 2012, including some untethered flights "inside a secured area."



Left: The E-FAN on the left side and on the right the DA36 E-STAR two experimental electric planes developed by Diamond Aircraft, EADS and Siemens.



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Dassault's neuron, unmanned aircraft under wraps



As with other tilt rotor aircraft, Project Zero's two rotors can be tilted up to 90 degrees. This allows it to take off and land vertically and to hover, like a helicopter, while also flying forward with the speed and efficiency of a fixed-wing aircraft. Each of the rotors are driven by their own electric motor, which is powered by rechargeable batteries – technical details are sparse at this time. When parked on the ground, those

rotors can be tilted to “windmill” in the oncoming wind, charging the batteries as they do.

Project Zero's control systems, flight controls and landing gear actuators are also all electrically powered, which means no hydraulic system is required – the plane also doesn't require a transmission.

The aircraft's entire exterior surface is carbon graphite to maximize strength and minimize weight. The wings provide most of

the lift when cruising, with elevons (combined elevators and ailerons) controlling pitch and roll, and the V-tail adding longitudinal stability. For missions that are primarily taking place in “helicopter mode,” however, the outer portion of the wings can be removed for increased manoeuvrability.

Additionally, because Project Zero's electric motors don't require oxygen in order to operate, the aircraft could conceivably



Left: The star of the displays: The SU-35.

fly at very high altitudes or in heavily-polluted air. It should also be difficult to detect, as it makes little noise and has a low thermal signature while in flight.

It's hard to say when or if a production version of Project Zero will be seen, as it was designed as "an insight into what advanced rotorcraft of the future may look like." AgustaWestland is looking into the possibility of a hybrid version, which would use a diesel engine to power a generator. •



*The Safran EGTS, the Electric Green Taxiing System allows a significant gain in fuel savings.*



# Paris Air Show

Photograph by Verruer/Sunlight Image





## Thales unveils avionics 2020 The cockpit of the future

On the opening day of the Paris Air Show 2013 Thales, world leader in avionics innovation unveiled the cockpit of the future.

Named Avionics 2020, this cockpit is the natural evolution of the cockpit concept for which Thales has become famous, the ODICIS demonstrator. Unveiled at the last Paris air show, the ODICIS concept illustrated the technologies and innovations Thales imagines will be need on commercial aircraft in the next 20 years. With the groundbreaking Avionics 2020 cockpit, Thales demonstrates to the world, the technologies and concepts manufacturable now and which can be made flight-ready on commercial aircraft in the next 7 years.

Avionics 2020 incarnates a new-generation cockpit founded on the principles of natural and direct hands-on interaction and human-machine interfaces, designed to serve the pilot through the use of the latest head-up and head-down technologies. Its totally scalable model, can also include bi-chromal head-up displays enabling enhanced collimated piloting data organisation and discrimination, associated with a synthetic representation of the outside environment.

Much like its overall avionics, the human-machine interface of Avionics 2020 can connect to

core functions supplied by third parties. Furthermore, it can be personalised so as to merge with the cockpit concept as defined by the customer. Personalisation duties can interchangeably be handled by Thales or by the customer, who may wish to retain control over IP aspects and enjoy greater autonomy in the development and management of changes to their solution. The cockpit's concept introduces a modern and effective cockpit implementation which integrates a large, secure display area associated with several reconfigurable means of control. This user-friendly organisation of the cockpit incorporates multi-touchscreen capabilities, offering pilots an intuitive interaction solution comprising all aircraft systems and functions.

Continuing on from the most important innovations presented on the 2030 concept, Avionics 2020 is centred on enabling pilots to capitalise on their strengths and help them manage their weaknesses. Thales has therefore worked closely for a number of years with researches, scientific institutions and world class experts in the field of human-machine interface, to refine its understanding of this field of development. These efforts, culminated into a cockpit entirely focused on the tasks to be completed by the pilot. It achieves



this by merging data from the different avionics and non-avionics systems and present them to the pilot in a transparent manner, making decision instinctive and less reliant on cognitive analysis, thus mimicking the processes which the human brain goes through in order to make a decision, especially under stress.

Perhaps most significantly, this cockpit anticipates the future challenges of the air transport industry, in their continuing efforts to maintain growth trends in air traffic, whilst at the same time reducing carbon emissions, noise pollution and ease congestion in the skies without compromising safety standards. This critical future proofing is accomplished with the integration of SESAR and NextGen capabilities already built into the cockpit so that the pilot can easily and efficiently use the full range of the new functions required by these programmes.

The capabilities built into the cockpit include I4D operations,

which consist of giving the pilot a time constraint at metering point to each aircraft converging to this point, in order to better sequence traffic. Furthermore D-Taxi (Digital-Taxi) functionalities will be included in the cockpit. D-Taxi is a real-time uplink of the cleared taxi route via CPDLC (Controller-Pilot Data Link Communications) and representation of the taxi path in the cockpit systems. In addition, ASAS (Airborne Separation Assistance Systems) will also be displayed. ASAS spacing helps create a regular traffic flow by ensuring an aircraft adjusts its speed so that it can keep its spacing relative to another aircraft, and therefore merges according to the requirement set by the controller. And finally the ground-breaking Thales concept of ECO Take-Off, will be available on the Avionics 2020. ECO Take-Off is an optimised take-off and climb profile in order to define the trade-off between CO<sub>2</sub> emissions and noise reductions. •



### OEM Defence Services announces a signature with Eurocopter of a throughlife support contract for worldwide NH90 helicopter fleets

OEM Defence Services has signed a five year maintenance contract with Eurocopter covering more than 100 equipment items, including avionics, hydraulics and mechanical systems, installed on all versions of the NH90 helicopter in service worldwide.

The single contract covers through-life support services for the equipment and systems manufactured by five major players in the aerospace sector that are shareholders in OEM Defence Services: Diehl Aerospace, Liebherr-Aerospace & Transportation, Safran, Thales and Zodiac.

Through this new agreement, which is based on a shared-services model with contractual commitments on performance levels and costs, OEM Defence Services is helping to drive the process of simplification of onboard equipment maintenance and improve the overall performance of through-life support for the NH90 fleet.

OEM Defence Services draws on the best-in-class industrial capabilities of its shareholders and partners to propose a collaborative, service-oriented model with innovative solutions that leverage synergies to adapt to the needs of customers.

With the conclusion of this contract, Eurocopter and OEM Defence Services will deploy an optimised model of industrial cooperation that will improve the operational efficiency of NH90 customers and help to control their through-life support budgets. •

# AMETA

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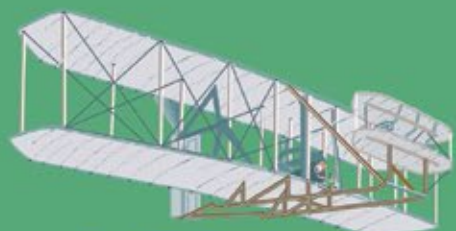
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Gas Turbine General	PT6A Series (Cat C)
Avionics (Cat X)	Electrical (Cat X)
Instruments (Cat X)	Beech 1900 Series (Cat A)
Cessna 208 Caravan Series (Cat A)	Citation 500 Series (Cat A)
HS/BAe 125 Series	Garret TPE 731 Series
Garret TPE 331 Series	JT15D Series (Cat A)
SA 330 Puma Series (Cat A & C)	

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Human Factors	3	05/08/2013 - 07/08/2013	AMETA (08H00-15H00)
Rotorcraft General	6	12/08/2013 - 16/08/2013	AMETA (08H00-15H00)
Airframe General	6	12/08/2013 - 20/08/2013	AMETA
Avionics Overview for Mechanical AME's	6	19/08/2013 - 23/08/2013	AMETA (08H00-15H00)
Gas Turbine General	6	21/08/2013 - 29/08/2013	AMETA
PT6A Series (Cat C)	6	02/09/2013 - 10/09/2013	AMETA

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## Beechcraft answers need for light ISR capabilities with the Baron G58

Company delivers first Baron G58 with ISR package

During the Paris Air Show the Beechcraft Corporation announced that it was offering the Baron G58 with Intelligence, Surveillance and Reconnaissance (ISR) capabilities. The company recently delivered the first Baron G58 with an ISR package to the Fuerzas Unidas de Rápida Acción (FURA), an agency within the Puerto Rico Police Department that uses the aircraft for law enforcement surveillance missions within the region.

Beechcraft has long served the ISR markets with its range of King Air turboprops. The company first introduced its version of its twin-engine piston Baron G58 aircraft with ISR capabilities last year at the Farnborough International Air Show, and plans to launch a company demonstrator aircraft in the fourth quarter of this year.

“Since we first introduced the Baron G58 ISR concept last year, we have seen interest from countries around the world needing a light aircraft solution that offers a balance of high dash speeds, long endurance, state-of-the-art glass cockpit avionics, exceptional flying and handling qualities, a rugged airframe and low operating costs,” said Dan Keady, Beechcraft senior vice president, Special Missions. “The Baron is unique in that it can provide all of these features for special mission operators, and we are pleased to deliver the first aircraft to the FURA.”

The Baron G58 ISR package includes a FLIR 230-HD electro-optical/infrared (EO/IR) camera system, an operator’s console which houses the mapping/mission management computer, a recorder and a multi-band communications radio system and data link for special mission operators.

The 230-HD EO/IR camera has the ability to virtually see both day and night, over land and water, in both good and poor weather. The mission mapping system provides the camera operator with a visual



The 230-HD EO/IR camera on the undercarriage of the Baron G58.

representation of the target location. The multi-band communications radio gives the flight crew and the sensor operator the ability to communicate directly with the military, police vehicles, coast guard and other maritime vessels and the recorder provides court

admissible evidence for prosecution.

All of the surveillance mission equipment for the Beechcraft Baron G58 ISR is commercially available with short lead-times and high reliability. While the physical integration of the mission sensors to the airframe is highly specialized,

the mission package integration is done without customized software, making it easy to troubleshoot and maintain in the field. More than 6,700 Barons have been produced to date and Beechcraft maintains a large inventory of spares around the world. •

## Piaggio Aero announces revised maintenance program for its twin turboprop

In its ongoing quest to make the already fuel efficient aircraft, even more cost effective to operate, Piaggio Aero announced today that it has now approved a revised maintenance program with extended inspection intervals for its fuel efficient twin turboprop.

In 2012 the Italian manufacturer reduced the tasks covered by its "A" check service, making it a "light inspection and servicing" operation, while at the same time extending the compliance interval from 150 to 200 flight hours.

This change, together with the cancellation of the previously

required daily check and monthly inspection, represented a reduction of up to 18% in the maintenance man-hours for the aircraft.

In early 2013 the 10-year, Time Between Overhauls (TBO) of the Piaggio Aero P.180 Avanti/II aircraft landing gear was extended from 10 to 12 years.

Piaggio Aero now announces that the C and D checks, due respectively at 1500 and 3000 flight hours, have been extended to 1800 and 3600 flight hours respectively. These newly approved intervals allow the operator to match the airframe inspection schedule with that of the Pratt & Whitney Canada

PT6-66A engines on the aircraft.

Paolo Ferreri, VP of Worldwide Customer Support for Piaggio Aero recently announced that approval of the new maintenance program had been enabled following an extensive study of reliability data gathered over 800 thousand flight hours, accumulated by the worldwide fleet of Piaggio P180 Avanti aircraft in a variety of mission profiles. He added that the company was consistently seeking ways to provide savings for their aircraft operators around the world and that they were confident that the extended maintenance times would do just that. •



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## Did you Know?

by Cesare de Villiers



1. Igor Ivanovich Sikorsky (May 25, 1889 – October 26, 1972), was a Russian American aviation pioneer in both helicopters and fixed-wing aircraft. He designed and flew the world's first multi-engine fixed-wing aircraft, the Ruskyy Vityaz in 1913, and the first airliner, Ilya Muromets, in 1914.

After emigrating to the United States in 1919, Sikorsky founded the Sikorsky Aircraft Corporation in 1923, and developed the first of Pan American Airways' ocean-conquering flying boats in the 1930s.

In 1939, Sikorsky designed and flew the Vought-Sikorsky VS-300, the first viable American helicopter, which pioneered the rotor configuration used by most helicopters today. Sikorsky would modify the design into the Sikorsky R-4, which became the world's first mass-produced helicopter in 1942.

