GLOBAL
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Heli-Expo 2018

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Fireblade Aviation welcomes first international flights

Some thoughts on flying the B737 800

Dassault Falcon 6X

A KLM Steward a century ago

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PILATUS CENTRE SOUTHERN AFRICA

Looking forward in 2018

Land expropriation without compensation

The words on nearly everybody's lips at the moment and land grab has already started with areas around Midrand being marked out and occupied literally overnight. Now people may say what has this got to do with aviation. Lets consider the close proximity of this land to Grand Central Airport. There is open land around the area and if the situation at the Vanderbijlpark Airfield is anything to go by, there is going to be little consideration for companies, aviators, or anybody else. At one stage our local airfield, if not on the same level as Grand Central, was active and well supported. In fact one year it was even the starting point for the former Presidents Air Race. Then squatters moved in and today the once busy airfield is overgrown, with nothing left to remind us of its previous importance to Vanderbijlpark.

And talking about Grand Central, Lanseria International is also surrounded by open land, agricultural holdings and farms!

Is this a worse case scenario, yes but we live in turbulent times. Hopefully common sense will prevail.

To date this year two of the most important aviation exhibitions have been held, attracting thousands of visitors and providing an insight into what can be expected from the industry during this course of 2018. The Singapore Air Show is the largest in Asia and was once again well supported although starting with an accident when a single-seater South Korean T-50 military aircraft taking part in the airshow skidded and caught fire while taking off at Changi Airport. The show saw a number of deals being signed with Boeing picking up a wide variety of orders from a number of Eastern airlines.

A highly successful Heli Expo 2018 was held in Las Vegas during February with Airbus Helicopters attracting much attention with the H160 prototype helicopter. Roads are becoming increasingly congested and with the old cliché of 'Time is Money' becoming a mantra for many, the advent of air taxis is on the horizon and Airbus is one of those companies steaming ahead to produce a suitable machine for such a service. A few decades ago the idea of landing on the moon or having space shuttles seemed a figment of the imagination, now of course all this is old news. Right now it seems almost impossible to think that one might go to an 'air taxi rank' to catch the first one home - in ten years time it may well be a reality.

Something to look forward to!

Charmaine de Villiers

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Opening shot


A380
AIRBUS A380
Own the sky

By Richard Browne

Engineers

A large portion of one's flying career will be spent dealing with an engineer, whether you are lucky enough to still fly a classic aircraft which requires a flight engineer or dealing with a ground engineer as a circumstance of events.

I recall an early friend in flying once relating to me that all engineers know how to start all aircraft, and he was right. It wasn't long before I'd be testing his theory actually when one morning I was struggling to start a little Beech Sierra and an engineer walked over, calmly told me to shift and brought the power plant to life in one motion. I was naturally slightly embarrassed but also in awe of the theory and the conclusion to prove it.

So, it was throughout my progression in flying, I was to meet a number of wonderful people who had a great ability to repair aircraft despite what us pilots tried to do to them.

It started on a five-year stint in the contract world flying turbo-props in dire places around Africa and Pakistan. I recall helping out changing an engine on a Kingair in the Kabul snow, watching these guys just get on with it. Each step was methodical and complete, not a nut left loose, nor a wire-lock skipped.

I managed to blow the nitrogen out of a nose-wheel oleo in Afghanistan, way up north in the mountains, on a steel runway. After having vaguely made myself heard to the base in Pakistan via HF radio, an engineer was dispatched in another aircraft and he got us ready in no time.

Later in my airline sojourn I have met many professional gents with whom I am still friends. I relied heavily on the flying variants as a junior First-Officer especially in the face of a persuasive Captain. I'd always ask if the engineer was happy to fly the machine, if he looked at his feet or came out with a negative then I'd be packing my flight bag and heading out the door. I learnt to trust them implicitly and this has held me in good stead till now.

A large portion of the ground time back then was spent with the guys who remained at base and had to attend to plenty snags in short turns. They were miracle workers and kept those aircraft flying and earning money for greedy managements and owners.

Currently the ground engineering team I work with are cut from the same cloth, they're spot on and have an air of alacrity to boot. Despite them being Japanese and my fluency in the language is heavily retarded, we are able to communicate towards the needs of the aircraft and the show keeps moving. They are extremely knowledgeable with regards the aircraft systems and limitations which makes my life easier trying to meet a slot time or comply safely with an MEL/CDL.

Aside from all of this my partner and I have built a hangar at the Morningstar Airfield near Cape Town, we called it DogBox. It is here where I have met more of these superb people who deserve such rich accolades but really just go about their day humbly and with grace, making plans and turning out the most unreal results. Not to mention they are all so easy to engage with and total gentlemen as well.

I cannot think actually of an engineer who has not given freely of their time to offer advice or get their hands dirty to help. I am a pilot and I have met many pilots who cannot share the same highlight, in fact I've met a few who I've not spent time remembering due to their overhyped self or sullen outlooks. Quite obviously these are the rare cases, but it has to be said that engineers in general are superb folk worthy of high praise.

I often wonder where they are headed in a world beset with liability and propensity for mechanising the very jobs we should be preserving. Remember Rosie the Riveter? Now a lost art, not forever but for the most part gone. I was watching two gents rivet last week and they resembled a synchronised ballet, the result was of course, perfect.

Attempts have been made to try and get youngsters to shadow certain engineers in the hope they will endear themselves to the engineering side of aircraft maintenance but the youth just don't seem too interested in it, mostly the feedback was along the thread of what were we paying and how would we get them transported home. I, for one, lost interest.

So, wherever you practise this art of aviation and have access to an engineer, treat him or her well, learn from them and use them when you can. They have an amazing eye, they can spot mistakes and save you long term budget by doing it right the first time.

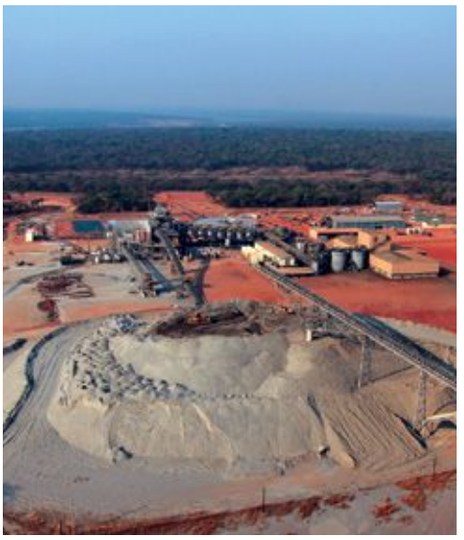
I look forward every day to meeting up with and learning from Renier and Chris. •

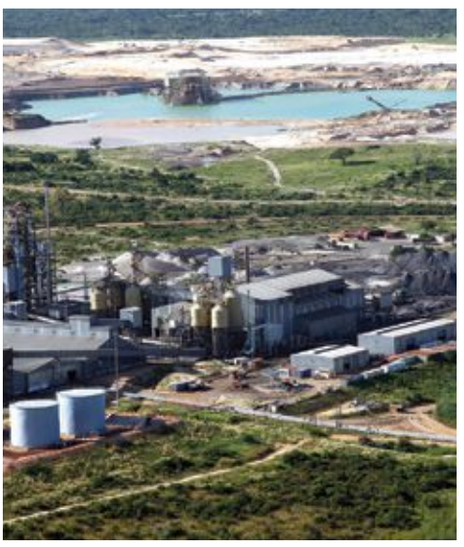
Top: DogBox.

Left: Chris and Renier hard at work.

Calling all pioneers,

mavericks, trailblazers,
and groundbreakers.





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Freedom of the African Sky

FlightSafety International

Since it was first started 67 years ago, FlightSafety International has established a reputation as a world class aviation training institution. The impact this company has made on global safety through its training centers, is immense.

In those days pilot training was mostly done in actual aircraft. Founded by A L Ueltschi, the company bought one of the first simulators to be built, a Link Flight Simulator invented and introduced by Edwin A. Link and this made a huge difference to training as the instrumentation, multi-axis movement, visual presentations, and sounds provided the students with an experienced at a virtual reality level.

Airlines were the first major customers to make use of simulators but the cost of purchasing and utilising the equipment was basically out of reach for most aviation companies which did not have enough aircraft, or the number of professionals needed to use the machines in order to make the purchase economically viable.

FlightSafety International created the financial solution by buying simulators and hiring trainers. It then offered airline quality training to the business aviation industry. Over the years FlightSafety International has steadily increased its number of training centers. The range of simulator aircraft types and the location of its centers make it easy for pilots to get excellent learning in their specific aircraft type in close proximity to their bases.

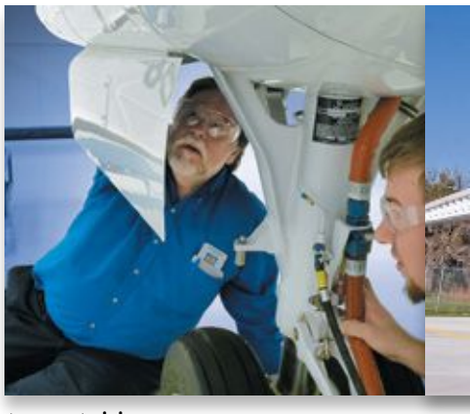
Growth

The company has located over 40 Learning Centers around the globe and conducts more than 1.4 million hours of training each year on their fleet of 320 simulators situated around the world, including at Denel's premises at OR. Tambo Airport, Johannesburg.

Expansion to the Learning Center in Columbus, Ohio, was completed in February, 2018. It incorporates 14 simulator bays, 29 advanced technology equipped classrooms, 28 briefing and debriefing rooms, as well as facilities

Cabin Management training.

Pratt & Whitney Canada Maintenance training.



Maintenance training

for Graphical Flight-Deck Simulators and other training and service areas.

Comprehensive training programmes in Columbus are available for aircraft manufactured by Bombardier, Embraer, Dassault, and Textron to commercial, government and military organisations. The company provides training each year to pilots, technicians and other aviation professionals from the United States, Australia, Brazil, Canada, China, France, Japan, the Netherlands, Norway, South Africa and the United Kingdom.

Training at FlightSafety International is not just about time spent on simulators. They provide training for pilots of fixed and rotary-wing aircraft, maintenance technicians, flight attendants and dispatchers, online, on location and at convenient Learning Centers.

Training programmes

FlightSafety supplies mission-critical training programmes and equipment to military, law enforcement and government flight crews. The company also partners with more than 40 national governments who entrust pilots trained by FSI with the safety of their diplomats and heads of state. A recent addition to the training programmes are the more than 100 courses approved for education benefits by the US department of Veterans Affairs at 11 Learning Centers across the country.

FlightSafety is the exclusive maintenance training provider for Honeywell and they also provide training programmes for Pratt & Whitney Canada engines including turboprop, turbofan and turboshaft and APUs.

Maintenance training on aircraft manufactured by Leonardo, Bell Helicopter, Beechcraft, Bombardier, Cessna, Dassault Falcon, Embraer, Gulfstream, Hawker, HondaJet, Piaggio and Sikorsky, forms part of the services offered by FlightSafety.

In addition, FlightSafety is expanding its Sikorsky S-70A Black Hawk training in West Palm Beach which are designed to provide a path for FAA type certification and recurrent training in the Black Hawk. Provided by highly qualified instructors and evaluators, the courses feature a Level-D qualified simulator and are designed specifically for restricted category, public use, and government operators.

The available courses include a two-week VFR initial and one-week prior experience course leading to an S-70 type rating with VFR limitation on an FAA certificate. A simulator for the Sikorsky S-76B training in Lafayette, Louisiana, recently entered service. The full flight simulator was previously located at the Dallas Learning Center.

FlightSafety announced at the end of February that training has begun using the new Airbus Helicopters EC130T2 full flight simulator located at its Learning Center in Denver, Colorado. The Center is equipped with Level D qualified simulators for the Bell 407GXP, Airbus Helicopters AS350 B3 and EC135.

FlightSafety's comprehensive helicopter training programmes include reviewing and practising routine, abnormal and emergency procedures, practiced in a simulator under a wide variety of weather and environmental conditions and repeated without delays from air traffic, weather conditions or air traffic control. The FS1000 simulator built for the Airbus Helicopter's EC130T2 include FlightSafety's VITAL 1100 visual system and CrewView collimated glass mirror display. •

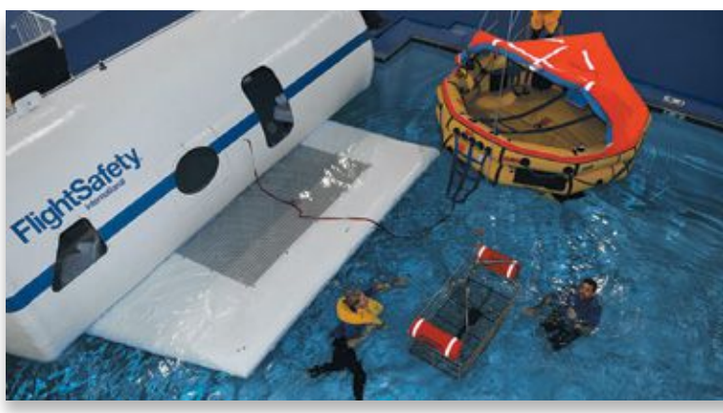
Above: FS1000 simulator interior.

Above: Gulfstream G550 simulator.

Above: Sikorsky S-76D simulator.

Above: Upset Prevention and Recovery Training (UPRT)

Caption to come



Corporate emergency training.

First Ultra Long Range A350 XWB makes its debut

The first Ultra Long Range version of the A350 XWB has rolled out of the Airbus final assembly line in Toulouse. The latest variant of the best-selling A350 XWB Family will be able to fly further than any other commercial airliner and will enter service with launch operator Singapore Airlines later this year.

Altogether, Singapore Airlines has ordered seven A350-900 Ultra Long Range aircraft, which it will use on non-stop flights between Singapore and the US, including the world's longest commercial service between Singapore and New York.

Following completion of the airframe assembly, the first aircraft has now moved to an outdoor station where it will undergo extensive ground tests, prior to installation of its Rolls-Royce Trent XWB engines.

The aircraft will then embark on a short flight test programme to certify the changes over the standard A350-900 that will bring the additional range capability. These include a modified fuel system that increases fuel carrying capacity by 24,000 litres, without the need for additional fuel tanks. The test phase will also measure enhanced performance derived from aerodynamic improvements, including extended winglets.

With a maximum take-off weight (MTOW) of 280 tonnes, the A350 XWB Ultra Long Range is capable of flying up to 9,700 nautical miles or over 20 hours non-stop, combining the highest levels of passenger and crew comfort with unbeatable economics for such distances.

The A350 XWB is an all new family of wide-body long-haul airliners shaping the future of air travel. The A350 XWB features the latest aerodynamic design, carbon fibre fuselage and wings, plus new fuel-efficient Rolls-Royce engines. Together, these latest technologies translate into unrivalled levels of operational efficiency, with a 25 per cent reduction in fuel burn and emissions, and significantly lower maintenance costs. •

George Airport wins Best Airport by region

Airports Company South Africa's George Airport in the Western Cape, has been honoured as the Best Airport by Region in the African category of the Airport Service Quality (ASQ) Awards. The airport came out tops as Africa's best airport in the category under two million passengers per year.

The Airport Council International awards programme is the world's premier passenger service benchmarking programme for airports. Passengers rate airports according to their travelling experience; an important component of the business of airports as it reflects on whether expectations have been met. George Airport's annual passenger numbers continue to grow and welcomed over 663 331 passengers last year.

The airport not only plays a central role in the region's tourist economy, but is a national distribution hub for cargo such as flowers, fish, oysters, herbs and ferns.

The airport has been awarded the South African Airport of the Year award six times, and this is attributed to its steady growth, coupled with an unwavering commitment to service and efficiency. George Airport is Africa's first airport to be solar powered.

In February 2016, a 200 square meter solar plant was launched at the airport, demonstrating a commitment to clean energy generation and sustainability.

The airport management has been invited to an awards ceremony at the ACI World Customer Excellence Global Summit in Halifax, Canada in September later this year. •

Airlink suspends Pretoria / Cape Town services

After two years and four months of up to four daily return flights between the cities, SA Airlink has decided to suspend air services on their Pretoria-Cape Town route.

"This was not a decision taken lightly, but after almost three years, the route has not developed as we expected it would and in order to stem losses, we will suspend services from the 8th of May 2018," explained Airlink CEO, Rodger Foster.

Since mid-August 2015 the Wonderboom – Cape Town service has provided Tshwane-based government officials, private sector businesses and leisure travellers with a convenient service between Pretoria and the Mother City. Until recently, Airlink operated up to four daily return flights on the route, using a combination of 83-seat Avro RJ85 and 37-seat Embraer ERJ135LR regional jets to deliver an effective full-service value proposition offering on the route.

"Sadly, the route has not become profitable, despite our collaborative best efforts – including significant marketing initiatives by the City of Tshwane, to promote the connection.

The combination of operational constraints on the size of aircraft that can be used on the route and the poor state of the economy have not helped," explained Mr Foster.

"A compounding factor has been Government's understandable and commendable belt-tightening efforts, which include cut-backs in government-related travel," he added.

"We are not closing the door, as we believe the Pretoria-Cape Town connection is important and could potentially be viable in the future. With this in mind, we will continually re-assess the market and the economy so that we can resume the service when the conditions are conducive", said Mr Foster.

Customers holding confirmed tickets for travel after the 8th May 2018 will be re-booked on alternative SAA flights between OR Tambo International and Cape Town, or offered a full refund. •

Customers with queries should contact either:

Airlink Agent Helpline	+27 11 451 7350
Airlink Customer Care	+27 11 451 7337 / 7371 / 7338 / 7395
or by email	customercare@flyairlink.com

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FlightSafety international

Captain Kell Kotze left and right senior first office Simon Day in the front office of the Mango B737 800.

Some thoughts on flying the B737 800

by Captain Kell Kotze - Mango

We normally fly leg for leg, and if the weather is forecast to be such that a monitored approach is to be flown, then the first officer will probably get the leg and fly the approach and the captain monitors, only taking over with the field in sight to carry out the landing. Otherwise the first officer will carry out the missed approach already being heads down on instruments.

We have 2 VHF radios on the 738 (as do all aircraft under part 121) some have 2 HF radios as well. Standard practice is to use VHF1 for all communications and to use VHF2 to listen to the ATIS or talk to company, otherwise it is set to 121.5 and monitored. Normally during flight (using our individual audio control panel) we select both VHF 1 & 2. When we say "off 1" it's short for saying I'm deselecting VHF1 either to then talk to company on VHF2, copy the ATIS or talk to the pax. After that we would re-select VHF1 and say "back on 1" and the other pilot would update any changes. We do this to alert the other pilot to listen out for any radio calls. It's also good practice to communicate to your colleague what you're doing so that everyone maintains good situational awareness.

The radios on our aircraft have two windows, active and standby, we use the selector knobs to tune the frequency in the standby window and when ready to use we push a transfer button that swaps the frequencies from standby to active. We then tune the next expected frequency in the standby window ready to be used.

Automation is very important in any aircraft as it allows the pilot to unload their workload (specially during any non normal situation) to see the bigger picture and keep good situational awareness. It stands to reason that a intimate knowledge of one's auto flight system is necessary for that desired effect.

We normally engage the auto-pilot at 400' and disconnect somewhere on the approach, depending on the crew.

Hand flying is also encouraged to maintain flying skills provided the crew have discussed it and the weather and work load is not going to be a factor. For example, a non standard departure with thunderstorms around is not the time to be hand flying in my opinion.

LNAV and VNAV stand for lateral and vertical navigation. Basically we have a lateral and vertical profile populated in the FMC with the data we enter (routing, weights, flight level (FL), so by selecting LNAV and VNAV the flight directors will command that profile, so if flying by hand, you would follow the FD and if the auto pilot was engaged the FCC (flight control computer) would follow the FD.

There are certain requirements for L and V Nav engagement, for example using LNAV for take-off the LNAV path must be within 5 degrees of take-off heading and departure

runway selected in the FMC.

When asked to enter the hold we have a hold button on the FMC that allows for the selection of the position (present position included) you would like to hold at, it can be modified for L or R hand patterns, inbound course.

To exit the hold we would simply select exit hold on the FMC or select the next waypoint. If for example, we received a clearance to the course fix or any other way-point we line select it from the legs page on the FMC place it on the top of the legs page1. This will now cause a white dashed line to the way-point to be displayed on our Navigation display and the execute light to be illuminated on the FMC, the pilots will then confirm it's the right point before executing the change.

Holding at altitude is an interesting exercise in that there's a fair amount of things to take into consideration. When we learn to fly we learn a rate one turn is 3 °/sec with out and inbound legs of 1 min or 1.5 min above 14000', we learn the rule of thumb for the bank angle of a rate 1 turn = 10% TAS + 7.

But as we increase altitude our TAS increases for a given airspeed. With a TAS of 480, a rate one turn will be at a bank angle of 55 degrees (54.54 to be precise) which is not possible without stalling and would be limited to at most a bank angle of 25 degrees which will give you a rate of turn of 1 degree/sec. Therefore the hold will take three min for the outbound turn, 1.5 min for the outbound leg, three min for the inbound turn and another 1.5 inbound leg giving a total of 9 min at around 2400Kg an hour = 360 Kg of fuel for 1 hold! When asked to enter the hold we would keep this in mind and take steps to conserve our fuel, re examining our alternate (possibly using a closer or further airport depending on the wx), and determine how long we can hold for. Depending on the reason and expected delay and wx, we could elect to use our alternate fuel and commit to destination, provided landing is assured or divert, always with final reserves intact.

Cat II III main differences are the minima, RVR is the controlling factor in a precision approach and the RVR required for a CATIIIa is TDZ 200/ MID 125/ STOP END 75m (advisory) with a DA of 50'.

Both touch-down and mid-zone RVR are always controlling. If reported and relevant, the stop-end RVR is also controlling. If the aircraft will be at taxi speed (<60kts) by the stop end then it is considered not relevant.

A CATIII approach is a coupled approach with a Auto land and a Auto land requires two auto pilots.

CAT II is either a manual landing or auto landing, a CATII manual landing is still a coupled approach but only requires one auto pilot that is disconnected for the landing.

The RVR required for a CATII manual is 350/150/advisory.

The RVR required for a CATII Auto is 300/125/advisory DA less than 200'.

All three approaches are monitored approaches auto brake is recommended but not required for a CATII or CATIII approach.

The auto brake is a very useful system and it provides maximum deceleration in case of a RTO and automatic deceleration on landing at the selected level (1, 2 or 3). The anti-skid provides skid, locked wheel and hydroplane protection for each individual wheel and is part of the braking system.

The tower gives info if the runway is wet or damp but doesn't provide depth info unless asked and then they would send out a car and physically measure the depth, so not very accurate. Pilot reports on braking action is a lot better and one would check your landing distance based on the expected braking action, and if wet, a positive landing is preferred to break the water surface tension and prevent hydro planing.

As part of the descent and approach planning we calculate our actual landing distance based on our landing weight configuration and auto brake setting, as we always plan on the safest and most cost effective method. On this occasion we opted for a flap 30 auto-brake two and calculated that we could stop safely well within the landing distance available. At about 60 Kts and two thirds down the runway the auto brake was disconnected and we continued to roll to the end in idle reverse to further reduce wear on the brakes reducing cost to company. The extra few minutes are also helpful in allowing the engines to cool down and stabilize after being used in reverse on landing.

What I like about flying the B738 is that it's a high performance aircraft that can run away from you easily if you ever think you've got it waxed. In my humble opinion the saying "never go anywhere your brain hasn't been 10 min prior" is for anyone that's lucky enough to fly the 800.•

Honeywell International Inc. cockpit technologies for South Africa's first Boeing 737 MAX fleet

Region's second-largest airline operator to enhance safety and operational efficiency with one of the best weather and navigation systems on the market.

Honeywell International Inc. announced that Comair has selected its suite of advanced cockpit technologies for its future fleet of Boeing 737 MAX aircraft.

"Our new fleet additions will enable us to be on the cutting edge of aerospace technology and in a leadership position among the airlines in region," said Erik Venter, chief executive officer, Comair. "Supplementing that with some of the best navigation and weather equipment from Honeywell International Inc. means that we can keep our commitment to safety and ensure passengers reach their destinations quickly and comfortably."

Outfitting the first 737 MAX fleet in Africa, Comair is using the industry's leading navigation and weather systems, including Honeywell's Integrated Multi-Mode Receiver and the IntuVue® RDR-4000 3D Weather Radar system. These advanced technologies work together to help pilots prepare for and respond to new or difficult runway approaches and hazardous weather conditions. In turn, Comair can increase passenger safety and comfort, while preparing for future flight safety regulations.