2. The de Havilland DH 106 Comet was the first production commercial jetliner. Developed and

manufactured by de Havilland at its Hatfield, Hertfordshire, United Kingdom headquarters, the Comet 1 prototype first flew on 27 July 1949. It featured an aerodynamically clean design with four de Havilland Ghost turbojet engines buried in the wings, a pressurised fuselage, and large square windows. For the era, it offered a relatively quiet, comfortable passenger cabin and showed signs of being a commercial success at its 1952 debut.



3. The de Havilland Ghost (originally Halford H-2) was the de Havilland Engine Company's second turbojet engine design to enter production and the world's first gas turbine engine to enter airline (BOAC) service. A scaled up development of the Goblin, the Ghost powered the de Havilland Venom, de Havilland Comet and SAAB Tunnan.



4. The de Havilland DH 112 Venom was a British postwar single-engined jet aircraft developed from the de

Havilland Vampire. It served with the Royal Air Force as a single-seat fighter-bomber and two-seat night fighter. The Venom was an interim between the first generation of British jet fighters – straight-wing aircraft powered by centrifugal flow engines such as the Gloster Meteor and the Vampire and later swept wing, axial flow-engined designs such as the Hawker Hunter and de Havilland Sea Vixen. The Venom was successfully exported, and saw service with Iraq, New Zealand, Sweden, Switzerland and Venezuela.

5. The Yakovlev Yak-25 was a Soviet military aircraft, an early turbojet-powered interceptor aircraft designed by the Yakovlev OKB. The designation was later reused for a different interceptor design. Tasked by the Council of Ministers in a directive issued on 11 March 1947, with producing a straight winged fighter similar to the earlier Yak-19, but powered by a Rolls-Royce Derwent V, OKB-115 swiftly produced the Yak-25, which blazed several trails as the first Soviet fighter with a fully pressurised cockpit, air conditioning, jettisonable canopy, and hydraulic airbrakes on the fuselage amongst other innovations.



6. The McDonnell XF-85 Goblin was an American prototype fighter aircraft conceived during World War II by McDonnell Aircraft. It was intended to be deployed from the bomb bay of the giant Convair B-36 bomber as a parasite fighter. The XF-85's intended role was to defend bombers from hostile interceptors, a need demonstrated during World War II. Two prototypes were constructed before the program was terminated.

7. The XF-85 was a response to a United States Army Air Forces (USAAF) requirement for a fighter to be carried within the Northrop XB-35 and B-36, then under development. This was to address the limited range of existing interceptor aircraft compared to the greater range of new bomber designs. The XF-85 was a diminutive jet aircraft featuring a distinctive egg-shaped fuselage and a forked-tail stabilizer design.

The prototypes were built and underwent testing and evaluation in 1948. Flight tests showed promise in the design, but the aircraft's performance was inferior to the jet fighters it would have been facing in combat, and there were difficulties in docking. The XF-85 was swiftly cancelled, and the prototypes were thereafter relegated to museum exhibits. The 1947 successor to the USAAF, the United States Air Force (USAF), continued to examine the concept of parasite aircraft under Project MX-106 "Tip Tow", Project FICON and Project "Tom-Tom" following the cancellation.

## AMO's South Africa

Company	Code	Telephone	E-mail or Fax	Fixed Wing	Helicopters - All Makes	Avionics	Piston Engines	Turbine Engines	Propellers	Weight / Balances	Paint	Interior	Sheet Metal Work	Rebuilds	Overhauls	Electrical Work	NDT Testing	Returbishments	Structural Repairs	Inspections	NACA Aircraft	Seat Belts	Instruments	R22 and R44 only	Bell Helicopter Components	Helicopter Component Overhaul	Design Organization	
<b>KRUGERSDORP</b>																												
ATS Maintenance - No. 1228	011	315 4391	ops@atsheli.co.za		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>RAND AIRPORT</b>																												
Emperor Aviation - No 1266	082	497 1701	paul@emperoraviation.co.za		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BC Aircraft Refurbishing	083	728 2206	baron@bcair.co.za								•	•						•										
<b>SPRINGS AIRFIELD</b>																												
Clack Air - No 1207	011	817 2562	brian@clackair.co.za				•								•													
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Interjet - No 080	011	701 3545	lelani@interjet.aero	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Aeron - No 16	010	593 9109	info@aeron.co.za	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Gemair - No 1003	011	701 2653	andries@gemair.co.za	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
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Xcel Aviation (Pty) Ltd - No 1106	012	543 3339	bill@xcel-aviation.co.za				•																		•			
Aero Electrical - No 0057	012	567 7312	gert@aero-electrical.co.za			•										•							•					
Aero Engineering & Powerplant - No 227	012	543 0948	nt.aep@iafrica.com				•	•							•													
Apco - No 12	012	543 0775	tonyrodrigues@mweb.co.za				•								•	•					•	•						

# Maintenance | Parts | Planning | Aircraft Management



## Aircraft type rated:

- Dornier DO-328 Jet-300
- Embraer 120
- Beechcraft 200 series
- Beechcraft 300 series
- Beechcraft 1900 series

## Engine type rated:

- Pratt & Whitney PT6 series
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8. The Saab 32 Lansen (Swedish: "lance") was a two-seat, high transonic attack aircraft produced by SAAB from 1955 to 1960 for the Swedish Air Force (Flygvapnet). During its long operational life, the Saab 32 also served as a fighter, reconnaissance, electronic warfare and a target-tug aircraft.



9. The Boeing 707 is a mid-size, long-range, narrow-body four-engine jet airliner built by Boeing Commercial Airplanes from 1958 to 1979. Its name is commonly pronounced as "Seven Oh Seven". Versions of the aircraft have a capacity from 140 to 189 passengers and a range of 2,500 to 5,750

nautical miles (4,600 to 10,650 km).

10. Developed as Boeing's first jet airliner, the 707 is a swept-wing design with podded engines. Although it was not the first jetliner in service, the 707 was the first to be commercially successful. Dominating passenger air transport in the 1960s and remaining common through the 1970s, the 707 is generally credited with ushering in the Jet Age. It established Boeing as one of the largest manufacturers of passenger aircraft, and led to the later series of airliners with "7x7" designations. The later 727, 737, and 757 share elements of the 707's fuselage design.

11. The McDonnell Aircraft Corporation was an American aerospace manufacturer based in St. Louis, Missouri. The company was founded on July 16, 1939 by James Smith McDonnell, and was best known for its military fighters, including the F-4 Phantom II, and manned spacecraft including the Mercury capsule and Gemini capsule. McDonnell Aircraft later merged with the Douglas Aircraft Company to form McDonnell Douglas in 1967.

14. McDonnell Douglas was a major American aerospace manufacturer and defense

contractor, producing a number of famous commercial and military aircraft. It formed from a merger of McDonnell Aircraft and Douglas Aircraft in 1967. McDonnell Douglas was based at Lambert-St. Louis International Airport near St. Louis, Missouri.

15. The McDonnell Douglas Technical Services Company (MDTSC), a subsidiary of McDonnell Douglas, was headquartered in unincorporated St. Louis County, Missouri, United States. McDonnell Douglas merged with its rival, Boeing, in 1997. •

## Piper completes flight tests of Archer fueled by airworthy auto gas

During July this year Piper Aircraft completed flight tests of a Piper Archer powered by 93 octane premium unleaded automotive gasoline. Piper worked with Airworthy AutoGas LLC, Phoenix, Ariz., to prove the concept in a test flight regime conducted from the company's Vero Beach manufacturing campus.

The Piper Archer is powered by a single Lycoming O-360-A4M engine generating 180hp. Fuel capacity of the Archer is 48 U.S. gallons (182 liters). The Lycoming O-360 series engines are four-cylinder, direct-drive, horizontally opposed, air-cooled models, and are approved for use of 93 octane unleaded fuel.

"As we search for more environmentally friendly fuels than 100LL to power piston aircraft,

Piper wanted to take the next step with Lycoming and Airworthy AutoGas to operationally prove the 93UL concept under rigid test conditions from Vero Beach," said Piper President and CEO Simon Caldecott. "Our next operational effort will include cross-country applications, working with Airworthy AutoGas to ensure availability en route."

Airworthy AutoGas plans to produce and distribute its high-purity, low-vapor-pressure, ethanol-free, 93 octane, premium unleaded automotive gasoline towards the end of 2013.

The company says its goal is to Bring Airworthy AutoGas to the marketplace providing an alternative for the majority of general aviation aircraft without compromising airworthiness. •



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October 22<sup>nd</sup> – 24<sup>th</sup>, 2013  
Xi'an, Shaanxi Province, China

# AEROMECHANICS CHINA 2013

## Organizing Committee Leaders



**Jian WANG**  
*President, AVIC EM*

Mr. Jian WANG used to work in AVIC JINCHENG, occupying important positions including President, Deputy General Manager, Vice President, General Manager, respectively.



**Kaisheng LI**  
*Vice President, AVIC EM*

Responsible for Power System of C919, he excellently completed the negotiation task with Hamilton Sundstrand for the joint venture company, Civil Aircraft Power System Industry.

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## Airbus Military awards A400M tailplane work package to South Africa's Denel Aerostructures

Airbus Military has placed a third work package with South Africa's Denel Aerostructures (DAe) for the manufacture of structural components for the A400M military transport programme.

This multi-million Rand contract was received at the Paris Air Show today on behalf of South Africa's Minister for Public Enterprises, Mr Malusi Gigaba and Denel's Group CEO, Mr Riaz Saloojee. It will see DAe producing the ribs, spars and swords (ie. the skeletal support structure) for the A400M's vertical tail plane.

Airbus Military CEO, Mr Domingo Urena, said: "Denel, with its diverse set of expertise, capabilities and capacities, is central to Airbus Military's ambition to develop an expanded and multi-faceted partnership with South Africa's high-tech aerospace and defence industry, tied to South Africa's military aircraft requirements and acquisitions".

South Africa's Minister of Public Enterprises, Mr Malusi

Gigaba, said: "The approximately ZAR200-million (€15.1m) work package is contracted to run over the entire life of the A400M programme and demonstrates Airbus Military's confidence in Denel and South Africa's design and manufacturing capabilities, coupled with our ability to deliver on time and within budgets."

DAe has already begun preparing to launch production of the components at its plant near Johannesburg and will deliver the first finished shipment to Airbus's specialised vertical tail plane factory at Stade, Germany in March 2014.

"Our success in establishing and maintaining partnerships like the one with Airbus Military is one of the pillars of our growth strategy, and it will make Denel profitable on a sustainable basis, improve our financial performance while also contributing to our national

socio-economic imperatives. The contract strengthens Denel's position in South Africa's aerospace industry and reconfirms the company as a strategic national asset, its contribution to skills development and advanced manufacturing, as well as its potential to generate export revenue for the country," Mr Saloojee said.

Under a renegotiated contract announced last September, the South African manufacturer is also responsible for two other A400M work packages involving the design, engineering and fabrication of the Wing-to-Fuselage Fairing and the fuselage Top Shells.

The wing-to-fuselage fairing is the largest single aerostructure component ever produced in South Africa and provides an aerodynamic shroud over sensitive equipment located in the centre wing part of the A400M. The fairing protects

the equipment from lightning, hail damage and bird strikes.

The fuselage Top Shells are made up of more than 1 100 individual parts and a large machined skin, engineered out of an aluminium alloy. Each A400M is fitted with two Top Shells, positioned in front and behind the wings where they join the fuselage. They are also fitted with approximately 1 000 brackets which support electrical and electronic wiring, hot air and heat exchange pipes and the aircraft's emergency life rafts.

### About the A400M

The A400M is an all-new military airlifter designed to meet the needs of the world's Armed Forces in the 21st Century. It is ideally suited to the typical African peace-support missions which continue to be undertaken by South Africa in support of the African Union and United Nations mandates on the continent. Thanks to its most advanced technologies, the A400M is able to fly higher, faster and further, while retaining high manoeuvrability, low speed, and short, soft and rough airfield capabilities. It combines both tactical and strategic/logistic missions. With its cargo hold specifically designed to carry the outside equipment needed today for both military and humanitarian disaster relief missions, it can bring this material quickly and directly to where it is most needed. Conceived to be highly reliable, dependable, and with a great survivability, the multipurpose A400M can do more with less, implying smaller fleets and less investment from the operator. The A400M is the most cost efficient and versatile airlifter ever conceived and absolutely unique in its capabilities. •



*Above (l-r): South Africa's Deputy Director General of Public Enterprises, Mr Kgathatso Tlhakudi celebrates Denel's new Airbus Military contract in the cockpit of an A400M military transport plane with Denel Chairman, Mr Zoli Kunene.*

*Below: The Airbus Military A400M takes off for a flight presentation at the 2013 Paris Air Show.*





## Gripen first to first Meteor missile

In cooperation with the Swedish Defence Materiel Administration (FMV), defence and security company Saab has successfully conducted the first test firing of the version of the Meteor radar-controlled air-to-air missile, developed for mass production. Gripen is thus the first combat fighter system in the world with the capability to fire this version of the Meteor, which has been developed for Gripen, Eurofighter and Rafale. At the end of June, the first two Meteor missiles in mass production configuration were fired for the first time from Gripen at a remote-controlled target. The test firing demonstrated separation from the aircraft and the link function between the aircraft and missile, as well as the missile's ability to lock in on the target. The test firing was also used to verify the command support that has been developed for the pilot. "Testing has been completed as planned and we've now taken yet another important step in work with integration and development of Gripen C/D," says Michael Östergren, FMV's project manager for the Meteor. "I'm impressed with the results that we've jointly accomplished and it instills considerable confidence in continued work with integrating the Meteor on Gripen." The Meteor is a BVRAAM (Beyond Visual Range Air-to-Air Missile) developed to enable engagement of airborne targets at long distances. The missile is the result of a European collaborative project involving Sweden, France, Italy, Spain, Germany and Great Britain. Great Britain has responsibility for contracts and work is led by UK's defence procurement and support organisation – Defence Equipment and Support (DE&S). "Once again it's clear that Gripen

is the leading combat fighter system with great opportunities for fast and cost-efficient continuous integration of new capabilities, such as weapons and sensors, thanks to our efficient way of working and Gripen's

innovative design. Gripen with the Saab PS05 radar and the Meteor missile represent the absolute best in the world when it comes to air defense," says Lennart Sindahl, Head of Saab's business area Aeronautics.

The test team included representatives from Saab, FMV and British MBDA. During the autumn, additional tests will be conducted so that delivery of the new capabilities can be made during 2014. •

## LAST SAAF PC-7 Mk II BACK IN SERVICE

by Clinton Barnard

On June 25, 2013, the 35th and final Pilatus PC-7 Mk II, serial 2025, was returned to service with the South African Air Force (SAAF) Central Flying School at AFB Langebaanweg following the conclusion of the Avionics Replacement Programme called Project Ithambo. The project involved the replacement of obsolete cockpit avionic equipment and displays that had become unsupportable by local industry following the demise of the South African companies concerned. The upgrade introduced new Honeywell avionic equipment as specified by the PC-7 Mk II's original designer and builder, Pilatus Aircraft Limited of Stans, Switzerland. This then de-South Africanises the Astra,

which, following upgrade, are no longer known as such, but simply as the PC-7 Mk II. PC-7 Mk II serial 2019, which was already at the Pilatus factory at Stans undergoing a corrosion rectification programme, became the prototype conversion and made its maiden flight from there during September 2009. Following testing, this same aircraft was officially unveiled back at Langebaanweg on July 13, 2010. The modified aircraft are most easily identified by the presence of a small disk-shaped GPS antenna on the very front top of the vertical fin. Less noticeably, the wing root fairings are also more prominent on modified aircraft.

The 31st example modified, serial 1015, was accepted back into SAAF service on March 12,

2013. The last three PC-7 Mk IIs modified, serials 2020, 2024 and 2025 respectively, were all appropriately adorned Silver Falcons Aerobatic Team aircraft.

On May 16, 2013, the project closure function was held and the hangar and equipment employed at Langebaanweg were due to have been vacated by June 28 and the Pilatus personnel involved returned to Switzerland.

Attempts by this writer to request a complete list of all modified aircraft were declined by the SAAF's corporate communications department as being "too sensitive to release!"

ARMSCOR, South Africa's armaments acquisition and disposal agency, is to market the bulk of the 18 or so examples that have not been modified. •



*The easiest means of identifying a modified PC-7 Mk II is evident in this view of serial 1015 seen at Africa Aerospace and Defence 2012 at Air Force Base Waterkloof on September 22. The GPS antenna is clearly visible on the front top of the vertical fin, the more prominent wing root fairings less so - Pic Clinton Barnard.*



Indian Air Force

# Pilatus PC-7 MkII

Basic Flight Training Course Started

**P**ilatus Aircraft Ltd is pleased to announce that the first Indian Air Force Basic Flight Training course using the PC-7MKII aircraft commenced, as planned, on 8th July

2013 at the Indian Air Force Academy at Dundigal, Hyderabad.

The Indian Air Force, the Indian Ministry of Defence and Pilatus have achieved this long-

awaited and significant milestone as promised and on time.

More than eighty cadets will participate in this first training course. The resumption

in basic flight training was achieved following delivery of the fourteenth PC-7MKII trainer aircraft in June 2013, fourteen months after contract signature.



In parallel, Pilatus has also provided training to Indian Air Force maintenance personnel and instructor pilots and has delivered a complete logistics support package.

The Pilatus team wishes the instructors and cadets at the Air Force Academy Dundigal, who are taking part in this first course, much success. Pilatus is confident

that the introduction of the PC-7 MkII into the Indian Air Force training system will prove itself to be an extremely capable, safe and reliable training platform.

We look forward to continuing deliveries of the 75 PC-7 MkII training aircraft to the Indian Air Force and in supporting the aircraft for the coming years. •

## The test range successfully supported two satellite launches in different parts of the world

During May this year, two telemetry specialists from Denel Overberg Test Range and their mobile telemetry station successfully supported the second launch of the VEGA launch vehicle (VV02) while deployed in Northern French Guiana.

Leon Korkie and Deon van der Hoven assembled the mobile telemetry station on site, integrated it with the French Space Agency telemetry kit and participated in the qualification of the telemetry network before supporting the actual mission. The mobile telemetry station of The Test Range provided key coverage for the powered



*New CEO Philippe Duhamel.*

## Philippe Duhamel named Chief Executive Officer of ThalesRaytheonSystems

Philippe Duhamel will become the Chief Executive Officer of ThalesRaytheonSystems. He succeeds Jack Harrington.

Philippe Duhamel joined the Thales Group in 1987 as head engineer for an anti aircraft defense system.

He was then appointed director of command information systems programs for European and North-American customers.

In 1998, he was named director of bids and proposals for Thales's air traffic control business. He then became the director of programs and integration for Thales's naval radars and ground-based air defense systems for Thales Netherlands.

In 2007, Philippe Duhamel was promoted to Vice President

for Ground-Based Radars and contributed to the development of the product policy for air surveillance radars and the integration of Thales's French and Dutch operations in this area.

In 2010, Philippe Duhamel became Chief Executive Officer of Thales Raytheon Systems SAS, the French operations of the joint venture between Thales and Raytheon specializing in air defense systems for armed forces worldwide.

Philippe Duhamel is 51 years old and holds a degree from the Institut Polytechnique de Grenoble and has been admitted to take part in the 65th defense policy session of the Institut des Hautes Etudes de la Défense Nationale (IHEDN). He is married and has three children. •

phase of the ascent of the launch vehicle from shortly after launch, from the Guiana Space Centre near Kourou, until it disappeared over the horizon in the North.

The second mobile telemetry station of The Test Range was deployed and prepared by Herman Steenkamp and Nico du Plessis at Invercargill in New Zealand during March 2013. On 5 and

## Patrick Dewar to Lead New Organization Focused on Global Expansion

Lockheed Martin Corporation has launched Lockheed Martin International (LMI), a new organization responsible for strengthening international customer relationships and industrial partnerships, and growing the company's global business. Patrick M. Dewar, 52, has been named Executive Vice President of LMI and will continue as a corporate officer.

The LMI team will work with global Lockheed Martin customers to deliver the company's products, technologies and services to meet their national security and citizen services needs. The LMI organization is headquartered in London, England, and the Washington, D.C., metropolitan area; has corporate offices in Ottawa, Riyadh, Abu Dhabi, Singapore and Canberra; and regional offices in Tel Aviv, New Delhi, Tokyo and Seoul.

Prior to being named to lead LMI, Dewar was senior vice president of Corporate Strategy and Business Development. Throughout his 28-year career with Lockheed Martin, Dewar has held a number of leadership positions of increasing

responsibility, including vice president of Corporate International Business Development, vice president of Business Development for the Electronic Systems business area, and the European program director for the Medium Extended Air Defense System (MEADS) based in Munich, Germany. Dewar has served as Chairman of the Boards of Directors for Lockheed Martin UK Holdings Limited, Lockheed Martin España, S.A., and Lockheed Martin Australia Pty Limited, as well as the Lockheed Martin UAE Advisory Board. He holds a Master of Science degree in Electrical Engineering from Drexel University and a Bachelor of Science in Engineering from Swarthmore College.

Headquartered in Bethesda, Md., Lockheed Martin is a global security and aerospace company that employs about 118,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration, and sustainment of advanced technology systems, products, and services. The Corporation's net sales for 2012 were \$47.2 billion. •



*Above: Denel Overberg Test Range's mobile telemetry station's antenna at the deployment site in French Guiana where it provided key coverage during the second launch of the Ve.*



*Above: Mr Herman Steenkamp, Mr Gilles Sonny, Telespazio - Kourou, Mr Robin McNeill, Venture Southland - New Zealand and Mr Leon Korkie, celebrating the successful support of the fourth Automatic Transfer Vehicle (ATV4) launch.*

6 June 2013, Leon Korkie and Herman Steenkamp flawlessly supported the fourth launch of the Automatic Transfer Vehicle (ATV4: Albert Einstein) from Kourou on an Ariane 5 ES Launch vehicle.

The launch of the Albert Einstein space vehicle with a mass of more than 20 metric tons was a record-setting heavy-lift mission for Ariane Space. It docked with the International Space Station on 15 June 2013 after a

10 day period of free flight.

Mr Japie Venter, Project Manager for these stations, remarked, "This is also a record for us, because it is the first time that two Denel Overberg Test Range mobile telemetry stations successfully supported two different missions on opposite sides of the world."

Both missions were contracted by the French Space Agency (CNES) under a current umbrella agreement. •



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# CHOPPER ONE

August 2013

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SA - R25

## Magic Merlins

Dirk Jan de Ridder and Menso van Westrhenen visit Esquadra 751 at Montijo airbase as the squadron celebrates its 35th anniversary.



*Main pic: After a SAR training mission over the Atlantic Ocean, crews regularly practice at the cliffs along the coast. This may include a rescue diver being hoisted down onto the beach as well as a 'slope landing'.*

*Above: A plate at the entrance of the squadron building proudly displays the number of lives saved over the past 35 years.*

**E**squadra 751 'Pumas' was named after the helicopter it received when the squadron was commissioned in April 1978, the SA330 Puma. By the turn of the century the SA330 needed replacement and the AgustaWestland EH101 Merlin was selected after a thorough evaluation, which also included the Sikorsky S-92 and Eurocopter Cougar. Twelve Merlins were delivered between December 2004 and July 2006, comprising six models EH101-514 for basic Search And Rescue (SAR), two EH101-515 for fishery patrol (SIFICAP), and four EH101-516 for Combat Search And Rescue (CSAR). While the latter two models are specially equipped for a secondary role, all helicopters are being used for the squadron's primary mission of Search And Rescue.

Standard features available in all three variants of the Merlin include a primary and a secondary winch, a NITESUN search light, a FLIR (Forward Looking Infrared) camera, a Galileo search radar with the ability to monitor 32 surface targets simultaneously and emergency floats. All helicopters are also NVG (night vision goggle) compatible. For passenger transport 30 front-facing seats or side-facing seats for 35 fully equipped soldiers can be installed. Other missions performed by Esquadra 751 include aeromedical evacuation, air logistic support operations and maritime surveillance.