In January 2019 Comair will take delivery of the first of eight Boeing B737-800 MAX 8s, which will complete its fleet replacement strategy, giving the most modern and efficient fleet in South Africa.

"Maintaining reliable, safe service is of maximum importance to airlines, especially as they look for new and more impactful ways to upgrade their fleets," said Rudolph Louw, aerospace leader – Africa, Honeywell International Inc. "Working with Honeywell International Inc. provides pilots with the intelligence they need to not only make incremental adjustments in their flight route to save time and fuel, but also avoid patches of turbulent weather. Ultimately this helps drive fuel and maintenance efficiencies, while promoting a positive passenger experience."

Key Honeywell International Inc.

technologies on-board Comair's new 737 MAX include:

- Integrated Multi-Mode Receiver, which provides the latest in radio navigation capabilities with satellite-based and ground-based navigation in one complete, lightweight receiver. This technology helps pinpoint precise aircraft locations for efficient landings and saves space in the cockpit, reducing the size and weight up to 50 percent compared with existing solutions.
- IntuVue RDR-4000 3D Weather Radar, which is the first automatic commercial radar to depict weather in the flight path of an aircraft, detecting inclement weather 5 percent farther than any other system. This allows aircraft to detect turbulence up to 60 nautical miles ahead as well as predict hail and lightning. IntuVue also enables Connected Radar, allowing Honeywell to download weather hazard data from other IntuVue-equipped aircraft.
- SmartTraffic Traffic Alert and Collision Avoidance System, which provides a long-active surveillance range capability of 100 nautical miles to detect incoming aircraft. The system offers pilots exceptional awareness of traffic to avoid and reduce risks on the flight path.
- Mark II+ Communications Management Unit, which manages two-way data link communications between the aircraft and the ground, enables the real-time transmission of aircraft health and position data, and provides a communication link between pilots and the airline's operations center.

In part because of Comair's selection of Honeywell International Inc. navigation and weather equipment, the airline can meet existing and upcoming regulations mandated by the Federal Aviation Administration, such as the Automatic Dependent Surveillance-Broadcast Out. Using precise GPS data, the technology can accurately pinpoint an aircraft's position in real time and share this data with surrounding aircraft and air traffic control to meet the aim of running more efficient, safer flights. •

DC-8, largest airlines in the 60's

Pic by Tim Rees

A KLM steward half a century ago

By: Peter Kerckhoffs - Part 2

This second story tells about my life as a Royal class steward with KLM Royal Dutch Airlines, 50 years ago.

In the sixties the airline world was unrecognisable compared to today. With the exception of New York which was flown twice a day, all intercontinental flights were flown once a week. KLM used the DC8-63, the largest aircraft of its time. It could carry 219 passengers of which 8 in the Royal class. The maximum range was 3900 NM. Therefore some of those destinations required stationing a crew en-route for a couple of months. You could request to be stationed in Brazzaville, Rio de Janeiro or Tokyo. I have been at each of those stations for 3 months and it was quite an experience.

To fly from Amsterdam to Johannesburg the aircraft needed refuelling in Brazzaville. In those days this was an undeveloped town. The Russian government had built the airport according to their standards and also supplied all the necessary support vehicles, including three large snowploughs. Go figure, smack on the equator!

The crew stationed in Brazzaville took over the weekly flight from Amsterdam to continue to Johannesburg, which took a little over 4 hours, and returned to Brazzaville after 8 hours. Then I had no idea that South Africa would become the country I would live in decades later.

There was not much to do, besides braais and looking at the trees. Now and then we took a 'cruise' on the Congo River. Sometimes large chunks of land broke off from the shore of this massive river and became floating islands, complete with trees, some small huts and even people. Surreal. We also sometimes visited Kinshasa on the other side of the river.

Romances were obviously happening, but overall this was a place where 3 months were really enough.

A much more attractive stationing was Rio de Janeiro. Our hotel was on the Copacabana beach. This was definitively the place to be for a 21 years old Dutch guy. Once a week we had to work, flying from Rio to Buenos Aires and back. The trip was 3.30 hrs. one way, turnaround time of 6 hours, so all in all one day work and 6 days off. There was so much to do in the city; one could have stayed easily another year. There were hardly any tourist, because who could afford to fly to Rio in the 60's. The beach was – especially on the weekends - full with Brazilian ladies, sunbathing in their minuscule bikinis and frolicking in the surf. Our pale Dutch skin was a sharp contrast but also the envy for some.

The street life was vibrant, the people joyful and high spirited. Such a contrast to the scene in The Netherlands. There was simply no way one could spent the $ 15.00, our daily allowance for enjoying ourselves and sightseeing.

Every week we took the crew who arrived from Amsterdam out for dinner to our favourite place, high up in the cooler mountains, overlooking Rio. They were obviously reluctant to leave after their 2 days stay.

This was a place we felt sad to leave after three months, especially when the winter had arrived in the Netherlands in full strength.

The third place I was stationed was Tokyo, in the winter. I was looking forward to it!

When we flew from Amsterdam to Anchorage, on our way to Tokyo, I noticed that the First Officer used a sextant to shooting stars through a specially installed glass dome in the cockpit roof. Always when I tell this to people they laugh and think I'm making it up, but it's true. The navigation equipment in the 60's was such that a back-up was needed. The results were written down and used to calculate our exact position. I tried – for fun – to get any results, but according to my readings we were somewhere in the middle of the Atacama Desert in Chile.

When we arrived in Tokyo it was already dark. The next morning when I opened the curtains of my hotel room, the first thing I saw ... was The Eiffel Tower! I was completely flabbergasted because I knew this tower is in Paris. Initially I thought it must have been the after landing drinks which somehow

did not agree with me, also because the colour of the Eiffel Tower had changed into bright red. Well ... it turned out to be that the Japanese built a similar tower in 1958, just slightly smaller, as a communications and observation tower. Mystery solved.

Tokyo was a very crowded and busy place. And big, really big. The metropolitan area housed already 24 million people in the 60's.

No tourist to speak off and hardly anybody spoke English. All signs in the streets, shops and underground/ train stations were only in Japanese characters. To avoid getting lost, our hotel supplied us with a card which said - in Japanese – to please return the carrier of this card to the hotel. The hotel was luxurious to the extreme.

Since I only had to work one day a week, flying to Anchorage and back, I strolled the streets in Tokyo endlessly, visited large department stores where the service was out of this world. At the entrance each and every client was greeted by a lady who opened the door, made a deep bow and addressed you in Japanese which loosely translated meant: "You most appreciated client, we thank you for visiting our humble establishment". Humble establishment, it had about 11 floors and numerous escalators, where at the bottom and top ladies with white gloves wiped the railing and made sure you arrived safely. Some department stores even sold single engine airplanes made by Subaru and Fuji. The electronic department was massive and it was just unthinkable not to buy some of these gadgets – tax-free. In The Netherlands at that time this was just not available at all, Japan was way ahead of Europe. There were whole streets with only shops selling electronic stuff. Or streets with only Bonsai trees shops, others with only kite shops, etc.

Taxis were spotless. I noticed that some taxis had a little green, blue or red flag attached to their windscreen, just popping out over the roof line. I was told that was to indicate that a driver - at that particular day - had either a difficult emotional, physical or intellectual day in their Biorhythm. The passengers and other drivers could then react accordingly; very thoughtful. Also people with a cold wore masks, to not infect others.

Once I organised a trip to Mount Fuji, by train. The trains were called Shinkansen, the so called bullet trains, which already then drove 200 Km+. Driving through the city on elevated rail tracks at 200 Km/hr I found way more spectacular than flying at 800 Km/hr.

For us climbing Mount Fuji was an exciting outing, but for the Japanese it was a pilgrimage to Holy ground. All over the paths were little shrines, where people paused for meditation or prayer. One could notice that the Japanese were in a special state of mind, and you more or less automatically adjusted. The top of this mountain, which we never reached, nor even came close to, is always covered in snow and ice and the shape is very symmetrical, from whichever side you look at it.

My job was to fly once a week from Tokyo to Anchorage and back. We left Tokyo on Monday evening and arrived in Anchorage on Sunday morning. I say this again, left Monday evening, arrived Sunday morning. You had a whole second Sunday. After staying in Anchorage one day, we left Monday morning and arrived back in Tokyo on Wednesday morning, so missing out Tuesday completely. This because we crossed the International Data Line, but I never got used to that.

On board we had also Japanese stewardesses, who looked wonderful in their traditional kimonos and we could learn something from their way of serving passengers.

I remember, when boarding in Anchorage for our return flight to Tokyo, how cold it was in the aircraft. The icy wind was blowing into the aircraft through the open doors at both sides; even with a jersey and overcoat, it was still stone cold. Passengers also all kept their overcoats on, until at least half an hour into the flight.

During our stay in Anchorage, which was then still a small town, with dirt roads and sidewalks made of wooden planks, we could hardly get out, because it was winter. Sometimes when you woke up, about 20 inches of snow had fallen during the night. But when the roads were drivable, we took a KLM car and drove out of the city. For a guy from tiny Holland, it was quite an adventure to drive for hours on end, seeing only endless forests and miles and miles of dirt roads, seeing not a single car – or people, only now and then a bear or moose crossing the road.

Now the flights from Amsterdam to Tokyo are non-stop, take about eleven and a half hours and cross Russia. The crew is back in Amsterdam in three days.

I'm glad that I worked with KLM in the 60's, when there was still plenty of time to see the world.

That KLM recruitment brochure I found some years before in my parents newspaper, said: "Travelling the world and seeing exotic places". And that's exactly what I did. •

Above: No wing lockers, just an open shelf - *Pic by Clive Peace*

Above: 'Old School' cockpit instruments - *Pic by Skymember*

Singapore Airshow

Asia's largest airshow, Singapore Airshow has won recognition as a global marketplace, networking powerhouse and the platform of choice for the world's aerospace community to do business in the thriving Asia Pacific region which is becoming increasingly important in the international aviation industry.

Held every two years, this year's show attracted over 1 000 of the world's leading aerospace companies together with high-level government and military delegates. An unfortunate incident occurred before the start of the on 6 February, when a single-seater South Korean T-50 military aircraft taking part in the Airshow skidded and caught fire while taking off at Changi Airport when taking off for an aerial display. The aircraft was part of the South Korean aerobatic team, The Black Eagles.

Other aerobatic display teams were from the Republic of Singapore flying the F-15SG and F-16C; Royal Thai Air Force (JAS-39 C/D Gripen); United States Air Force (F-16); Royal Malausian Air Force (SU-30 MKM); and a fly-past by the B52 by the USAF.

Contacts, networking and conferences all form part of international airshows and at Singapore a number of deals were announced.

Rolls-Royce and Singapore Airlines sign Trent 1000 and Trent 700 contracts

A confirmed $1.7bn order for Trent 1000 engines to power 19 Boeing 787 Dreamliner aircraft, which will be covered by Rolls-Royce's flagship TotalCare® engine support service was signed between the two companies. The order, originally announced in February 2017, was in addition to an order for Trent 1000 engines for 50 aircraft, made by SIA Group, in 2013. Singapore Airlines is preparing for the entry into service of its first 787-10 aircraft powered by the Trent 1000. A full-size Trent 1000 was on display at the Rolls-Royce stand. The airline also signed a contract for SelectCare™ support for Trent 700 engines that power 11 Airbus A330 aircraft.

Boeing

Boeing showcased a wide range of products and services at this year's Singapore Airshow. Boeings strong presence in Singapore reflects the strong growth prospects and opportunities across its commercial, defence and services businesses in Asia-Pacific.

The Asia-Pacific region is Boeing Commercial Airplanes' fastest growing market with a strong demand for both single and twin-aisle airplanes. In addition to models of the 737 MAX and 787 airplanes that have been delivered to numerous customers in the region, the Boeing exhibit also showcased a model of the new 777X now in development and build.

Boeing Defence, Space & Security will have a robust line-up of Boeing and customer products on static display at the show. Singapore's Air Force displayed the F-15SG multi-role fighter, and the CH-47 Chinook and AH-64 Apache helicopters. The US Department of Defence exhibited the P-8A Poseidon and the F/A-18 Super Hornet, alongside the Integrator unmanned aircraft system from Insitu. The Boeing exhibit also included the Insitu ScanEagle, and the Wave Glider, an ocean surface robot with seabed-to-space autonomous capabilities from Liquid Robotics.