The EH101-515 is adapted for fishery patrol with a cabin console behind the cockpit for the operation of the 360-degree scanning radar

and other sensors, an external loudspeaker and an additional bubble window on the starboard side. The EH101-516 features CSAR mission equipment such as armored plating and a full defensive aid suite, consisting of a radar warning receiver, missile warning system and countermeasures dispensing system. In case no EH101-516s be available for combat missions, then these defensive measures can be installed in the EH101-514 as well. The main rotor blades and the tail rotor of the CSAR Merlin feature a fully automatic folding system for operations from Landing Platform Docks. Finally, they are also configured for air-to-air



*The squadron's 35th anniversary patch and a Patch of 751 Squadron*





refuelling and hover-in-flight-refuelling, but these capabilities are currently not being used.

Initial maintenance issues and lack of experienced crews sparked the Portuguese Air Force to bring the SA330 back in service shortly after retiring it in 2006. A lack of spares led to half the Merlin fleet (mainly SAR versions) being grounded in order to provide spare parts for the other six helicopters. A contract signed in 2008 with AgustaWestland, saw the manufacturer take responsibility for secondary-level maintenance of the helicopters as well as the provision of spare parts and technical support. This has led the entire fleet of Merlins to become operational again.

When the authors visited Montijo, several Alouette III, Super Lynx and Merlin pilots were evaluating the AW109. The AW109

would allow future EH101 pilots to fly a multi-engine helicopter before converting to the Merlin. At present, rotary flying training is performed on the Alouette III and pilots describe learning to fly the EH101 as 'learning to fly all over again'. Portugal is among the worst hit European economies though and it will be difficult to find the money to replace the Alouette III.

Under the command of LtCol João Carita, who is one of only three pilots in the world with over 2000 hours on the EH101, Esquadra 751 consists of around 100 personnel, including some 25 pilots, 12 systems operators and nearly 20 rescue swimmers. Defence budget cuts have affected the squadron's flight hours, but the importance of their mission is such that other Portuguese Air Force squadrons have been hit harder. The number of

flight hours logged by the squadron decreased from 2208 in 2011 to 1744 in 2012. When talking about operational SAR missions, in 2011 the squadron logged 608 hours while saving 173 lives. These numbers decreased to 430 hours and 157 lives the next year. Each pilot flies a rough average of between 150 and 180 hours per year. Although this may seem a very fair amount, this includes frequent rescue missions, leaving only around a hundred hours for training. One pilot told the authors he scrambled into action for the past three consecutive 24-hour shifts he was on alert. If there is a sudden increase in rescue missions, or an increase in flying distance to emergency locations, pilots will get less training.

At six million square kilometers, Portugal has the largest area to provide SAR coverage for

in Europe. In fact, Portugal is responsible for the second largest area worldwide, behind Canada. Besides operating from the squadron's home base Montijo (near Lisbon), two Merlin crews are permanently detached to Lajes air base in the Azores (some 850 miles west of Portuguese mainland) and an additional crew is detached to Porto Santo airport (440 miles west of Casablanca, Morocco). In order to have the helicopters deployed as long as possible they only fly when called into action. All three locations are provided with round-the-clock SAR coverage. The response time is 30 minutes during the day or 45 minutes at night. Since crews at Porto Santo are accommodated off-base, they require an additional 15 minutes. Deployed crews generally stay for two weeks. At Lajes they alternatively work 12 or 24-hour



shifts, while at Porto Santo they are on standby 24/7 for the whole duration of their deployment. Lajes tends to get the most alert calls, due to tropical storms and its strategic position astride major shipping lanes between Europe and the Americas.

Over the 28 years the squadron flew the Puma, 1800 lives have been saved (an average of 64 per year). In November 2012, less than 8 years after service introduction, the EH101 has already saved its 1000th life. Undeniably, the squadron is busier than ever, even on a limited budget. Pilots with previous experience on the Puma told the authors they prefer it to the Merlin when it comes to hovering over a ship, but they love the EH101 in all other aspects. In the Puma it was very easy to look down, whereas pilots are seated further away from the side windows in the EH101, making communication with the systems operator hanging out of the cargo door even more important during winch operations.

The Merlin's range of up to 400 miles, double that of the Puma, has been a major improvement. Several missions have already been carried out as far away as 350 miles offshore. Lieutenant Ricardo Nunes, pilot-in-command on the EH101: "Long-range missions bring planning to a whole new level. Every small factor can influence the mission. For example, if the sea state is worse than expected it might take a couple more minutes to rescue someone from a ship. You can imagine how this adds up if we have to rescue ten or more people. So, in long-range SAR missions a good plan is essential. We often fly OEI (One Engine Inoperative) profiles in long-range missions because it can give us a 12% saving in fuel consumption. When you have someone's life at risk in the middle of the Atlantic, at night, in stormy weather, that can make a difference!" Another pilot told the authors how the wind affects their range more than it does to aircraft, because of a helicopter's relatively low speed and its non-streamlined design. On one occasion, they planned to do a long-range mission with a strong headwind on the way to the scene. On the way back the tailwind would easily take them to solid ground. However, the wind turned and they faced it again on the return flight! They made it back with just enough fuel, but it was a very close call.

SAR crews comprise a pilot-in-command, co-pilot, systems operator, rescue swimmer and flight nurse. While the co-pilot directs, plans and executes actions related to the flight, the pilot-in-command is ultimately responsible for all decisions taken by any

*The Merlin is a very powerful helicopter, suitable for both long-range SAR missions and tactical flying at low level.*

*Several types of training are always combined during a flight. Rescue swimmers are frequently hoisted down onto sailing ships and into the ocean to practice every type of situation they may encounter for real.*



*Depending on the mission, the EH101's cabin is fully customisable with seats, stretchers or both.*

*Pre-flight inspection.*

*The fishery patrol versions are equipped with loudspeakers.*



*As soon as the EH101 reaches an altitude of 60 feet above the water, the cargo door is opened and the systems operator will prepare to hoist down a rescue swimmer.*



*As the salt is washed from the helicopter after a sortie, two rescue swimmers walk back for a shower as well.*

*All versions of the EH101 are equipped with a NITESUN search light.*

*The systems operator hoists down the rescue swimmer onto a moving ship and the rescue swimmer is hoisted back up as the EH101 moves away from the ship.*

crewmember that will influence the course of the mission. The systems operator will guide the pilots over a ship or drowning victim and he operates the winch. Of all crew members, the rescue swimmer is the most exposed to the elements. He will be winched down with or without a stretcher, and he has to bring the victims on board safely, often in non-ideal weather and at night. Once taken on board, if necessary, victims are medically

taken care of by the flight nurse.

A typical everyday SAR training mission lasts two and a half hours and will see a crew of four (usually without the flight nurse) fly out to the ocean, looking for a random vessel willing to cooperate with their training. As a rule, the Merlin will position at 60 feet above the vessel moving sideways at the exact same speed and in the same direction of the ship. This will allow the systems

operator and rescue swimmer to carry out their training. Depending on training requirements they will winch down a dead weight or the rescue swimmer, with or without a stretcher or a real-weight training dummy. The same types of winch training are frequently carried out in the water and near cliffs along the coast during the same flight, as well as at night. Sometimes multiple systems operators or rescue swimmers get their training on a

single flight, which can become a little uninteresting for the pilots when it comes to hovering over open sea for dozens of minutes. Ship training never gets boring though. The level of concentration needed for it wouldn't allow for it anyway. Other frequent types of training include tactical flying, IFR and VFR navigation flights, exercises with force protection and special force units, general handling and emergency training.

### Esquadra 751 - EH101 Merlin variants

Variant	Registrations	Role
EH101-514	19601-19606	Search And Rescue
EH101-515	19607-19608	Fishery Patrol
EH101-516	19609-19612	Combat Search And Rescue



Monday morning 30 March 2010, 06:35h, and 751 Squadron's phone rings. A vessel named 'Kea' from Barbados, carrying 24 people is sinking 170 miles off the coast of Cape Finisterre, Spain (to the north of Portugal). Ground personnel quickly install an external fuel tank before 'Rescue23' takes off. Lieutenant Nunes, the co-pilot on this mission, picks up the story as they approach the ship after a 400-mile transit: "As we reached

the area, the scene was like a Hollywood movie. The sea was very rough with waves up to seven meters. We found the Kea turned upside down, with the bow slightly raised and we could see almost the entire hull. The sailors were already in the water so there was no time to lose. We decided to go into the hover immediately and rescue three victims floating in line, clinging to a cable. Their anti-exposure suits were filled with water causing them to be

in a state close to hypothermia."

"Some others had in the meantime been picked up by nearby ships. After rescuing two more sailors, we initially decided to remain on station looking for two sailors still missing, but after consulting rescue coordination and due to the status of the sailors already on board we decided to head back to Santiago de Compostela, where we refuelled earlier in the morning." The sailors are taken

to hospital and the helicopter crew takes a well-deserved break before returning home later that afternoon. The total flight time that day amassed 8 hours and 30 minutes. For this mission, the Spanish maritime rescue and safety agency SASEMAR awarded the crew with the 'Silver Anchor 2010', but for them it was just another day in which they lived up to their motto 'So others may live'. •



*Main Pic: To celebrate the 35th anniversary of the squadron, the tail of one EH101 was painted in a low-visibility special colour scheme. This side shows a merlin (bird of prey) and the other side a puma.*

*Right: Tactical missions regularly train with Air Force force protection teams and navy seals.*



pic by Anthony Pecchi

## Speed record for Eurocopter X3

**E**urocopter has announced a new pair of speed records set by its hybrid helicopter demonstrator, the X3 which reached a level flight speed of 255 knots over the south of France recently eclipsing the 250 knots) HYPERLINK "<http://www.gizmag.com/sikorsky-x2-demonstrator-250-knot-milestone/16424/>" \n \_blankset by Sikorsky's X2 demonstrator back in 2010. The X3 reached 263 knots (487 km/h) several days beforehand, achieved during a dive

rather than level flight, also besting the X2's record in descent – by a single knot.

In a company press release, Eurocopter flight test engineer Dominique Fournier, who was aboard the X3 during its record-breaking flight, reveals how the extra performance was eked out of the machine. "These flights allow us to further explore the behavior of main rotors at high speeds, and enable us to make effectiveness assessments of the fairing we've

added to the main rotor hub – which will be beneficial for drag optimization across Eurocopter's overall product range," he said.

Otherwise, Eurocopter reports a familiar specification for the aircraft that flew on June 7. Two adapted Rolls-Royce Turbomeca RTM322 turboshaft engines power the X3's five-bladed main rotor and twin propellers mounted on the X3's stumpy fixed wings which differentiate it from the Eurocopter EC155 on which it

is based. This is more or less identical to eurocopter-x3-hybrid-helicopter that notched up 232 knots (430 km/h) in May of 2011.

However, having amassed more than 140 hours in the air since its maiden flight in September 2010, it's thought that the Eurocopter X3 will retire before the year is out although it is possible that the X3 may live on in the form of LifeCraft, a high-speed helicopter proposed by the European Commission. •

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AW169



by Georgina Hunter-Jones  
Pics by Alan Norris



*Flying the*

# Cabri G2 Guimbal

Every so often someone comes out with a new idea for a light helicopter that will revolutionise helicopter flying with its cheapness, its ruggedness and its safety features; then the idea goes into R & D, attempts are made to gather funding and slowly the idea and its practical application dies away. Very few of those ideas actually get even up to the prototype stage and even fewer get actually put into production and sold. One notable exception, of course, is the Robinson R22, which led to a whole stable of Robinsons. The Cabri Guimbal G2 is another.

**B**runo Guimbal, like Frank Robinson, was an engineer working in the helicopter field, in his case for Eurocopter, when he had his dream of a small light piston helicopter. Like Rob-

inson he brought this idea to his employer and like Robinson he found that his idea did not fit with the employer's schedule. However, unlike Robinson's case, but perhaps learning from it, Eurocopter agreed



to give Guimbal a lot of support, including the use of their research facilities and test rig. Guimbal took full advantage of this generosity. His first prototype was produced in 1992, but that got no further and he returned to development, finally bringing out the current G2 in 2007. Since 2007 he has sold forty helicopters, which between them have flown 14,000 hours.

Differences from other light helicopters currently in service

include the main structure, which is made of carbon fibre with only a few uses of metal, such as the fire-wall, the rotor hub, the engine, the fenestron tail and the skids. This use of composites makes the helicopter light as well as strong, avoids corrosion and allows parts to be 'on-condition' rather than time-lifed.