Boeing announced that it had received nearly $1 Billion in services orders with the agreements stretching across Global Services' four capability areas, including parts; engineering, modifications and maintenance; digital aviation and Boeing AnalytX.

Airbus

Airbus Helicopters announced the first flight of its Skyways UAV at the National University of Singapore.

During the demonstration, the UAV flew from its maintenance centre and landed on the roof of a specifically designed parcel station where a parcel was automatically loaded via a robotic arm. The UAV took off again from the roof after loading the parcel and returned to land, demonstrating its automatic unloading capability.

Using the Skyways UAV, campus students and staff will be able deliver small parcels between 2kg and 4kg to designated parcel stations within the campus, which is the size of 150 football fields.

This flight demonstration follows

Left: Trent 1000 engine on the Rolls-Royce stand *- Pic Rolls Royce*

the launch of an experimental project with the Civil Aviation Authority of Singapore (CAAS) in February 2016 to develop an urban UAS to facilitate the safety, efficiency and sustainability of the air delivery business in cities such as Singapore.

Regional agreements announced

As the largest show in Asia, Singapore Airshow is the natural venue for Eastern airlines and companies to conclude agreements and a number of airlines signed contracts during the four trade days.

- All Nippon Airways signed a contract for 36 landing gear exchanges for the 787.
- China Southern Airlines and Guangzhou Aircraft Maintenance Engineering Company Limited (GAMECO) signed an agreement to develop service capabilities for the Boeing Global Fleet Care portfolio, as well as enhanced component and composite repair capabilities.
- Malaysia Airlines signed an agreement for 48 landing gear exchanges for the Next-Generation 737. Through the programme, operators receive an overhauled and certified landing gear from an exchange pool maintained by Boeing, with stocked components and supporting parts shipping within 24 hours.
- Nippon Cargo Airlines is to renew a five-year agreement for Jeppesen charting and electronic flight bag services to optimize navigation and flight operations across their 747 fleet.
- Royal Brunei Airlines signed a contract for five 787-8 overhead flight crew rest retrofits. The modifications, to be completed at Boeing Shanghai, will allow the carrier to fly the 787-8 airplanes on long-haul routes, providing increased operations flexibility to the fleet and operator.
- SilkAir is to receive fleet material services for 54 of its 737 MAX and Next-Generation aircraft. Fleet material services include Component Services Program, Integrated Material Management and Customer Furnished Parts, providing the customer with a centralized supplier of parts.
- Singapore Airlines signed a contract to use Electronic Logbook on its 777 and 787 fleet. As a Boeing electronic flight bag app, the Electronic Logbook replaces paper logbooks with digital records that improve operational efficiency and reliability, reducing schedule interruptions.

Agreements were also signed by Alaska Airlines to renew Jeppesen Flight Planning for its 737 fleet while Biman Bangladesh Airlines has expanded its use of Boeing's Component Services Programme by adding the service to support induction of new 787 aircraft that will enter its fleet in August this year. DHL has ordered one 767-300ER Boeing converted freighter. Boeing converted freighters carry high-density cargo on long-range routes, as well as e-commerce cargo on domestic and regional routes.

Boeing CH-47 Chinook aircraft of Singapore Air Force *- By Phuong D. Nguyen.*

Aviall

Honeywell is to extend Aviall's product support agreement as the exclusive distributor for Honeywell Aerospace through 2022, covering interior and exterior lighting equipment for all commercial after-market product sales. Products covered include indicators, annunciators and other components used on commercial aircraft. Aviall has appointed Parker Aerospace's Aircraft Wheel & Brake Division as master distributor for its Cleveland Wheels & Brakes product line.

UTC Aerospace Systems

UTC recently celebrated the 10-year anniversary of its Singapore Maintenance, Repair and Overhaul

Gulfstream G280 private jet on display *- By Phuong D. Nguyen.*

facility which started with a team of 30 technicians in 2007. The Singapore facility serves as the centre for Asia-Pacific operations, with other sites located in China, Australia and Malaysia for a total of 1 million square feet of MRO shop floor space in the Asia Pacific region.

The company announced in Singapore that it will provide several key components for Korea Aerospace Industries (KAI) KF-X advanced multi-role fighter jet. The company is under contract with KAI to provide the fighter's complete environmental control system—including air conditioning, bleed air control and cabin pressurization and liquid cooling—along with the aircraft's air turbine starter and flow control valve.

Electric, Environmental and Engine Systems President Tim White: "Our state-of-the-art technology will help maximize the performance of this new aircraft, and we are positioned to offer additional system opportunities to further enhance its competitiveness. We look forward to supporting the KF-X program in the years ahead."

Textron Aviation

Textron has increased investment in factory-direct service and support footprint for its customers throughout the APAC region. The company has demonstrated its investment this year through a significantly increased parts inventory, augmented capabilities at its Singapore Service Centre and an expanded team of in-region experts.

As part of its support investment

The back end of a McDonnell Douglas F-15E Strike Eagle fighter aircraft of Singapore Air Force - By Phuong D. Nguyen.

Boeing AH-64 Apache helicopter belonging to the Singapore Air Force - By Phuong D. Nguyen.

A Lockheed C-130 Hercules aircraft of Singapore Air Force - By Phuong D. Nguyen

for customers within the APAC region, Textron Aviation has doubled the value of its parts inventory — comprising nearly 6,000 unique part numbers — at its regional parts distribution hub within the Singapore Service Centre. Further streamlining parts distribution and efficiency, customers can now order parts online direct from the Singapore warehouse.

Textron Aviation's Singapore Service Centre is part of an international support footprint of factory-direct service centres, equipping customers with direct access to a team of expert service representatives delivering timely maintenance, inspections, parts, repairs, avionic upgrades, equipment installations, refurbishments and other specialized services.

With more than 1,000 Beechcraft and Cessna turboprops operating throughout the region, Textron Aviation expects to receive several authorizations for turboprop maintenance in the coming months — including FAA-registered Caravans and King Airs registered in Malaysia, Indonesia and the Philippines.

A number of the company's aircraft were on static display - Cessna Citation Longitude, making its APAC debut, the Beechcraft King Air 350i and Cessna Grand Caravan EX turboprops, as well as the Cessna Citation Latitude, Citation CJ4 and Citation Sovereign+ jets.

***Part of a Sukhoi Superjet 100 aircraft belong to the Singapore Air Force on display** - By Phuong D. Nguyen.*

***A Lockheed C-130 Hercules aircraft of Royal Malaysian Air Force** - By Phuong D. Nguyen*

Satair

At a signing ceremony Satair and UTC Aerospace Systems celebrated a recent long-term distribution contract for primary and secondary flight controls for the Airbus A300, A300-600 and A310.
The 10-year contract covers worldwide distribution of spares and line-replaceable units.

UTC Aerospace Systems is one of the world's largest suppliers of technologically advanced aerospace and defence products, and through its Actuation Systems business manufactures flight controls for a number of commercial and military fixed wing and rotorcraft platforms around the globe.

Satair and Cobham Aerospace Communications renewed their distribution agreement across the Asia-Pacific region, including China and also extending into the Middle East. The agreement covers a range of aircraft intercommunications equipment including radio management panels, audio control panels, audio management units and related spares. Satair will provide a high level service covering inventory from Singapore as well as the management of repair and exchange services.

All Nippon Airways has signed a multi-year IMS contract with Satair for a long-term, fully integrated end-to-end supply chain package covering expendable material for the airline's growing A320 family fleet, comprising A320CEO and NEO and A321CEO and NEO.

The service includes planning, sourcing, purchasing, logistics and inventory management covering some 15,000 part numbers with a possible increase in the part number scope to follow. The coverage includes all expendables materials needs of ANA. •

CAPE TOWN INTERNATIONAL

DEON CLOETE, General Manager Cape Town International Airport.

ACSA commits R7billion capital for a 5 year expansion program at Cape Town's International Airport to match record growth in internationalair travel

Robin Rabec reports after a recent visit

The integrated domestic terminal accounts for the big 5 of South Africa's domestic carriers representing 75% of all passengers at CTIA

Airports are catalysts for socio-economic growth and Cape Town International Airport has organically been growing into an Aerotropolis, a concept which sees an airport at the core of modern urban activity.

During the early formative years of aviation, aerodromes were merely rudimentary open fields from where aircraft commenced and ended flights. Dependent on weather conditions, all that was required for take off and landing was a level strip of land relatively free of obstructions. En route navigation was basic VFR following roads and railway lines. Needless to say, following the end of the flying boats era that connected Europe with Southern Africa, there was a growing awareness of the benefits of travel by air. In the wake of the Second World War, regulations governing aviation and the structures of aerodromes followed and The Wingfield Aerodrome, a post World War II military aerodrome situated close to the city centre became Cape Town's municipal airport,

Within a decade after the end of the Second World War, the Jet age was dawning and airlines were transitioning into bigger more sophisticated aircraft. In 1954 Cape Town's state owned international airport named after D.F. Malan, the sitting Prime Minister at that time, commenced operating to replace the obsolete Wingfield Aerodrome.

Apart from servicing South African Airways' domestic services, and other schedule and non-schedule carriers, two international long haul flights operated

The integrated domestic terminal accounts for the big 5 of South Africa's domestic carriers representing 75% of all passengers at CTIA.

weekly flights from Cape Town to Britain. One of which, a direct flight to London departing out of Cape Town on Friday evenings, the second a flight routed via Johannesburg.

The popularity of Cape Town as a prime tourist destination is matched by the equally vibrant commercial business sector that is bountiful to the national economy of South Africa. Many of South Africa's biggest companies have their headquarters in the "mother city" while political officialdoms attending to international relations are also housed or based in Cape Town

As the rays of the evening sun settle behind one of the world's most famous rocks, the blackened silhouette of "the mountain" unfolds into a city of lights twinkling brightly around Table Bay, enhancing the splendour of the Mother City. The air traffic between Cape Town and Johannesburg accounts for more than 60% of the country's air traffic which is regarded to be the 9th busiest air corridor in the world and accounts for an estimated 5 million passengers travelling each year on this route between Cape Town and Johannesburg. There are fewer more inspiring sights than that for a pilot seated in the cockpit of an aircraft

approaching CTIA in the early evening for landing on Runway 19.

Records continue to tumble:

Geared to handle an ever-increasing volume of passengers, the airport's infrastructure handles between thirty and thirty five thousand passengers per day, translated during the 2016-17 financial year into a record movement of 10.2 million passengers.

The annual turnover derived during this period is reported to be R1.7 Billion generated from regulatory operational fees including pax taxes and other ACSA commercial interests including, motor vehicle parking facilities, retail outlets within the terminal buildings and related properties within the airport precinct.

As these figures continue to grow, CTIA ranks as the third busiest airport on the African continent

The approach onto Runway 19 will move 11.5 degrees counter clockwise to make way for the new R3.1bn runway 18/36. The old runway 19/01 is to become a parallel taxiway, the diagonal runway 16/34 is to be closed and disbanded

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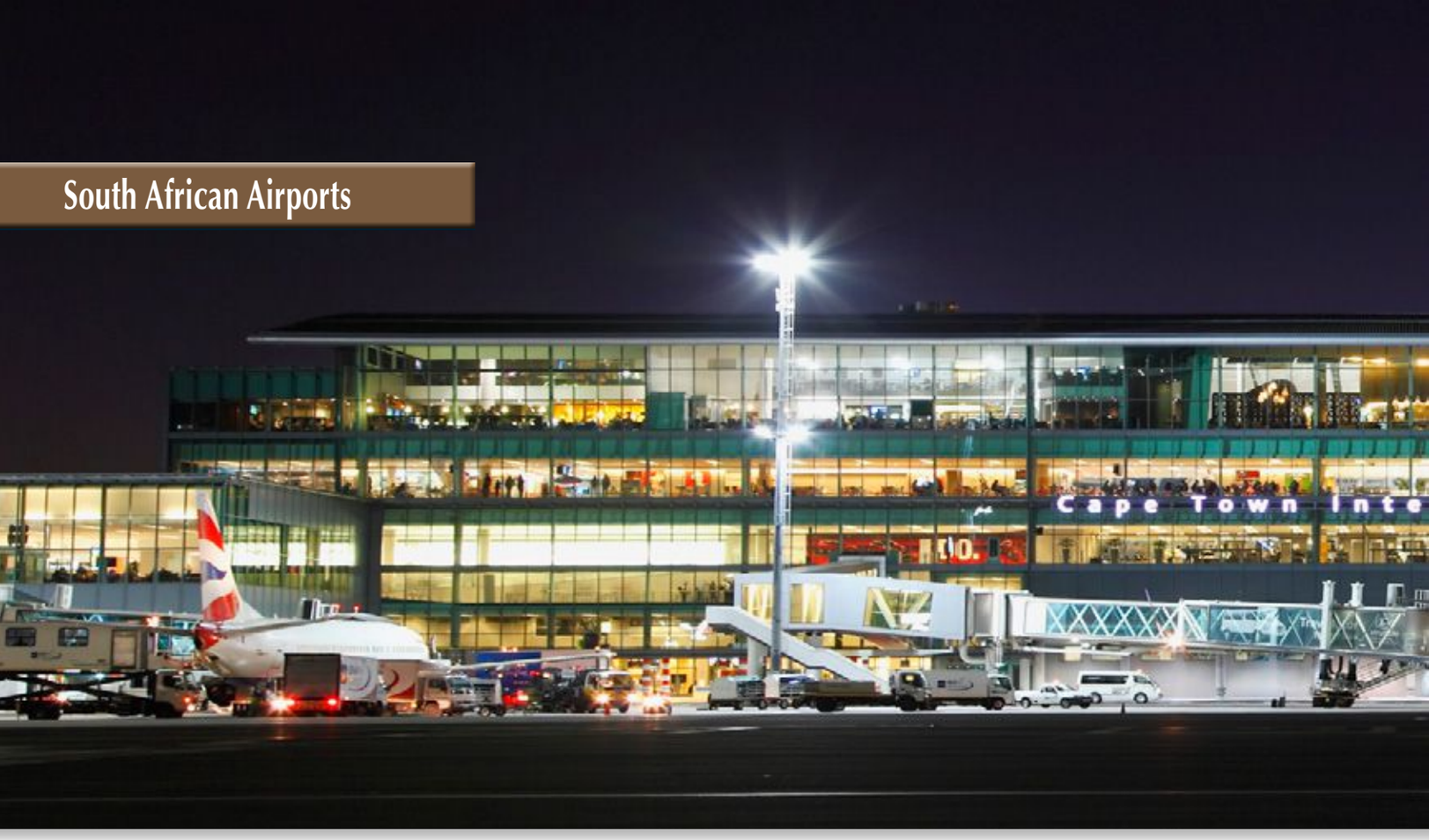


behind Johannesburg's OR Tambo International Airport (ORTIA) and Cairo's International Airport in Egypt.

The continued improvement in international passenger movements processed during the CTIA financial year ending at 31 March indicates the growth in this sector to exceed 20% per annum, which relates to 2.7million international air travellers passing the airports gates. This figure reflects in the ratio between domestic travellers versus international travellers has been leaning approximately towards 80% domestic passengers versus 20% international travellers. Recent reviews indicate however, the growth in foreign travellers has increased to 25% of passengers passing through the airport. The growth in domestic air travel between Cape Town and all other ACSA airports continues however to grow, but at a nominal 4-5% growth per annum.

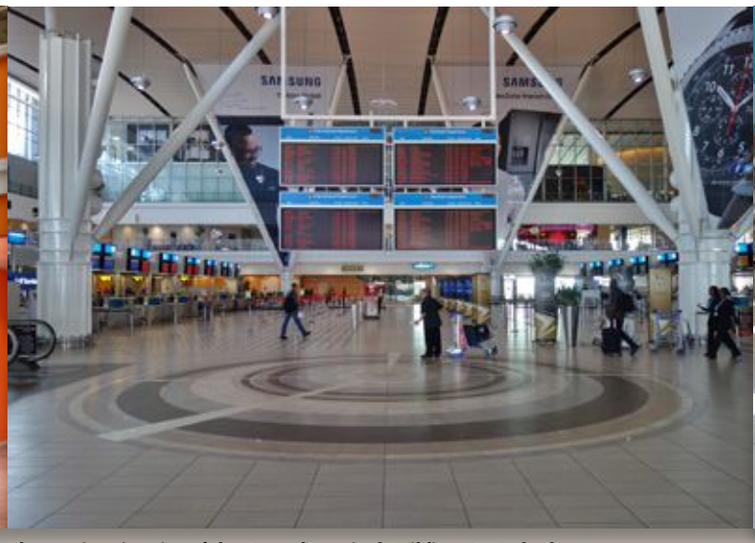
Passenger and Baggage handling

Managing the movement of passengers is dependent, as with any large airport, on the process of handling passenger baggage, especially during high season demands for travel.

On any given day the airports fully automated baggage handling system manages to move up to 3300 pieces of baggage per hour. On an average day the airport most effectively moves approximately 12 000 pieces of baggage in a day, but during peak periods especially when there are prestige social events happening in the city, this number can escalate up to as many as 22 000 pieces of baggage per day.

Keeping with modern infrastructural systems, CTIA is abreast with technology and the complexity of processing of passengers by improving it's operational systems. Passengers not carrying extra baggage can virtually arrive at the boarding gates without standing and waiting at lengthy check in

A scene for international arriving passengers passing through the colorful concourse in the International Arrivals Terminal.



The spacious interior of the Central Terminal Building (CTB) both domestic and passenger processing procedures.

Cape Town International Airport has consistently been recognised by SKYTRAX and reveived multiple awards as the best airport in Africa.

counters. Equipped with the latest smart phone technology, a boarding pass can for example, be displayed on a smart phone and interpreted at the boarding gates without any further need for paper documentation or lengthy delays during peak periods at check-in counters.

With an average of 280 domestic and international air traffic movements happening each day at the airport, the demand for fuel varies around 1.5 million up to and as much as 2 million litres per day during the summer peak periods.

The current means of moving fuel to the airport from the refinery is by road transport. Each day a fleet of up to 50 road tankers transport fuel to the airport.

Planning is now in an advanced stage for the construction of a dedicated pipeline to pump Jet A1 fuel through a pipeline from the oil refineries close to the harbour directly into the fuel tank farm at the airport.

"Cape Town Air Access", established in 2015 is a collaborative programme driven by ACSA, and WESGRO, the Western Cape official, Destination, Marketing Investment, and Trade Promotion Agency which is affiliated with the city of Cape Town, is the focal point for international air route development into the Western Cape. Air Access has successfully created 10 new routes to be developed into and out of Cape Town and 11 expansions to existing routes with enhanced connections into Cape Town from less frequented cities associated with Cape Town.

The benefits of this initiative translates annually into a further 700 000 inbound passenger seats For example, as a direct result of these initiatives a new Austrian carrier plans to introduce a direct route from Vienna to Cape Town. What Cape Town however strives for, is for future collaboration with a carrier to secure a direct service between New York and Cape Town.

A five year capital development

A welcoming reminder of the vibrancy of Africa.

The retail shopping sector is an integral part of the CTB.

plan includes construction on an all new runway and major changes to the Terminal Buildings.

The revamped terminal buildings at Cape Town International are the result of restructuring at the airport which was done to accommodate the expected surge in tourism around the 2010 FIFA World Cup and growth in tourism beyond the 2010 World Cup extravaganza.

Deon Cloete is the incumbent General Manager at the helm of Cape Town International Airport, steering the airport into the next decade of the 21st century. He says "ACSA is committed to a 5 year development plan for Cape Town Airport and the company is investing R5 to R7 Billion capital for infra structural changes which includes the construction of a new single runway and modifications to the existing Domestic and International Terminals".

Strategically designed the Central Terminal Building (CTB) positioned between the International and Domestic sections of the airport was first commissioned for use in 2010 as part of the airport's future modernisation planning.

Moving ahead from the extensive refurbishment of the airport terminal buildings the eventual model for the structural layout of a larger more enhanced airport is removed from existing structures at CTIA. The existing domestic arrivals and baggage collection terminal, to quote a source within ACSA "is dated and tired" and requires extensive modernisation.

The CTB or "Central Terminal Building" built during the alterations made for the 2010 extravaganza is the central feature linking both the International and Domestic terminals. All of the pre departure systems including the check in counters, food courts, retail shops and access to the boarding gates for both international and domestic travellers are situated in this area.

Future projections for integrated terminal buildings indicate the terminals and apron design will eventually incorporate a three "pier" feature with nodes extending onto the "air side" apron but connected or linked to the Central Terminal.

The immediate requirement is to move the existing runway into a new position.

Although the existing 3.2km runway and it's features are acceptable for use by most modern wide body aircraft including the Airbus A380, the 50 year old runway has aged and is considered to be inefficient, limiting the ATC movements to 30 aircraft per hour.

Airports Company South Africa proposes to replace the existing primary runway 19/01 with an entirely new 3.5 kilometer runway aligned 11.5 degrees counter clockwise from the old facility onto the new runway headings 18/36

The old runway (19/01) will be configured as a parallel taxiway with a mid track connection via a "Rapid Exit Taxiway"(R.E.T) from the new runway. The plan for this arrangement is to expedite traffic frequency up to 45 flights per hour, a 50% improvement of the present 30 movements per hour. This initial expansion of traffic movements can contribute towards the airport eventually managing up

Top: South African Airways began to operate Super Constellation aircraft on international flights from then, D.F. Malan Airport.

Mid: Travel by air to Cape Town was novel, unique and very exciting.

Left: Back in the early days in 1954 when the D.F. Malan airport replaced the old municipal Wingfield aerodrome.

to 40million passengers per year.

With the final EIA approval process concluded, construction on the R3.8 billion project for the re-aligned 3500 meter primary runway built to international specifications, allowing for larger (Code F) aircraft to land at Cape Town International Airport, is expected to commence at the beginning of 2019 and due for completion due towards the end of 2020.

The extended centre line of the new runway will pass west of the Tygerberg Hills in the north to cut the coastline across Table Bay. Scientists have done extensive research to examine noise pollution studies to ensure the effect of jet noise is minimised to acceptable international standards

The ILS glide slope on both runways will be raised to facilitate 3.2 degrees slope to further help reduce noise pollution over the city and approaches onto both runways.

ACSA has also acquired control of the southern tract of land extending southwards towards the coast of False Bay. This extension ensures the entire approach lighting facility and other equipment is contained within the airports secured 30 kilometer security perimeter.

Worth noting, the old runway that is to be re –configured as a parallel taxiway will NOT be de-commissioned as a runway but can serve as an emergency runway should there be an urgent requirement for this to happen.

Beyond the 5 year expansion project however, there are significant plans afoot that Cape Town International Airport will become part of a new development node for the Cape Town metro.

Cape Town's International Airport will look to becoming what a leading international Aerotropolis concept developer has described as "a new urban form placing airports in the centre with cities growing around them".

Deon Cloete, subscribes to this philosophy saying "future cities will be shaped around airports by providing a self sustaining environment with hotels, shopping malls, restaurants and housing for thousands of people and an inter linking transport network."

In February 2015, ACSA appointed the international airport consultancy organisation AECOM to undertake a pre feasibility study to test the applicability of the Aerotropolis concept to bring Cape Town in line with other international recognised Aerotropoli that include Amsterdam's Schipol Airport, Chicago's O'Hare airport and noticeably Singapore's Changi Airport.

What lies ahead for the future of South Africa's top three international airports managed by ACSA are exciting times that will eventually create employment opportunities derived from air travel and tourism. •

Adventure by helicopter beckons

Are you ready to book that shark dive, or a trip to Paternoster on the Cape west coast? What about seeing the wine lands in style or maybe you prefer the beauty of Africa's reserves and the wildlife that roam thereon? All can be accomplished by getting into a vehicle and driving there but that is so ordinary. Turn your thoughts to the sky above, get the fingers working as you surf the internet and book a charter.

By Charmaine de Villiers

The view out of a Robinson Helicopter, the world's best selling helicopter!

Charter for business or pleasure

Charters are not just for going from A to B for a business meeting, or to save time between two destinations. Forget the square box and wander out. For those who want an experience of a lifetime, it is easy to charter a helicopter flight in Cape Town – take off at sunrise and head for the east coastal town of Gansbaai, popular gathering for the Great White. A dive with these magnificent creatures, leisurely lunch and a flight back to Cape Town. There are flights over the Peninsula from the City to the Cape of Good Hope and then onto an aerial view of False Bay.

Aerial view from a helicopter over Cape Town.

Chartering a helicopter or aircraft gives a sense of freedom without the constraint of standing in queues to check in, or sitting on hard chairs waiting for a flight to be called. While aircraft are not quite as versatile as helicopters as they need runways so are slightly more restricted, it is possible to fly greater distances without refuelling.