The rotor-hub is an aluminium alloy with magnesium forging for greater strength, and is surrounded

by a rugged monofilament fibreglass winding 'safety belt' that will hold the rotor hub together even if it cracks in flight. The manufacturer says that this safety belt has been tested by deliberately fracturing the head, and then subjecting it to 700 hours at 1.5 times the full design loading. The safety belt extends the whole way up the blades to the tip weights, which it holds in place. As the blades are also carbon fibre they

are light and have tip weights to keep the inertia high and to improve the tip-plane path.

The main rotor has three blades with a high inertia system. This was designed to avoid the problems encountered in the R22 of a low inertia teetering-head system. The G2 head has elastometric bearings and dampers and has used the Eurocopter example of the star flex technology in the head.

The G2 is the only piston



*Above: The landing gear is composite and because there are no oleos there is a damper between the skids and the body of the G2.*

*Right: The engine is a standard Lycoming 360, fitted with one magneto and one plasma ignition system.*



engine helicopter with a fenestron tail. In this case it is a seven bladed fenestron, with a 9x gearing with the main rotor. Because the fenestron blades are almost completely flat the blades move very fast and increase the aerodynamic efficiency.

While it is not surprising that a light helicopter with Eurocopter influence has a shrouded tail rotor Guimbal enthusiasts talk of the clear advantages including its quietness; safety in a public environment and the reduced likelihood of damage from the shrouded tail blades. However, on the downside, it is less powerful than the normal tail rotor and has a different usage range that is not linear.

Many parts of the Cabri G2 are made by outside contractors using moulds created by Guimbal. This includes the fenestron tail, which is made in two pieces and joined together in the factory.

I went to do a test flight with Cotswold Helicopters at Kemble, doing a walk-round with Andy Moorhouse and the flight with Chief Pilot Oliver Heynes.

### Walk-round

There are no locks on the doors and no key. Instead the doors open with remote opening device like a car, this includes a sophisticated anti-theft sensor that works in collusion

with an on-board computer to recognise the owner. And, like a car, the key-fob will light-up the navigation lights so you can find

your Cabri in the parking area (no doubt Guimbal was looking ahead here with anticipation to the day when there is a Guimbal

in every garage). Cleverly, if the battery goes flat and you are left away from home without a charger (something familiar to any owner of a mobile phone) there is also a mechanical method of getting in to the helicopter through the luggage hold. Once in, it is possible to start the helicopter using a code known only to the owner. Once flying this anti-theft device has to be disabled, which it does automatically, so it is possible to restart the engine in the event of a failure.

The blades do hang rather low – so you need to warn any passengers, especially if they are getting out with the blades still moving. Although the pilots operating hand book prohibits start-up in wind speeds of 40 knots or more the Cabri is good in wind – we flew in 32 knots and I hardly felt anything, except when doing spot turns when it was a bit of a fight but that would be the same in any light helicopter. Three blades so as to avoid mast bumping and the dampers are easily seen and checked.

The engine is set in a ‘double redundancy space frame’. This is a safety measure and means that if two of the space frame bars are broken the helicopter is still serviceable to get you home. Moreover, Andy Moorhouse explains, “The mounting brackets above the MRG absorb the torque loading. The upper part of the space frame absorbs the transmission loads and the lower part of the space frame absorbs the flight loads.”

As an added safety system the G2 has crash-worthy seats, which were tested on a sled-bed. This is a first for a light helicopter and the manufacturer says that survival can be expect in a fall of up to 2000 feet pm. There are two places to check on a walk-round, one behind the seats and the other adjacent to the door, where the seat rails have a crash absorber.

The fuel tanks are made of Kevlar and were inspired by Formula 1 racing cars. In testing they survived a drop from 50 feet, fully fuelled, and without spilling a drop.

The landing gear is composite and because there are no oleos there is a damper between the skids and the body of the G2. This stops a sympathetic vibration occurring and causing ground resonance: this should also be checked on the walk-round. As a bonus this damper makes sloping ground very easy.

The engine is a standard Lycoming 360, fitted with one magneto and one plasma ignition system. The exhaust opening is in the roof of the helicopter

cockpit blowing upwards, possible because this is a piston not a turbine engine and hence will not damage the blades. The advantage is that it makes the helicopter quieter - the noise signature of the Cabri is 75.7 decibels at max power, for comparison a R22 has a 78.2 db level and the S300 is 80 dbs. A fixed wing Cessna 172 is around 60 db.

The clutch system is another unique Guimbal factor. When the clutch switch is activated a hydraulic piston situated in front of engine pivots the engine downwards round a hinge in the engine bay, this prevents bending strain on the rotor mast.

Walking around the back of the helicopter there is a chip detector on the fenestron to check, which is a very simple pull out, and the gear-box oil level.

It is noticeable that most of the parts are easy to get at and check, something that shows the designer had been a working engineer himself and knew the importance of easy access.

### Start-up and flight

Once inside the helicopter, the cockpit is noticeably wider than the R22, though smaller than the S300 or the Enstrom 280FX with a width of 1.24m (4.07 feet) same as R44 and .12m wider than the R22.

We closed the doors as the temperature was cold but in hot conditions the doors can be left off in flight without reducing any speed limits. This is different from the JetRanger, for example, which has notable differences between doors-on and doors-off characteristics.

Above our heads were the mixture and rotor brake and behind us the circuit breakers. I plasma ignition and one magneto have separate switches in the cockpit ceiling .

The start-up procedure is not complicated but different and relies heavily on the computer and is actually quite intuitive. Moreover, to save on the cost and weight of fuel injection they decided to use electronic plasma system instead.

There are a series of 'checks' that relate to the computer warnings. The digital screen has a list of every flight taken place and whether any 'events' occurred therein and it performs a self-test before start-up showing previous flights, problems and the fuel

systems. As a safety system for the digital box itself there are back-up lights if the screen goes dark and these are tested too.

There is no Manifold Pressure gauge, instead an electronic multiple limit indicator system with a flow mode versus power mode, which shows a warning when pulling too much power: a red square with 102% (for eg.) inside flashes up on the screen to warn the pilot. Thanks to this it is almost impossible to overspeed the engine.

As this is a piston engine with a carburettor you need to have a carburettor heater and in the G2 this is automatic, reacting to temperatures inside the carburettor. It is worth noting that Robinson has had problems with its own automatic carburettor heating, which suffered from the warning being disguised by governor movements, however this one is said to be different.

The clutch will not start up if rotor brake is connected. One massive belt instead of many small ones but if it was damaged it would be possible to fly with some inches out - in an emergency only.

There is a damper under the skids to prevent ground resonance this does make the Cabri a little see-sawey on start-up , it is actually a rather reassuring feel, rather like being rocked in a cradle.

The controls are normal, although the Cabri has a standard cyclic stick rather than the Robinson T-bar.

### Actual flight

The pilot sits in the right hand seat, and probably the biggest difference for most current light aviation pilots is the direction of the blades - clockwise instead of anticlockwise, which means right instead of left pedal in power-on situations. Because fenestron performance is not linear this does need to be thought about as well as felt. Andy Moorhouse pointed out that while *ab-initio* pilots have no trouble with this, pilots trained on the American models find it quite hard to adapt to the new pedal thinking and they currently recommend that while you are learning on a right tractor model it is better not to fly a left tractor one.

We took off and flew across the Gloucestershire countryside. The cyclic is quite heavy compared to an R22, though similar to a



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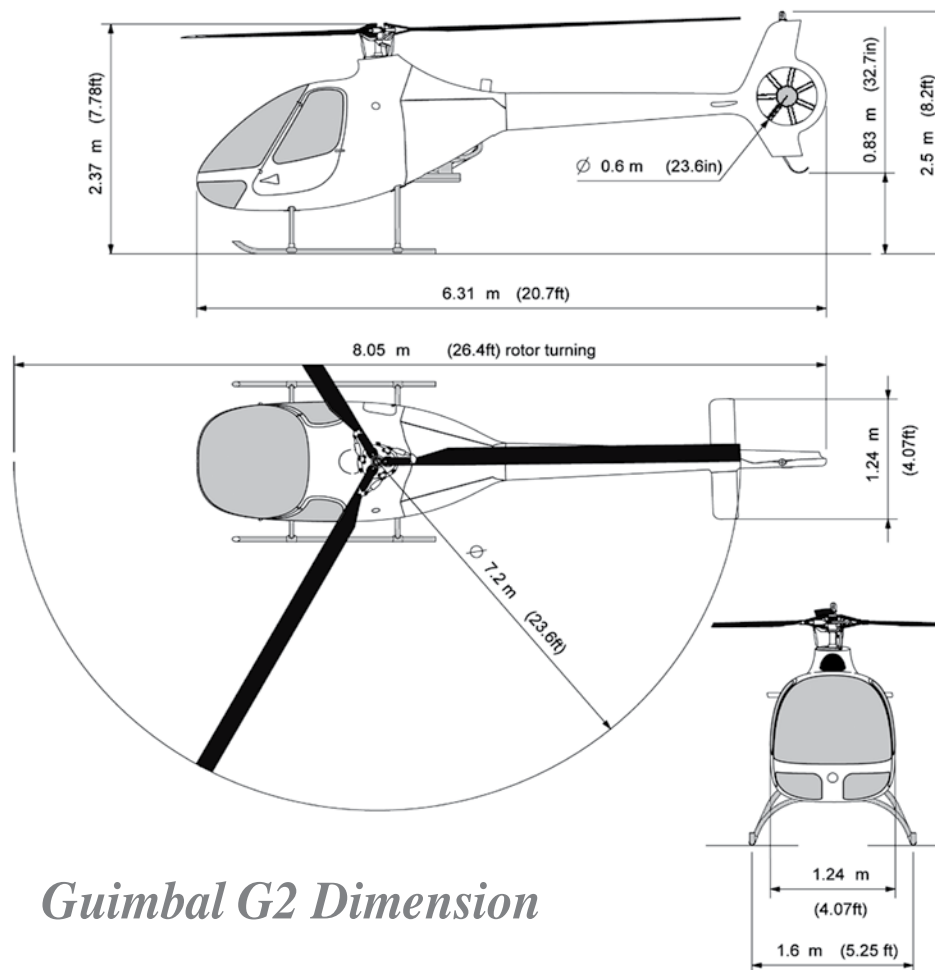
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Many parts of the Cabri G2 are made by outside contractors using moulds created by Guimbal.

This includes the fenestron tail, which is made in two pieces and joined together in the factory.



Guimbal G2 Dimension

## SPECIFICATIONS

### General characteristics

Crew:	2 (Removable controls for left seat)
Engine:	180 hp (134 kW) Lycoming O-360 piston engine derated to 145 hp (108 kW)
Average fuel burn:	38 litres an hour
Fuel capacity:	170 litres
Length:	6.31 m (20 ft 8 in)
Main rotor diameter:	7.2 m (23 ft 7 in)
Width:	1.24 m (4 ft 1 in)
Height:	2.37 m (7 ft 9 in)
Gross weight:	700 kg (1543 lb)
Typical empty weight:	420 kg (926 lbs)

### Performance

Maximum speed:	185 km/h (115 mph)
Cruising speed:	166 km/h (104 mph)
VNE Power on:	130 kts @ sea level
Range:	800 km (431 Nautical miles)
Endurance:	5.8 hours @ 55 knots
Service ceiling:	3963 m (13,000 ft)

S300, but has the cocked-hat trim on the cyclic (like the Hughes 269, now Sikorsky 300) which is extremely useful and takes the weight off well. There was some vibration in the right hand seat, but not so much as to make it uncomfortable, however when we increased speed to see if this increased the vibration it remained the same. This was a surprise as I had been told vibration increased a lot over 80 knots, and as I was

to discover later is something the factory is looking at very closely.

Turns were fine, although there is a tendency to climb. This, ironically, is due to the excellent vision out of the front cockpit; having no impediments to vision means there is also nothing to relate the horizon to and some early pilots have had difficulty with pitch control because of this. However, again this is something students who are not expecting a



Above: The rotorhead is aluminium alloy with magnesium forging surrounded by a fibreglass 'safety belt' for protection if the head cracked.

## The Cabri has a stable hover even in a strong cross-wind



*Above: Georgina Hunter-Jones hovering the Cabri next to instructor Andy Moorhouse.*

*Left: The interior is well finished off with a place for everything.*

'prop' get used to very quickly.