For the ultimate adrenalin rush, try a Cape Town Huey helicopter flight over the West Coast and experience the thrill of low level flying and sharp manoeuvring as the pilot simulates a flight through a combat zone, with speakers playing the famous Combat Music. Doors are in an open position to make this the most unforgettable and exhilarating experience you've ever had.

Flights to destinations such as these are at set departures days and times although charter companies are mostly happy to arrange private charters as well although this will naturally be at a greater cost.

For the combat flight various flight suits, combat jackets and military-style poncho's are available for inflight use or photographs. Flying at altitude can get cold and a jersey or jacket is advisable. If a camera is taken, make sure it is safely attached.

Helicopter charters are becoming increasingly popular with tourists. Ensure that a reputable charter company is chosen, whether it is for a short flip or for a long term charter. A responsible company will undertake daily inspections conducted by their engineers to ensure that the machine is running as it should. The passenger's safety is paramount.

With a variety of helicopter types to choose from, the following seem to be the most popular:

Bell 205, Bell 206 JetRanger, Bell 206 LongRanger, Bell 407, Eurocopter EC 120 and Bell 525.

Fireblade Aviation welcomes first international flights with South Africa bound tourists

During February this year Fireblade Aviation processed its first international flights at the Fireblade terminal at OR. Tambo International Airport. The seven-star facility successfully handled international tourists arriving in South Africa. This marks the culmination of years of effort following a rigorous approval process and is a significant milestone for Fireblade, the South African aviation sector and South Africa's high-end tourism industry.

Amongst other officials, the Department of Home Affairs (DHA), the South African Revenue Service (SARS) and the South African Police Service (SAPS) were on-site at the Fireblade terminal to provide the required government clearance for the international flights. The handling of these arrivals at the Fireblade terminal is done through a sterile customs and immigration facility adjacent to the business lounge, designed by and under the strict control of government officials.

Jonathan Oppenheimer, CEO of Fireblade Aviation, commented: "We are excited to service international movements, which will complement our current domestic aircraft movements and enable Fireblade Aviation to fulfil its intended potential. We encourage all privately-owned and chartered aircraft to use the Fireblade terminal when flying to Johannesburg and South Africa."

Airports Company of South Africa (ACSA) stated: "There are several benefits to having fully operational international border control capabilities at Fireblade. Our main terminal at O.R. Tambo International will be freed up for additional capacity when commercial business aviation can use the Fireblade terminal. Runway crossings will be reduced tremendously, which will both improve safety and reduce time for departing and arriving aircraft. There is also a genuine need for the premium services offered by Fireblade at the largest airport in Africa since the lack of these facilities currently affects our reputation and brand."

As is the case with many Fixed-based operation facility (FBO) terminals across the world, the provision of this world class service by Fireblade demonstrates that collaboration between public and private sectors can bring significant benefits to South Africa, especially within the tourism sector. •

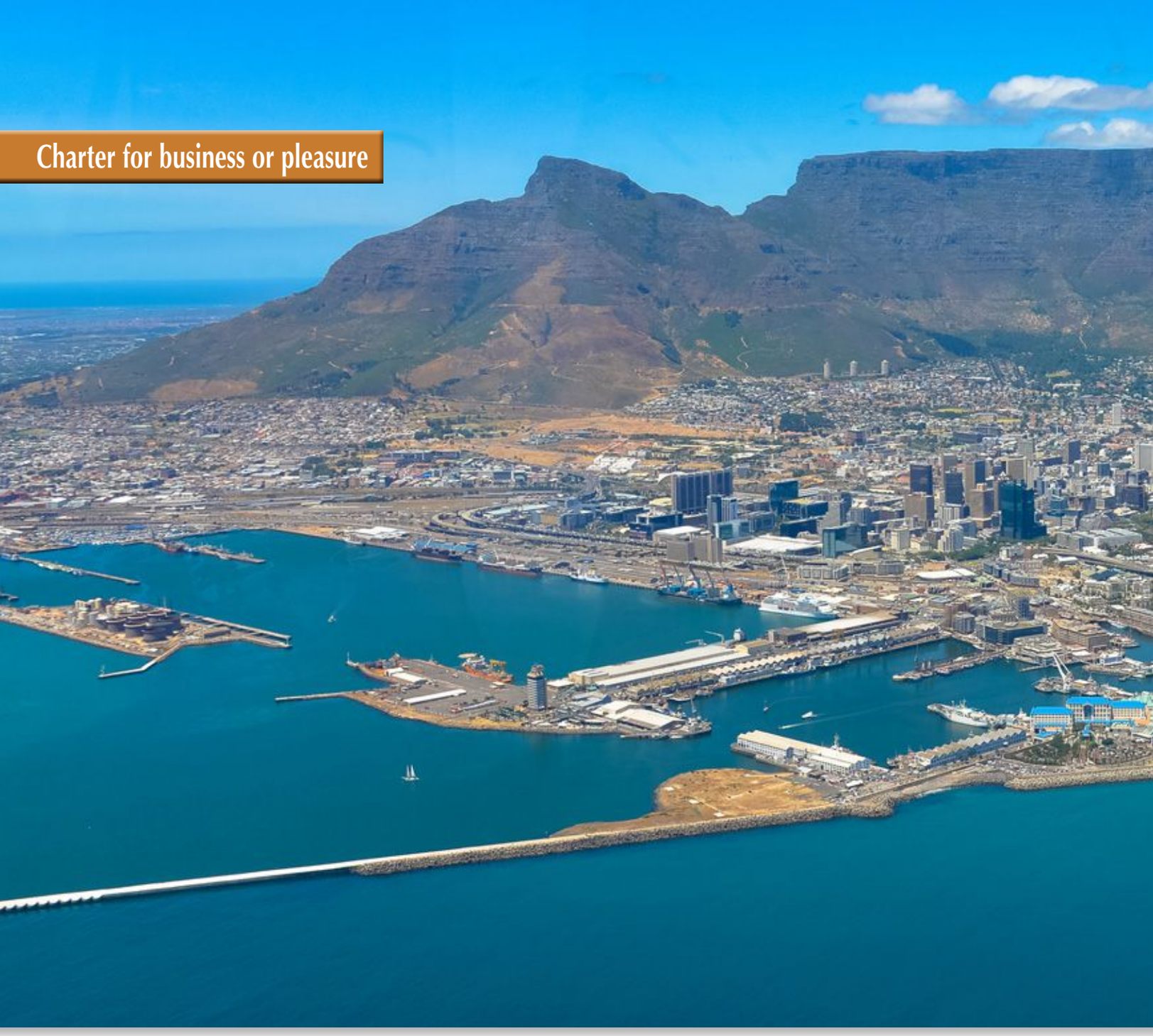
Chapman's Peak Drive, Cape Town

By Olena Granko

Woman enjoying the view of the Blyde River Canyon and Blyde River Dam from the highveld viewpoint along the Panorama Route in Mpumalanga Province of South Africa.

By Harry Beugelink

Charter for business or pleasure



Aircraft charter
What are the advantages:

Flights are tailored to each individual's needs and requirements, whether it is for a business trip to a mine in the DRC, a meeting in Cape Town, a private flight to luxury game lodges or the coast. A number of companies charter aircraft when taking staff to a conference venue or as a reward for targets met. The passengers comfort is a major consideration when arranging catering, deciding on the type and size of aircraft, refreshments and extras that may be required. The client is given every assistance in selecting the aircraft, advise on destination if necessary, transport and even accommodation bookings. A meet and greet service is available and passengers can relax in private lounges before the flight.

Many charter companies also provide ground handling but where necessary, a ground handling company can assist with customised and high security transportation arrangements, cleaning services, loading facilities, recreation and catering. For cross border charters they provide customs clearance assistance, visa arrangements for both crew and passenger if required, slot or PPR, and aircraft security.

For business aircraft operators, Africa can be a permit-intensive operating environment, with specific documentation requirements and longer-than-average permit lead times. It's important for them to begin the process well in advance and regional or international flight should be arranged with thought given to these processes.

Tourist destinations

Before approaching any charter company, a destination must be decided on with the most popular being Cape Town and game lodges. South Africa has an excess of game and nature reserves with the Kruger National Park, Madikwe, Timbavati, Sabi Sands, Manyaleti and Pilansberg featuring prominently in the northern part of the country, Aquila, Addo Elephant and Shamwari are amongst the many well known game reserves in the South. Most have runways, be they registered airports such as Skukuza or bush strips which is more often the case. This is part of the attraction of flying to a lodge – imagine coming in to land with an elephant or two, or maybe lion, eyeing you from the surrounding bush with contemplation in those eyes. Pilots will fly over the lodge to alert them to your arrival and then do a pass over the airfield to check for animals.

Mozambique and Zimbabwe are also popular destinations and

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FederalAirlines
Exploring new horizons

Left: Livingstone Zambia 30 March 2016 Helicopter flights over the Victoria Falls in a Airbus EC120 Colibri is a highlight for tourist visiting the world famous Landmark - Pic by Sean Heatley

international visitors should always enquire about visa requirements as this can differ according to nationality. Visas, in most cases, cannot be arranged on arrival, and if you land without a visa, you will be subject to deportation. Always make sure that there is at least six months' remaining validity on all passports.

With the exception of Cape Town, South Africa is a summer rainfall region and although the weather may be hot to extremely hot in summer, thunder storms can arise very quickly and at times it can rain for days on end. Autumn and spring are pleasant or hot, however nights can be chilly and international guests should remember to bring some warm clothing but also remember that South Africa and its neighbouring countries do not experience the intense, bitter cold seen in most northern hemisphere countries. No Arctic fleece jackets.

Yellow Fever is a vaccine preventable disease and endemic to many parts of Africa. Vaccination is recommended for those over the age of nine months travelling to any endemic area. The vaccine affords long term protection. Existing and new Yellow Fever vaccination certificates are valid for life starting 10 days after vaccination as from 11 July 2016.

Some countries require proof of Yellow Fever vaccination for entry. Countries can no longer require travellers to show proof of re-vaccination or a booster dose as a condition of entry.

Vaccination precautions: If travelling to an endemic area and not able to be vaccinated in time, tours cannot be delayed or avoided, the person should be vaccinated depending on a risk assessment of Yellow Fever infection at their destination and a country's entry requirement: Children between the ages of 6 to 8 months, persons over 60 years, those with asymptomatic HIV, pregnant or breastfeeding women should be vacinated.

Important: Vaccination contraindications: Children under 6 months of age, persons with immune deficiencies or on immunosuppressive or immunomodulatory therapies, persons with allergies to egg proteins, thymus disorders, malignant neoplasms, transplant recipients, and persons with symptomatic HIV infection should not get the Yellow Fever vaccine. If vaccination is contraindicated for medical reasons an exemption letter or waiver should be issued to the traveller. However, acceptance of such a letter is at the discretion of the destination country, and entry might be denied.

Cost

Chartering a helicopter or aircraft will set you back a bit more than a commercial flight but the comfort, personal service, versatility and convenience make it worthwhile. Costs will differ from operator to operator and the type of aircraft requested, destination and length of charter. Once an itinarary and requirements have been decided upon, find a reputable charter operator for a quote. If you know the type of aircraft you want, perfect, if not the operator will assist.

A wide variety of aircraft are used for charter depending on what the client's preference and requirements are. These aircraft can range from a Cessna 208 to a Boeing, jet to twin engine or single turboprop. For government ministers, businessmen and VIPs this usually means Boeing 737, Embraer 145, Hawker 4000 and 350, Gulfstream. Challenger 350, 601 and 850, Learjet and Hawker 800XP, mostly for long haul flights.

The King Air 200, 350, Beechcraft 1900C/D, Embraer 120, PC12, Cessna 208, Cessna Caravan and Cessna 402C are all popular short haul aircraft. When it comes to bush strips the Caravan, King Air 200 and Pilatus PC-12 are extremely hard-working, versatile and able to cope with short landing strips.

For private travel plans that call for an extended stay at your destination, one-way charter flights could save you money on your next private jet charter. •

Experience Africa

Press conference of the unveiling of the Falcon 6X, Febuary 28th 2018. From L to R: Olivier Villa, Senior Vice President, Civil Aircraft, Maria Della Posta, Senior Vice President Pratt & Withney Canada and Éric Trappier, Chairman and Chief Executive Officer of Dassault Aviation.

Speech of Cédric Gauthier, Director Sales and Marketing Pratt & Withney Canada - **Dassault Aviation - A Daste**

The king is dead Long live the king!