It is noticeable that you need a lot of right pedal in flight, which is different to the American models and a result of the shielding of the fenestron. Tail rotor machines have stabilisers at the rear, but the fenestron does not need these and this and the relatively small amount of pedal needed in the hover is the result.

We did several autorotations and it can only be described as benign although you do need a fair amount of left pedal. The blades have higher inertia blades than the Bell 206, hence the good autorotation characteristics. Their fiberglass laminated composite

has a solid leading-edge weight in steel and an additional tip weight to increase this inertia. The rate of descent was around 1500 feet, which is to be expected with the power to weight ration of this type of machine and is less than the low-inertia R22 and H300, the latter of which descends at 2000fpm. The autorotation felt very controllable and, thanks to the trim, it is possible to do it hands-off. We initiated go-around a little earlier as the governor has a decisive 'bite' when it kicks back in and there is quite a lot of pedal movement, however this would not be an issue in the case of a real engine failure.

We returned to the field and

slowed to the hover. I had been warned that you need to watch the change from forward flight pedal position to hover and so was thinking 'feet' in a serious manner, but in fact it seemed a natural progression and we were not in danger of any false swings. There was also a fairly significant wind holding us straight.

While in the hover we did some quick stops, which were nice but also require a fair amount of pedal work, some spot turns and some landings.

### **Conclusion:**

It was a lovely machine to fly. The controls are stiffer than the R22 or

the H269 and heavier so it is very useful to have the trim. Although there are moments of low pedal work when changing from one type of movement to another the feet are kept quite busy, but this is simply a matter of practice and getting used to subtle pedal movements.

To buy a new Cabri G2 costs £240,000 but Andy Moorhouse explains that this is the consequence of such intensive testing and points out that while a new R22 is about half the price it is also a throw away helicopter that has to be replaced in 12 years, so as far as an asset keeping its value is concerned the G2 is far more cost effective. •



# We fly with **Red Bull's** Glen Dell

Saturday 15th June was Top Gear day in Durban and I had a rare opportunity to fly with Red Bulls' Glen Dell in the Extra 330 LC. When Glen phoned me on the Friday afternoon to invite me the response was a resounding, Yes Please!

**T**he machine is the strong, nimble, amazing product of the Walter Extra factory in Germany and its light on the controls extremely responsive and frankly it will break you before it breaks (and is stressed to plus and minus 11g) about that there is absolutely no doubt. In Glens very able hands

it is a delight to fly in.

It was good to have an opportunity to chat to this amazing aviator. He is a former World aerobatic champion. He raced in Red Bull Air Races, has won the World Aerobatic Championships, is senior training captain at SAA on the A340 with 30 000 flying hours to his credit





***When did the aviation bug bite?***

My father flew in WWII. Normal trainers, Baltimores, Catalinas and Sunderlands. After that he flew for South African Airways. In those days one could get up close to the planes which we did every time we picked Dad up from Jan Smuts International. I was two or three at the time and reckon that is when the flying bug bit.

***Red Bull air racing - this must have been a huge event for you?***

The Red Bull Air Races were an amazing event, extremely well run and well presented. The demands on the organizers and participants was high. There was a constant media presence and pilots were expected to be available to the press 24/7. The RBAR certainly set the bar with regard to aviation as a sport and it is unlikely that they will not return.

***Your SAA career - you are currently training captain on the SAA A340 fleet***

I went through the normal path as First Officer on the Domestic and International fleets and am now on the Airbus A330/340. The Airbus certainly has an interesting design and operating philosophy. It fits in with modern airline transport requirements - safe A to B transportation at minimum cost. Sales show that the Airbus does this extremely well.

***What about your early career - types flown etc.***

I learnt to fly on a Cessna 150 with Ted Baines in Queenstown / Grahamstown in 1978. I was 16 and at school. After getting my PPL and matriculating I went to the SA Air Force and did pilot training there, receiving wings in 1981. In 1982 I did my Commercial Pilots License and Instructors Rating in 1983. The Instructors Rating gave me the opportunity to fly as much as I wanted and in some really wonderful aircraft. There are about 275 of them now, from the J3 Cub to the Boeing 747 and Robinson R22 to the SA330 Puma. Besides helicopters, vintage planes and warbirds are my favourite.

***Your new Extra 330 - what are you feelings of this machine?***

The Extra 330LC is part of the new

line of aircraft from Walter Extra. The certification of the Lycoming AEIO580 engine allowed Walter to incorporate it into his latest designs satisfying the markets incessant desire for more power. In order to keep the weight down in this particular aircraft, it was fitted with one oil cooler. In the USA, pilots were struggling with temperature issues but in South Africa it was simply impossible to operate. Although the performance was great, I could not fly the plane as I had my original 300L. Extra worked on the problem but because of EASA Certification issues, it took two years to resolve the problem and re-certify with an additional cooler. All is well now though and it really is a good plane.

***You are based at Kitty Hawk. Tell us a bit about this field***

Kitty Hawk is situated to the East of Pretoria and is probably best known as the friendliest airfield in South Africa. It has an 880 meter long tar runway, no landing / parking fees, fuel and one of the most well run Clubhouses and Restaurants around. Probably the best breakfast fly in venue on the Reef. It is a short distance from the general flying area and has little traffic. Most of the people that hangar at Kitty Hawk are aviation nuts.

***Your current air show program. Where can we see the Red Bull Extra in action this year?***

Red Bull's marketing program is well developed and targeted. Their activations are mostly extreme sport orientated and often aviation centered as with Flugtag. Saturation advertising however, is not where Red Bull wants to be, and consequently only three or four Air shows are flown per year. I participate in around 24 Air Displays per year however, of which six per year are International.

***Sponsors - how do you keep them?***

Look after their needs, exceed their expectations.

***Your thoughts on fly by wire***

Fly by wire allows a philosophy to be employed through a computerized interface. Airbus

philosophy is safe transport at minimum cost. To this end, the fly by wire on their aircraft provides a stable platform controlled (in normal operation) within clearly defined limits. The fly by wire system will not allow pitch angle, bank angle or speeds to be exceeded. Whether this reliance on technology is a good thing or not is a matter of constant debate however statistics show that modern Air Travel is the safest way of getting to your destination.

***What is your favourite aircraft?***

I suppose all pilots would have a favourite aircraft. There are so many different facets to flying though and so many different aircraft designs to fulfil those requirements. Big, small, fast, slow (hover), stable, aerobatic etc. I could choose the best of each but there would be too many.

***Are you still involved with the Slick 360 program - tell us a about the machine and your involvement.***

Dev Howett had a fuselage frame and a wing mould of a Lazer/ Lazer type aircraft. I obtained these from Dev and took the package to the guys from Aerocam. Francois Jordaan did the structural design work and Chris Hattling did almost everything else. The idea was to build an aerobatic airplane that could compete against the best for a fraction of the cost of what was out there at the time. The Slick (with pilots such as Johnnie Smith at the controls) has won the Advanced SA Champs many times since, usually competing against planes that cost two or three times more.

***Any unfulfilled aviation dreams?***

I have flown a J3 Cub on floats around the Southern States of the USA and have now purchased an Icon A5 Amphibian. I intend flying that around the lakes of North America and Canada when time allows.

***Thanks so much Glen - catch him at an air show near you.***



## Deliveries begin for world's fastest certified single engine aircraft

During June the Cessna Aircraft Company delivered the first production units of the Cessna TTx to customers following a ceremony at the Cessna facility in Independence, Kan. The TTx holds the distinction of being the world's fastest commercially produced and certified fixed-gear single engine aircraft.

"The customers will now find out what we know, that the TTx is an aircraft which will wow pilots with its performance, and surprise passengers with its comfort," said Brian Steele, business leader for the Cessna TTx. "Everything about it is fun, fast and sporty, while at the same time intuitive and comfortable. The G2000 avionics are so advanced and at the same time familiar. The interior appointments add a refined touch of class to the overall TTx experience."

A high performance, all-composite aircraft, the TTx is



designed for advanced pilots with advanced technology and greater comfort in mind. The leather-wrapped side-stick control and additional horsepower provide advanced TTx pilots with speed and performance close to that of a jet. The speed comes with style, as the fit and finish of the TTx has been likened to detailing reminiscent of a luxury sports car interior.

One of the customers accepting delivery is David Barnes, Chief Executive Officer of Watermark Retirement Communities. Barnes said he plans on using his TTx to travel between the 32 Watermark properties throughout the country. Representatives from Pacific Air Center (PAC) were on hand to

assist with the event. PAC is a Cessna authorized sales center covering the southwest United States, with bases in Long Beach, Calif., and Scottsdale, Ariz.

Production line flow of the TTx was announced in April of 2012 at the Sun 'n Fun International Fly-In and Expo in Lakeland, Fla. The aircraft has a top speed of 235 kts (270 miles per hour), an operating ceiling of 25,000 feet and an optional Flight into Known Icing (FIKI) system, enabling pilots to file flight plans allowing for varying weather conditions. The TTx is the first aircraft to be equipped with the Garmin G2000 avionics system which features a glass cockpit with dual 14.1 inch high definition

displays and touch screen controls.

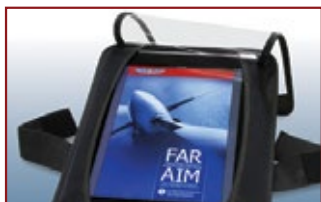
"Cessna has a versatile, reliable workhorse in the 208 and the world's dominant flight trainer in the 172, so it is rewarding to see an aircraft as unique and distinctive as the TTx leave the Cessna hangar to round out our single engine offerings," said Jodi Noah, Cessna senior vice president of single engine/propeller aircraft. "In true Cessna fashion, the teams involved in delivering the TTx to the marketplace have placed quality and performance as top priorities, and they delivered."

Cessna provides additional training for pilots in the TTx, due to the additional horsepower and capabilities of the aircraft. •





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*The Airlink crew on the day.*

# Pietermaritzburg **2013** **Air Show**



**O**n the 29th June it was Pietermaritzburg's turn to host the Kzn Winter Air tour and the day started with an impressive 'rocket' takeoff by Airlink's RJ 85 at 0830 from runway 34. Christine Smith, Airlink head at PMB had arranged a live patch between Capt Timo Rebel and the Capital broadcast tower for the departure so the crowd could hear exactly what the crew were doing from before start up to passing 3000 ft.

New for this show was Chris Briers in the New Zealand built PAC 750 XSTOL and Chris

flew the pants off this machine even taking Ian Douglas and his Durban Skydive teams aloft twice. The machine's short field capabilities are exceptional – after dropping the parachutists it came down like a lead machine.

Warren Haslam with his Russian SU 29 with its Veneyedev 9 cylinder radial engine and Roger Deere in his Zlin 50 provided good entertainment for the crowd as did Michel Leusch with his SU 29 who gave an outstanding display that included 3d stalled work. Nigel Hopkins' Cirrus MX

2 performance again showed his excellent airmanship. That knife edge he does in both directions was awesome and an aviation photographers dream come true. The aerobatic teams of Goodyear Eagles Pitts (Dennis Spence, Johan Van Solms and Neil Trollip) and the Extra Harvards (Scully Levin, Gavin Brown, Jeff Earle and Sean Thackeray) gave their normal polished displays.

Also in attendance was the beautiful Impala ZU IMP under Mike Weingartz and owned by David Laas. This was special

for the show considering that one display by this machine consumes 200l of fuel.

Geoff Dyer and Noel Mc Donogue from Light Flight had an impressive static display which included the newest addition to their family being the Sling. The SAAF museum society was also represented.

The car/plane race was a great draw card, with Fed Air pilots Luke Rattray and Jon van Duyn in Chantelle Hickley's very fast Mini Cooper taking on Dennis Spence in the Goodyear Pitts.



- A. Yak 52 lining up for take-off.
- B. Eqstra Flying Lions lines up on runway 16, led by Scully Levin.
- C. Scully Levin with daughter Hayley.
- D. Mike Wright with Brian Emmenis.
- E. Light Flights Chief Flying Instructor Geoff Dyer.
- F. Fedair pilots with Fedairs Chantelle Hickley.
- G. Chris Briers arrives flying the Airteam PAC 750 XSROL
- H. Michel Leusch gives an impeccable performance in the Decathlon.

Chantelle arranged flights in the Fed Air Caravan for the mayoral party and some children. The Federal Air C208 Caravan is branded in Kzn Winter Air Tour colours and pilots

Luke and Jon facilitated transport to Richards Bay on 22 June. For the first time in Pietermaritzburg Brian Emmenis opened the gates to the aircraft stand

at lunchtime and the public were able to see the aircraft and meet the pilots. It was great to see the premier Dr Zweli Mkize in attendance as well as the Mayor

and Deputy mayor of PMB. Justin Scott head of marketing of the Kzn tour was very pleased with the great crowd attendance which was larger than 2012. •



*Scully Levin and Brian Emmenis celebrate 28 attendance of consecutive Durban air shows.*



*Skydiver boss Ian Douglas with Fed Airs Chantelle Hickley.*



*Mx 2 pilot Nigel Hopkins chats to crowd*



*Tom Chalmers (Airnews) and Leon du Plessis Capital Air.*



*Goodyear Eagles Glen Warden.*

Durban Air Show  
wraps up this year's

# KZN'S Winter Air Tour

By Mike Wright





*Carl Trieloff and Chantelle Hickley of Federal Air.*



*CC Pocock and friend.*



*Dr Clive Coetzee, one of the organizers.*



*Stu Low - President Durban Wings club.*



*Impala pilot Mike Weingartz.*



*Federal Air Pilot, Jon van Duyn with safety officer, Fred Bebington.*



## Stu Davidson's P-58 Sea Fury



Above: A happy Ayre team on airshow day.  
Top: Eclipse taking off for its display.

The past six weeks have been very busy in Kzn with the Winter Air Tour doing the rounds but everyone always looks forward to the big grand finale and this year's show did not disappoint in any way despite there being no SAAF or SAPS Airwing participation.

The action packed program offered spectators a full day of display slots which saw a unique mix of thrilling sky-high aerobatics, biz jets, war birds and much more. A big screen was on hand and also brought the spectators closer to the sky-high action with live feeds into the cockpit of some of the planes while legendary commentator Brian Emmenis entertained the crowd with his special commentary and vast knowledge on all aviation issues.

The KZN Winter Air Tour team wrapped up their very successful second annual air show series on a high, as the Durban air show attracted the whole city to the Virginia Airport

and delivered plenty of exciting moments and numerous firsts at a South African air show.

It was evident from early on that this air show would go down as the best Durban air show yet, with a completely revamped line-up that pulled in thousands of people.

The air show proved to be a fun day out for the whole family while also providing aviation enthusiasts with an exhilarating day of aircraft displays with over 30 different planes and 40 pilots while stalls and tents provided additional entertainment that included a flight simulator to compliment the aviation theme on the day.

### What was different about this show?

Scully Levin was interviewed by Brian Emmenis and it was revealed that he, Brian and Dennis Spence had attended 28 consecutive Virginia air shows – a very impressive commitment when you think that these



Above: R44 of Kzn Aviation taking off for a flip.

two aviators and their teams are based at Rand Airport.

Visitors were treated to the sight of not the usual one but two P51 Mustangs and as a bonus Stu Davidson brought in the Sea Fury as well. I chatted to both Stu and Patrick before the show on Friday afternoon and one thing was clear - they are both very passionate about aviation and of their 'air force' kept at Green Bushes airfield just south of PE.

The business jet park and the opening of the crowd line at the lunch time

break went down very well.

On the formation aerobatic front we had the Eqstra Flying Lions, Gabriel Pitts, Good year Pitts with 4 planes and team Extremes MX 2s.

A great bonus this year was the presence of not only of former world champ Glenn Dell in his Red Bull Extra 330 LC but also Nigel Hopkins in the amazing Mx 2.

Michel Leusch was superb in the aerobatic Decathlon and Radio Controlled jet while another polished display was given by the Impala flown by Mike Weigartz. He and owner David Laas have

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1. Chris Briars in action I the military trainer PAC CH4T  
 2. CC Pocock in action. Bush Pilot bar none!  
 3. The Quest Kodiak flown by JP Fourie takes off for his display.  
 4. Menno Parson's P-51 Mustang taking off.  
 5. Scully and Ellis Levin depart off runway 05 for their display.  
 6. Nigel Hopkins in the MX 2.  
 Nigel has just become SA National Aerobatic Champion.

attended every Winter Tour show.

An extremely unusual sight at air shows over the past years has been gliders but Virginia broke that drought when a JS-1 took to the skies.

"We haven't seen a glider at the air show for many years and spectators were captivated by the silence, grace and beauty of this unique aircraft," said flight director John Neilon.

Gliders normally take off by means of a winch or are 'tugged' up by another aircraft. However some gliders do have engines and the JS-1 in particular has a small turbine engine on board that enables the pilot to extend the flight. Once a glider has gained enough altitude the pilot will exchange height for distance by gliding to the next thermal source.

Said pilot Oscar Goudrian - Gliding is a relatively cheap way of flying and also very safe. About flying in his glider Oscar says, "It gives me a great sense of freedom while also challenging my abilities. A good friend once said it's like having a conversation with nature."

Dennis Jankelow and Associates

raffled a Cherokee 235 with the proceeds going to Reach for a Dream. The prize included training at 43 Airs school Port Alfred.

In the hotly contested Car versus Plane race Shane Botha from SMG Rocks in a Mini beat flying legend Dennis Spence in the his Goodyear Pitts Special in a most exciting race.

Finally 13 parachutists from Durban Skydive Centre ended off the day with a jump which finished up along the entire crowd line to close off the best show in years.

Keeping their promise to bring aviation to the people, the KZN Winter Air Tour team also made sure that visitors came as close as possible to the aircraft and the adventurous pilots with planes lined up along the runway and pilots interacting with the crowd and signing autographs. At lunchtime, in another first for the Durban show, the organisers opened the spectator line and allowed visitors to admire the aircraft up close, including the famous "Mustang Sally" P51D of Menno Parsons, 'Queen of Hearts' of Patrick Davidson and the mighty Sea Fury of Stu Davidson. •

# Zandspruit Airshow

## 7 September 2013



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## Latest mould release technology

A new range of mould release agents have been introduced that will enable manufacturers to reduce mould "set up" time, as well as being kinder to the environment.

The Zyvac range has been built around a core of experience, which



has been associated with the semi-permanent release industry for over 50 years. Changing requirements has led to the development of new products to meet and exceed the latest environmental regulations abroad. Several years ago the company became one of the first to develop solvent-based release agents with no ozone depleting chemicals (ODCs) and no Chlorinated solvents. These original formulations have remained unchanged ever since and still lead the market in terms of performance and price.

During a recent demonstration to introduce the Zyvac range of products to local manufacturers, Jo Jacinto of AMT Composites, the country's leading supplier of advanced composite products, said that new ways had to be found in the manufacture of moulded products. While the popularity of composite materials for

moulds worldwide has exploded, the current release technology used is drastically outdated.

### Safe Solvent and Water based mould release technology

In order to keep up with these requirements Zyvac also produced one of the first commercially available solvent free release agents systems to complement their existing range of solvent based release products. The product line consists of a cleaner, sealer and release agent, all designed to incorporate the benefits of a semi-permanent release agent without the concerns associated with using solvents.

Flex-Z is the newest in the line of easy application release products for the moulding industry. Zyvac also release the first ZERO-HAP (hazardous air pollutant) safe solvent release system with

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adjustable release. The variable release system offers attributes not found in any competitor products and offers different release rates in the same mould.

## Polymer science

“Zyvax uses the latest in polymer technology to provide safe and easy to use products to clean, seal and release moulds. Their release agents are available in a range of slip factors and therefore the release system can be tailored to meet the most demanding release applications”. All Zyvax products are easy to apply and cure at ambient temperature quickly allowing shorter “mould down time” and thus improving production.

“Currently used solvent based products need longer curing times between applications and while being hazardous to workers, they could also contaminate surrounding moulds during application and as a result, production needed to be stopped during the application process” Says Jo.

Existing cleaners are also solvent based and pose considerable risks in storage and usage in confined spaces. By comparison the range of mould cleaners from Zyvax make use of either safe-solvents or water-based chemicals to clean moulds. Particle technology used

within the water based cleaner makes cleaning far easier and leaves surfaces ready for sealing.

Jo explained that worldwide there is an ever-increasing demand for manufactured products from electronics to architectural and leisure equipment and others. More importantly, environmental issues and a safe working environment are becoming key considerations in the growing world composites industry. As a result, manufacturers are constantly looking for environmentally safer products and faster production techniques that will enable them to meet these requirements.

## Well received

Technical teams from manufacturing companies representing a wide variety of industries - from international airways, to concrete products and high-tech electronics industries, that had witnessed the demonstration were in agreement that the new fast and safe technology represents the way forward for the local manufacturing industry. •

For more information  
contact Advanced Materials  
Technology, Jo Jacinto  
Tel: (011) 392 4232

# HS 400 Signum



## beyerdynamic

# COMET

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the eagle has landed.



**2007 Robinson R44 Raven II**

TTSN: 500hrs. 9 Hole Panel, Bubble Windows, Grey Leather Interior. King KY 98 Com, King KT 76 transponder with mode C, Garmin GNS 420 with colour moving map. MPI midlife. Calendar time 90 hrs to fly. AIR CONDITIONING. Full House. GREAT MACHINE. Bladder Mod Completed

R 3 200 000 Excl VAT



**OFFERS**

**1997 Cessna Grand Caravan**

Recently imported! Fresh C of A and ready to fly TTSN: 7000hrs, ESMOH: 800hrs, New Prop, Cargo Pod, Radar, Auto Pilot, Air Conditioning, BRAND NEW 14 Seat, Interior. Great Value For Money! PRISTINE CONDITION!

\$ 1 300 000.00 EXCL VAT



**OFFERS**

**2008 Robinson R44**

708 TT . 9 hole panel, Garmin GNS 430 with colour GPS with moving map display, 2 comm, 2 bubble windows, air conditioning, Bladder Mod Completed.

R 3 200 000.00 EXCL VAT



**1971 Cessna 182 N**

TT 1877 hrs, Engine SOH 377 hrs, Propeller SPOH 6 hrs, Cessna NAV/COM Radio VOR, Cessna 200 ADF, Cessna TXP Transponder, Cessna ADF, Heavy Duty Undercarriage, Factory Original Aircraft.

R 795 000 Excl VAT



**1978 Cessna 172N**

TT 8371 hrs, Engine SMOH 0 hrs, Propeller SPOH 0 hrs, Narco MK12E Nav/Com 1, Cessna RT385A Nav/Com 2, King 82A DME, 4 Place Intercom System, Cessna 359A Transponder. New paint and New Interior.

R 695 000 Excl VAT



**2008 Robinson R44 Raven II**

480 hrs TT, Nine Hole Panel, GNS 420 GPS/COM, Bubble Windows, AIR CONDITIONING, Bladder Mod Completed. Full House. Pristine Condition!

R 3 200 000.00 EXCL VAT



**1996 Bell 407**

King Equipped, Dual Controls, Rotor Brake, Particle Separator, Leather Seat Trim & lots More!

\$ 1 750 000 Excl VAT



**1970 Bell 206 B3 Augusta**

4819 hrs TT, Components brilliant, Engine 0 SMOH, Garmin 340 Audio Panel, Garmin 530 Com/Radio

R 4 200 000 Excl VAT



**1971 Beechcraft V-Tail Bonanza V35B**



**OFFERS**

TTSN 3544 hrs, Engine SMOH 1537hrs, 183 hrs left to fly. SPOH 40hrs, MPI Fresh, King KMA 20 audio panel, King KX 170B, Nav/Com/ILS, King KY95B Nav/Com, Narco 890 DME, King KT78A Txp with mode C, Apollo GPS, 4 place Intercom System, Auto Pilot, 6 Seats. A great buy for the speed lovers.

R 695 000 Excl VAT



**2008 Robinson R44 Raven II**

1100 hrs TT, Nine Hole Panel, AIR CONDITIONING, Bubble Windows, Bladder Mod Completed.

R 2 700 000 Excl VAT



**2006 Robinson R44 Raven II**

TTSN: 1680 hrs, Nine Hole Panel, King KY196A Digital Com, 4 Place Intercom, King KT76C TXP mode C, Garmin 150 XL Aero 798 GPS, 4 x Bubble Windows, New Beige Leather, Bladder Mod Completed

R 1 900 000 Excl Vat



**File Photo**

**2005 Robinson R44 Raven II**

1288 hrs TT, Nine Hole Panel, AA12S Audio Panel, Garmin Area 500 with low IFR Maps, King KT76C Transponder mode C, Bladder Mod Completed, Stickers will be removed.