By Erik Brouwer

DASSAULT Falcon 6X

Pics: Dassault Aviation

FalconEye Combined Vision System HUD

On 28 February, Dassault announced the launch of the Falcon 6X program. The name and specifications were no surprise, after the ultimate cancellation of the delayed Falcon 5X program at the end of 2017. The challenges faced by the French company makes a great textbook case for both marketing and engineering students.

When Dassault was informed of a new delay of the Snecma Silvercrest power plant designed for the Falcon 5X, the engineers at Dassault Falcon under pressure of top management were given only 6 weeks to come up with a rough sketch of an alternative solution.

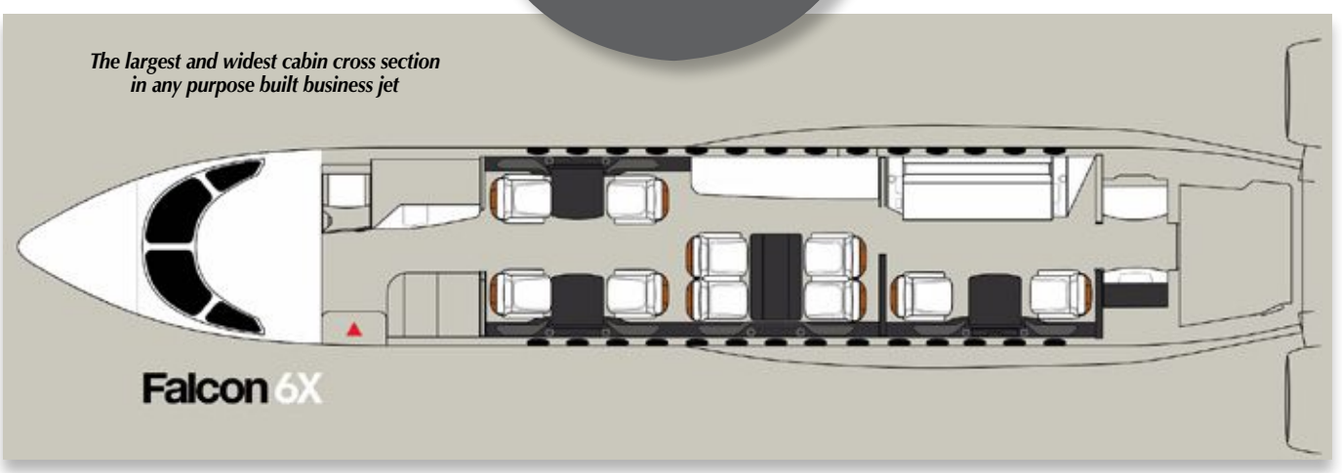
They ended up fitting the closest competitor of the Silvercrest, the Pratt & Whitney Canada PW800 turbofan, to the fuselage. Then, a 20 inch fuselage plug was added in front of the wing to balance against the heavier engines, making the new design even bigger than the already biggest-in-class 5X. There you have it: the Falcon 6X in a nutshell.

Worthy its own name

With the first engineering results, the challenge was forwarded to the marketing department. Was the new design still a Falcon 5X, or was the new design worthy of its own name?

In the end, the sales people probably decided the new plane deserved its own name and for two

The largest and widest cabin cross section in any purpose built business jet



reasons: most original 5X customers had walked away after the multiple delays, or changed their order to a 7X or 8X aircraft. Pitching the upgraded 5X to those people would be a challenge, and a new name could probably take away some of the bad taste the 5X delays had caused.

Secondly, the technical changes made the 6X an even more game changing aircraft than the 5X already promised to be. With the heavier engines, longer fuselage and stronger and more advanced wing Dassault believes it further increases the lead it has on its competitors when it comes to cabin space and comfort.

Larger than largest

Where the 5X already had the largest cabin in any purposely designed private jet in terms of height and width, the 6X only increases its lead with a cabin that is over 12 meters long and almost two meters (1,98) high. Up to 19 (!) passengers can enjoy the comfortable 3,900 feet cabin altitude at flight level 410 for the time it takes the aircraft to travel 5,500 nautical miles.

What remains unchanged is Dassault refusing to participate in the speed race. Where comparably priced competitors cruise long range at Mach 0.85 and exceed Mach 0.9 if their fortunate owners want to be somewhere in time, the max cruise speed of the Falcon 6X is 0.9. But to accomplish the maximum promised range, the throttles have to be pulled back to Mach 0.8. Dassaults philosophy is that more time is gained by enabling the aircraft to land at short runways closer to the final destination, than to enable an extra five percent of cruise speed and land at an international airport after which a long ride in a cab is required to go where you want to be. The folks at Dassault also take pride in the fact that their aircraft are usually able to take off from short runways with much more fuel than their competitors, enabling direct point-to-point flights between small airports over a long distance.

Small margins

To enable the 6X to operate from exceptionally short runways despite its above average size and weight, Dassault has designed an advanced wing with advanced automatic flight control systems including flaperons - a first in this segment.

Flaperons in the center of the the trailing edge combine the functionality of the aileron providing roll control and a classic flap, providing control and safety margin at slow approach speeds. Dassault believes approach speeds below 110 knots are possible, and expects no more than 760m of runway length required to come to a full stop.

A production rate of two per month is targeted, at a catalog price of 47 million 2018 USD, which is - inflation included - the same as the 43 million 2014 USD price tag of the Falcon 5X. Upon our request Dassault did not want to disclose the exact price per unit of the PW812 engines. But the manufacturer does admit they are more expensive to purchase than the Silvercrest. In order to stay competitive, Dassault had to accept a reduced margin on the sales price. You can expect the Falcon 6X on a short runway near you from 2022 onwards, which is when the manufacturer hopes to deliver the first aircraft to customers. •

Large entryway option with crew rest.

FalconEye Combined Vision System HUD.

The most spacious cabin in its class up to 16 pax in three lounges.

HAI Heli Expo 2018

Acknowledged as the world's largest trade show dedicated to the helicopter industry. HAI Heli Expo 2018 was once again highly successful with more than 700 exhibitors sharing space on the show floor which spans nearly 304 800m of the Las Vegas Convention Center and features everything to keep your aviation business running — from manufacturers to suppliers to service providers.


HB-ZXB

Attracting a great deal of interest were the H160 helicopter prototype from Airbus, and alongside on display at the booth, making their first-ever appearance at an international airshow, were the H145, H135, H125, and a full range of updated HCare digital solutions.

A number of important announcements were made at the Expo and with air taxis becoming a possibility within the next decade, it was appropriate that Airbus Helicopters made public the strategic partnership being formed between themselves and the digital aviation service, Blade, which offers helicopter app bookings in seven US states with the aim of building the demand for urban transportation by using helicopter manufacturers and operators to provide a convenient and cost effective service for clients. The partnership will allow Airbus to gather information regarding the trends and requirements with the urban transport market, especially with reference to the frequency and distances flown. Airbus recently acquired Voom, an on-demand helicopter service operating in São Paulo, Brazil. Since April 2018

The service is viewed by Airbus as 'complimentary' to its recent urban transport projects which include Voom as well as Airbus Ride - the company states that the former has now flown 3,000 passengers since commencing commercial operations in Sao Paulo in April 2017.

Much disagreement regarding air taxis exists in the aviation industry, especially about using electrically powered engines to power the machines. At the heart of this is the idea that current technological applications can support air taxi flight imminently compared with alternative sources. Many feel that lengthier time lines are much more realistic as payload capacities for electric engines are not yet sophisticated enough to support flights longer than half an hour.

H160 main attraction

A major story coming out of Las Vegas was that of Airbus's new H160 medium-twin helicopter, which made its US début. It will be embarking on a three-month customer demonstration tour followed by high/hot testing in Leadville, Colorado. Airbus Helicopter is hoping for certification next year.

The aircraft features an all-composite airframe, flat-floor cabin, oversize cabin windows, and a baggage compartment that can hold a very handy 300kg. Its cabin can be configured to seat four or eight passengers in executive/VIP layouts, or 12 in a utility configuration. The H160 also incorporates a variety of new technologies, among them Blue Edge active tracking main rotor blades in a five-blade system with a double sweep design that reduces noise and contributes to a smoother ride, and 10 to 15 percent better fuel consumption than the H155 family it replaces.

The H160 central and front fuselages will be produced pre-equipped at Donauworth in Germany with the tail booms being produced at Albacete in Spain, and main rotor blades at La Courneuve, near Paris. They will be assembled in Marignane near Marseilles, where the dynamic components are also produced. Airbus is introducing new lean production processes aiming to reduce assembly to just 24 weeks, compared with 36 for the AS365N3. All hydraulics is above the cabin in the production aircraft, as the landing gear will be electrically actuated. The prototype on display featured a stand-alone hydraulic pack in the baggage bay.

The SafranArrano powered H160 has also been designed for maintainability. All scheduled maintenance (with the exception of the 50 hour oil check and top up) is visual only. Twice each day Airbus staged a demonstration of access to the upper deck.

Babcock has confirmed a five year frame agreement for the purchase of a fleet of H160s as launch customer.

Above: Leonardo had a number of orders for their AW139 helicopter at the show.

Enstrom

Enstrom's TH180 training helicopter is now expected to receive certification in the 'mid to late' 2019 time frame after the programme suffered from manpower problems and 'high risk design issues' that have been resolved. Certification was originally anticipated to take place last year. Two prototype aircraft have also accumulated 300 flying hours to date. The TH180 was first introduced at Heli-Expo in 2014 and although it was built as a trainer platform, can also carry out patrol and

surveillance missions. The helicopter is a modified version of the three-seat 280FX weighing 225kg less than the older model.

Precision Flight Controls (PFC)

PFC and Ryan Aerospace demonstrated their joint Bell 206/407 simulator which received FAA certification in October last year. The simulator provides basic and advanced training with IFR capabilities. It is now in service with the first one scheduled to be delivered to Honeywell in May 2018. The simulator is used across both the military and civil sectors. According to PFC the simulator offers a convertible instrument panel that allows the operator to decide between an analogue or Garmin G1000 flight deck display. The company is also hoping to receive certification for its R22/44 during northern hemisphere summer months. PFC also states that the simulator has optional control loading, motion platforms and visual systems as well as hand held instructor's interface (IOS touch screen) that can be used by a second pilot or instructor during training sessions training sessions.

Bell Helicopters

Bell received a signed Memorandum of Understanding from Bristow in order to explore the 525's possible use in a search and rescue role. Certification of the 525 is expected "early 2019 after a delay caused by an accident in flight test. An unusual feature of the helicopter is its Fly By Wire controls.

Frasca International

Frasca International has launched a lower priced helicopter training device designed for helicopter air ambulance providers, airborne law enforcement, introductory turbine transition training and ab-initio flight schools. The device was developed as a result of customer demand a for training device with a lower price point, but which still delivered the features required to meet their training objectives.

The device comes standard with one aircraft configuration kit (B206, B407, R44, AS350), Garmin G500H or analogue instrument panel, Garmin GTN 650, collective grip based on aircraft configuration kit (governed or ungoverned piston, modulated, or FADEC), annunciator panel and circuit breakers required in RFM procedures, Frasca's helicopter mission training database, single channel visual system, Frasca's Simplicity Touch-Screen Instructor Station (IOS) and will be AATD qualified.

Launch customer is Air Evac Lifeteam, who took delivery of seven B206 HTDs earlier this year.

Above: Sikorsky have fitted their latest iPad flight calculator to the Sikorsky S-92.

Sikorsky

During Heli Expo 2018 Sikorsky unveiled the latest version of its iPad flight calculator application for S-92® and S-76D™ helicopters. In addition to replicating common performance calculations and performing as weight-and-balance calculator, iFly Sikorsky v2.0 now connects to internet based weather data and offers an entirely new graphical interface.

These applications provide operators easily accessible information in the cockpit and allows Sikorsky to send notifications to operators electronically. The iFly set of tools allows for preflight planning and performance predictions based on ambient conditions and aircraft configuration. It also includes standard information such as normal operating procedures, checklists, emergency procedures, aircraft supplements and other manuals.

With this latest version of iFly, Sikorsky radically streamlines the work flow of preflight calculations and focuses on reducing and automating the number of pilot actions needed to conduct typical performance predictions. Specific location based weather data can instantly be incorporated into the calculation pages, as well as data directly from the aircraft sent via the optional pilot interface module. A two-stage climb calculator and multi-chart interpolation have been carried over from the previous version but with a simpler, user-influenced interface.