US\$ 220 000 Excl VAT



**1997 Bell 407**

3617 hrs TT, Garmin GMA 340 Audio Panel, Garmin 500 Series GPS, Air Conditioning, Auxiliary Fuel Tank, Provision For Sling, Corporate Seating.

\$ 1 975 000 Excl VAT



**2008 Cirrus SR 22 G3 GTS**

TTSN: 300 hrs. MPI Fresh. Full Avidyne Glass Panel PFD + MFD, 2 x Garmin 430's, STEC55x Auto Pilot, AIR CONDITIONING, And lot's more! Pristine Condition, Like New!

R 3 300 000.00 Excl Vat



**File Photo**

**2005 Robinson R44 Raven II**

TT 1170 hrs since new, Engine SMOH 175 hrs, Nine Hole Panel, King KY196A Digital Com, Garmin GNS 420 Colour GPS/Moving Map display with 2nd COM, Bendix King KT76 Transponder, Bladder Mod Completed.

R 2 500 000 Excl VAT

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**EXCELLENT COMPONENTS**

**1983 Bell 206 B III**

7500 hrs TT, garmin GNS 420 GPS/ NAV 340, KMA 24 H Audio Panel, KT76 Transponder, Dual Controls, Wire Strike Kit, Particle Separator, STC For Weight Increase. Fresh (3 year) TT Straps. Will be delivered with new paint and interior.

**R 5 000 000.00 Excl VAT**



**2005 Cessna T206H Turbo**

280 hrs TT, Garmin G1000 package. Aircraft as new like it. Arrived from the factory!

**R 4 200 000 Excl VAT**



**2005 Robinson R22 Beta II**

1114 Hrs TT, Engine SMOH 1315 hrs, 7 Hole Panel, Bendix King KY 187 Digital Com, Garmin 150 Excel GPS, Garmin Area 500 (mounted above instrument panel)

**R 1 150 000 Excl VAT**



**OFFERS**

**1990 Lancair 360**

TTSN 600hrs, Engine SMOH 600hrs, SPOH 0 hrs, MPI Midlife. King Equiped, King digital KX 155 Nav/Com, King Digital KY97 Com, King Digital KLN89 GPS, King Digital KT76, Txp with mode C, Stec 50 auto pilot (3 Axis), Digital Engine Monitoring System. 10 980 Hp tuned 230 HP. 200 knot cruiser, Ferrari of the skies.

**R 1 200 000 Excl Vat**



File Photo

**1975 Cessna T210L**

TTSN 4355 hrs, Engine SMOH 85 hrs, Propeller TT 65 hrs, Propeller SOH 5 hrs, King KMA 20 Audio Panel, Garmin GNS 430 Nav/Com with ILS & Terrain Awareness, King KT76 Transponder, Cessna 300 A Navomatic Autopilot. NEW PAINT, NEW INTERIOR and NEW WINDOWS of your choice!

**R 1 400 000 Excl VAT**



**2007 Robinson R44 Raven II**

TTSN 235 hrs, 9 Hole Panel, AIR CONDITIONING, Bubble Windows, Dual Control, Artificial horizon, Directional Gyro, Turn Coordinator, Interior - Grey Leather. Full House.

**R 3 200 000 Excl VAT**



**1984 Cessna 303 T**

3610 hrs TT, Engines SMOH 1610 hrs, Propellers Since overhaul 10 hrs, IFR Equipped, New interior, new paint, full house, like new!

**R 1 900 000.00 Excl VAT**



**1976 Cessna 210L Turbo**

TTSN: 2170 hrs, Engine SMOH: 736 hrs. Prop Since New: 55 hrs, Cessna Audio Panel with 3 point Marker Beacon, Garmin 430 Nav/Comm/GPS moving map display, Cessna 400A Navomatic Autopilot.

**R 1 450 000 Excl VAT**



**1988 Piper Cherokee 180**

TT 9910 hrs, Engine SOH 744 hrs, Propeller since new 1453 hrs, KA134 Audio Panel, King KY 92 Com/Radio, Wing Leveler, Grey Metal Panel, Perfect Trainer.

**R 395 000 Excl VAT**



**2008 Bonanza G36**

Low hour Aircraft, Only 210 hrs TTSN. Garmin G1000 Fully Integrated Dual Glass Avionics. Solid state AHS & Digital ADC. TAWS, WX 500 Storm scope, Wx link. Lot More!

**R 5 000 000 Excl VAT**



**1998 Seneca V**

TT 1620 hrs, Engines 1520 hrs (TBO 1800 hrs), Dual KING NAV / COMMS, KING KX155, GPS and weather radar with AVIDYN colour screen and terrain ADF/DME, AUTO PILOT

**R 2 000 000 Excl VAT**



**1984 Piper 235 (250 HP)**

TTSN 3888 hrs, Engine SMOH 427 hrs, 2 Blade prop, SPOH 72 hrs, King KMA Audio panel, Dual King KX170B Nav/Com, King KR 87 ADF, King KT 76 A Txp (Stec 50 Auto Pilot)

**R 550 000.00 Excl VAT**



**2010 Robinson R44 Raven II**

65 hrs TT Since New, Nine Hole Panel, Audio Panel, AIR CONDITIONING, Bladder Mod Completed, FACTORY FITTED ALUMINIUM BLADES, 4 x Bubble Windows, NO Accident History!

**R 4 400 000 Excl VAT**



**1983 Cessna 182 F**

TTSN 3266 hrs, Engine SMOH 1037 hrs, Propeller SPOH 76 hrs (3 Blade) KA134 Audio Panel, 1 x KX155 Digital Nav/Com + ILS/Com 1, 1 x KX155 Digital Nav/Com + ILS/Vor.

**R 525 000 Excl VAT**



**1979 Cessna T210N With Inter Cooler**

TTSN 4193 hrs, Engine SMOH 1006 hrs (TBO 1600hrs), Prop SPOH 549 hrs, Garmin 340 audio panel, Garmin GNS 530 Nav/Com + VOR King Digital, KR87 ADF, King digital KN87 DME, Collins Txp mode C, KFC 200 Flight Director, 3 Axis auto pilot/flight director, HIS/LS, DME, Radar Altimeter, Digital Fuel Flow Monitor.

**R 1 600 000.00 Excl VAT**



**OFFERS**

**1973 Cessna U206F**

TTSN 4163 hrs, ESMOH 988 hrs, Prop Since Midlife: 17 hrs, MPI Fresh, Garmin 340 Audio Panel, 3 Point Marker Beacon, Garmin 530 Nav/Com, Garmin GNS 430 Nav/Com + GPS colour Moving map + ILS, Navomatic 100 auto pilot with STEC Altitude Hold, Garmin GTX 327 Txp mode C, and much more. New Paint, New Interior. A must see.

**R 1 500 000 Excl VAT**



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AVIATION



# Stay Cool

Imagine you're in a powered aircraft – fixed or rotary, with doors and a canopy, one or more engines, and some combination of electrical and hydraulic systems running through the aircraft. At the very least there's a pilot, but the odds are that there are other occupants as well – some mixture of crew, passengers, and even (hopefully invited) livestock. If it's daytime, then as likely as not there's also sunshine falling on the airframe. That's easy to imagine, because it's probably most aircraft you've ever flown, or flown in.

And in every one of those aircraft, all of these things create heat. Typically a human body generates about 80 watts of heat – so a largish airliner with 300 people on board that's a substantial 24kW of heat from the passengers alone. Flying above cloud or in cloudless conditions, an aircraft will see about 1.4kW for each square metre of fuselage so again for a typical airliner, that's hundreds of kilowatts, which even with the normal shiny white-painted reflective roof will be a few tens of kW making its way into the cabin. Every electrical system on board the aeroplane as well will eventually turn most of the electrical power it receives into heat – a little will make it into radio transmissions or light from lamps and displays, but most just heat. Pumps are particularly dreadful, and although bigger aircraft have engines well away from the cabins, smaller ones don't and heat can make its way regularly across firewalls

and into the aircraft interior.

So any reasonably modern flying machine is a sealed space into which we keep pumping heat. That's clearly not ideal, and something needs to be done about it.

In a small unpressurised aeroplane – say your typical Piper, Cessna or Robinson – or even something a little bigger like an Islander or Do228, this is really not difficult. You just keep pulling cool air in from outside the aircraft, and hot air naturally leaks out of the cabin maintaining a reasonably cool environment. Some aircraft will even let you open the window,

technology has been around for a lot of years, and so it's unsurprising that this is how most aircraft deal with the problem of heat build-up. It's still an inefficient way of cooling things, so the natural ventilation will be used for the major heat areas – in particular engine ancillaries and the avionics bay, which between them will often produce several tens of kilowatts of heat – a single seat fighter, full of avionics may be producing 50kW of heat from the avionics bay alone, and an airliner whilst containing less computing power, isn't much better – dumping all that heat into space is easily the best thing to do with it.

Which all sounds great – but does it really work that well? In truth, only partly. Firstly I've learned over the years that apparently the cabin pressurisation designers and the air conditioning designers don't really talk well in most aircraft companies. The cabin outflow valves are usually located just under the floor which whilst great for getting rid of unwanted heavy waste gas – the CO<sub>2</sub> we all breath out, it rather ignores that hot air rises. In an ideal world we'd probably have larger outflow valves under the floor to get rid of the CO<sub>2</sub> and smaller ones in the roof space to get rid of a portion of the hot air – but no, we just get the floor valves, and so have to expend a lot of energy running air conditioning pumps back in the tail. Oh well, it works.

There have been other solutions over the years – the famous Supermarine S6b of Schneider trophy fame circulated water between twin skins of the huge seaplane floats, whilst the later development Spitfire had monstrous great radiators, mostly for engine cooling – which less-than-cunningly were located just behind the undercarriage doors so that an aeroplane on the ground had to get airborne very quickly before the engine overheated and had to be shut down to protect the engine. More recently I've seen a few British designed small aeroplanes, particularly in the microlight class, which partly use coolant from the engine cooling system to heat the fuel line and carburettor body, thus pretty much eliminating carb icing – a rare bit of cleverness, but only one that really works with a liquid cooled engine of-course.

Another common trick incidentally is to use a much larger and heavier ground based air conditioning unit to cool an aeroplane before flight. The reasons for that are simple enough – it's a lot easier to keep an aircraft cool which started that way than to cool a hot aeroplane.

The message however is that cooling an aeroplane – its engine(s), avionics, and cabin is most of the time, really really important. Fail to cool an engine properly, and it'll overheat and in extremis seize up; fail to cool electronics properly and just about anything will fail; whilst failing to keep people cool results in all sorts of nasty problems. So respect for cooling systems, not messing about with arrangements and coolants, as well as making sure that anything new going into an aircraft has the ability to be cooled properly is vital. •



*A heavy duty ground cooling unit preparing a passenger aircraft for flight from Tucson, Arizona.*

although the relatively high speeds of an aircraft make this a lot less comfortable than in a car so most pilots don't use that ability unless it's in something particularly small and slow.

The real complications come in when you get onto pressurised aircraft. The pressurisation system will be pumping air continuously into the cabin either from an engine driven pump (most likely a pressurised piston-prop such as a Cessna C421) or more likely from engine bleed air (pretty much anything with a gas turbine engine). Either way this air will be heated up by being compressed, whilst also the flow of air out of the cabin has to be restricted, to ensure pressurisation. The result is a pooling of heat in the cabin that unless you're somewhere very cold, needs to be dealt with.

Air conditioning as a

Within most cabins, what will be done is that a certain amount of new air is passed into the cabin continuously, with leakage controlled through two or more outflow valves to maintain the required cabin pressure. A proportion of the air in the cabin however must also be continuously cooled, otherwise the temperatures will soar and it's likely to be minutes rather than hours before temperatures become dangerously high. So normally some mixture of the air already in the cabin, and the new air being brought in, is passed through heat exchangers, usually in the tail, which pulls heat out of that air and puts it either into external air which will then be dumped out the back with all this extra heat, or into the fuel, which takes advantage of the extra little bit of energy going into the engines.



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