Sikorsky and HABCO Industries have entered into an exclusive equipment distribution agreement to supply ground support equipment products for the maintenance, servicing and manufacturing production of Sikorsky helicopter products. The agreement covers all commercial, international military, and US Government ground support equipment, as well as locally fabricated and Commercial off the Shelf items where Sikorsky is the main source for those products. The agreement commits HABCO to support commercial and military helicopters currently in operational use.

LifePort

LifePort, a Sikorsky company, announced the delivery of cabin and cockpit floor armour for Columbia Helicopters' model 234 aircraft (commercial equivalent to the Boeing CH-47). The armour is designed to protect crew members operating in hazardous environments. LifePort has incorporated

an existing lightweight armour solution and delivered it on an aggressive schedule. The armour panels are encapsulated with LifePort's LifeGard protective coating, providing enhanced durability to support cargo transport in the Columbia 234.

The company also unveiled a Machined Sled upgrade. The new sled has a wider backrest and is certified in the Leonardo AW139, Bell 212, Bell 412, Sikorsky S-76®A, B, C and D variants, and the Airbus H-130 airframe. The third generation product provides operators with improved features and durability, including: 16% weight reduction over the previous composite AeroSled, resulting in an overall weight savings of 4 kg; a new machined aluminum structure, designed for both accident scene and patient transfer missions; and improved maintenance and durability due to machined structure.

The Rockwell Collins nose-to-tail avionics solutions for light to heavy helicopters.

Rockwell Collins

Rockwell Collins showcased an enhanced portfolio of nose-to-tail avionics solutions for light to heavy-lift helicopters. For the first time at Heli-Expo, Rockwell Collins will have products on display from its interior systems business, which was formed from its acquisition of B/E Aerospace in April 2017. A comprehensive portfolio now spans the length of the helicopter that include cockpit display systems, mission computers, radios, pilot and passenger seating, exterior and interior lighting, connectivity routers, and other on board components.

Also on display at its booth was its next-generation cockpit display system, as well the HeliSure flight situational awareness solution, which includes Helicopter Synthetic Vision System (H-SVS) and the Helicopter Terrain Awareness and Warning System (H-TAWS). Integrated into low-risk, digital and all glass cockpit upgrade retrofits that Rockwell Collins provides, the HeliSure system enables crews to operate in tough, all-weather environments while increasing safety.

The Enstrom Dealer of the Year award was given out at the Enstrom Sales meeting at Heli Expo in Las Vegas this week. The award was given to Eastern Atlantic of England. Eastern Atlantic was founded by Simon Oliphant-Hope and has been an Enstrom Dealer since 1996. Pictured is Tracy Biegler, CEO & President of Enstrom and Jamie Chalkley. Director of Sales & Chief Pilot for Eastern Atlantic.

Leonardo

Leonardo announced that Sino-US Intercontinental Helicopter Investment (Sino-US) of China has signed contracts for additional 26 helicopters, including 7 AW119Kx single engine, 15 AW109 Trekker light twins and 4 AW139 intermediate twins with deliveries expected to start this year through to 2019. The contracts are valued in excess of 120 million euro.

The orders follow a series of contracts, particularly for EMS helicopters, signed by Sino-US in recent years which include 25 AW119Kx single engines and a mix of 30 AW139s and AW169s in 2016, followed by 10 AW109 Trekkers in 2017. These latest orders strengthens the collaboration between Leonardo Helicopter and Sino-US in China, including Hong Kong and Macau. Leonardo has set a new yearly delivery record in the Chinese market with 30 units in 2017. With further deliveries planned in the next couple of years, Chinese civil operator Kingwing would become one of the largest for Leonardo helicopters worldwide.

Leonardo also announced further combined orders for helicopters for a total of 17 aircraft valued at almost 140 million euro for several customers in various countries and for a range of commercial and public service applications. Contracts include a mix of AW119Kx single engine, AW109 GrandNew and AW109 Trekker light twins, AW169 light-intermediate, AW139 intermediate and AW189 super medium types, confirming the strong competitiveness of Company's modern product portfolio.

PAC International

PAC International

Airbus Helicopters partners with Blade to boost Urban Air Mobility business

Strategic alliance and investment in Blade will expand new market opportunities for on-demand helicopter services

Airbus Helicopters and Fly Blade, Inc. ("Blade"), a digitally powered aviation leader servicing 22 core routes in 7 U.S. states, have signed a strategic partnership to develop new premium on-demand helicopter flight experiences, paving the way for enhanced urban air mobility solutions to benefit the future of vertical flight.

Launched in 2014, Blade arranges more civilian transport by helicopter than any other company in the U.S. and specializes in offering customers a seamless end-to-end flying experience. The partnership agreement will allow Airbus Helicopters to incorporate Blade's unique expertise developed in the US market with premium services such as comprehensive booking and operator technology platforms, "gate to helicopter" airport transfers, multi-state lounge network and high touchpoint customer experience into its overall on-demand helicopter services portfolio. This strategic alliance complements Airbus' Voom offering in emerging markets. It will not only increase customer access to helicopters in urban areas, but it will bring more business to operators as their helicopters will be used more frequently in this new market environment.

The partnership with Blade will complement Airbus' global UAM business strategy, which is already in swift development through Voom, the fast expanding helicopter taxi service which has flown thousands of passengers since it launched commercial operations in April 2017 in Sao Paulo and Airbus Ride, an event-based helicopter shuttle service in the Dallas-Fort Worth area. •

displayed a recently refurbished Cleveland Metro Life Flight Airbus H145. The helicopter has a reconditioned interior, upgraded Techisonic TDFM9100 FM communication system and dual Garmin GTX330ES ADS-B. It also features the Outerlink Iris flight tracking, communication, and monitoring system.

Cleveland Metro Life Flight has been part of the Metro family since 2009.

Wire Strike Protection for R66 Helicopters

Robinson has added wire strike protection provisions to its R66 options list. Available only on R66 helicopters, the provisions are FAA certified and allow for easy, bolt-on installation of Magellan's WSPS (Wire Strike Protection System) sold separately by Magellan Aerospace, Winnipeg, Canada. The manufacturer announced it has added provisions, FAA-certificated, for bolt-on installation of Magellan Aerospace's wire strike protection system.

The protection system is sold separately by Magellan of Winnipeg, Manitoba, Canada. Seven pounds are added to the empty weight of the helicopter with the provisions, Robinson said. That comprises reinforcement and attach points on the windshield bow, roof and chin, with low-profile deflectors near the ground handling ball and forward landing gear struts.

Magellan's R66 WSPS, complete with wire deflectors and cutting blades adds 16 lb. to the empty weight of the helicopter. The system is available as a kit compatible with Robinson factory-installed provisions for $16,000 or as a complete after market kit with field-installable provisions for $22,800.

The complete wire strike protection system was on display at this year's Heli-Expo. •

Boeing

Aviall, a Boeing company, said they will provide CHC Helicopter with Vendor Managed Inventory services to support its global helicopter fleet, which includes aircraft like the Sikorsky S-92. Vendor managed inventory should improve efficiency and streamline supply chain costs for CHC, Boeing said. The workflow tools included would provide CHC with integration into Aviall's planning, forecasting and delivery model with real-time information for parts availability and distribution to CHC's regional base locations in Australia, Brazil, Europe and North America. •

Kopter announces order for two units from Safomar Aviation of South Africa

On day two of HeliExpo 2018 in Las Vegas, Nevada, Kopter Group AG has announced that Safomar Aviation (Pty) Ltd of South Africa had signed an order of two units of the SH09 single turbine helicopter.

Safomar is currently in advanced stage discussions with Kopter of a representation agreement for its products in South Africa which will include sales and after sales support and services for the future SH09 fleets.

Safomar Aviation has been operating in Southern Africa over the past 30 years. It is a diverse aviation group comprising of aircraft sales, after sales support, pilot and technical training, maintenance, aircraft spares supply and repairs thus providing a full turnkey solution to the aviation industry on the continent.

Shai Shalem, Safomar Aviation Group CEO, said that they were pleased to enter into a partnership with Kopter as they believe the helicopter's latest and revolutionary technology with the diversified capabilities would cater to the various applications and missions in the medium single engine helicopters and would certainly be a game changer in the helicopter fraternity. He added that he believed that the Safomar Aviation Group was best positioned to promote and sell this ground breaking product and the company looked forward to growing the product and their relationship with Kopter in Southern Africa. •

R44

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Helicopter do's and don'ts

PREVENTING HELICOPTER ACCIDENTS

By Helen Krasner

Most helicopter accidents are caused by more than one thing going wrong.

If the weather is closing in find a place to land and sit it out rather than trying to get to your destination.

Pic: Shutterstock

Helicopter do's and don'ts

Despite how it often looks at the time, few helicopter accidents are the result of only one factor. Many are said afterwards to have happened due to human error, pilot error, or whatever term you prefer, but they actually tend to occur because a number of things go awry at the same time.

Poor weather, navigation problems, fatigue, stress, distraction – all of these are contributory factors in many rotary accidents.

Yet most helicopter pilots, if they are honest, will admit to having flown when tired or stressed, and have been distracted by something or had the weather start to close in on them. It's normal, almost; it tends to happen to everyone if they fly for long enough. Generally it's not a major problem, and indeed such things can often be converted into learning experiences.

However, it is different when more than one problem occurs at the same time. For example, perhaps the weather worsens, you decide to divert, and then you realise the GPS is playing up. Maybe a long flight has tired you; then you suddenly have to cope with complicated ATC instructions in crowded airspace.

It is the odds stacking up like this which can lead to disaster. Some years ago I wrote about a flight in which, as a low hours helicopter pilot, I attempted a long trip over unfamiliar territory, through the airspace of a major airport. On the flight home, with a low sun in my eyes and complicated departure instructions to follow, I missed an instrument warning light and was lucky to avoid an accident.

I called my article "The Holes in the Cheese", a reference to the well known analogy of flying disasters being like gruyere cheese in which each hole represents a possible problem; and it is when the holes line up that an accident occurs.

Where accidents happen. A large proportion are caused when flying, low - by CFIT, wire strikes, or colliding with obstacles.

Another way of putting this is to say that disasters happen when you become mentally overloaded. Overload when flying is difficult to deal with since, by definition, there is no part of your brain available to sit back and realise that you simply can't take in any more. If you can manage to see it coming it is sometimes possible to take off the pressure – perhaps by diverting, or giving control to a co-pilot, or even landing ... it depends on the circumstances. But if you don't or can't do any of those things, your mind can simply cease to take something new on board – perhaps an obstacle, or a radio call, or a warning light as in the example mentioned above. Indeed, someone speaking to you in such a situation can simply be enough to push you over the edge – and this is when accidents take place.

Of course, all these points apply to any pilot of any flying machine. So why mention helicopters in particular? Well, I believe that this kind of accident is more likely to affect helicopter pilots, simply because of the nature of the aircraft we fly and the prevailing rotary aviation culture. Let me explain.

Firstly, let's look at where accidents happen. A large proportion are caused when flying low - by CFIT, wire strikes, or colliding with obstacles. Indeed, short of losing control of the aircraft or having some mechanical failure, there's not really much which can go catastrophically wrong at altitude – and if it does, you have far more time to sort it out.

So low flying might well be seen as a contributory factor, and, as a general rule, helicopters fly lower than fixed-wing aircraft. This is often simply because they can! Helicopters are easier to manoeuvre at low level than their fixed-wing counterparts, so we tend to use that facility frequently – we avoid bad weather by flying round or underneath it rather than 'on top'. Perhaps we do this to the extent that pilots even think it's a necessary part of helicopter flying.

In an article I once read concerning a group flight, the author recounted how "with a cloud base of only 1,300 ft and rising ground ahead, the helicopters were soon struggling to find a clear route, while the fixed-wings were able to climb." What ... the helicopters couldn't climb? Since when are rotary machines limited to staying below 3,000 feet? Yet it must be admitted that is often an assumption, or a habit, in rotary flying circles, and many helicopter pilots will stay low in difficult circumstances. And at low level you have obstacles, wires, less time to take action ... in fact you could be unwittingly setting yourself up for an overload situation.

Secondly, the legal weather minima for helicopters is slightly different in that at low levels there is no fixed visibility limit. Now I think this is reasonable, and I certainly wouldn't want to change the rules! Yet ... does it maybe cause some pilots to think they can fly in exceedingly poor weather? When working as an instructor, I recall a low hours helicopter owner setting off in his own aircraft in very limited visibility, when three instructors told him it would be a good idea to stay on

***Accidents tend to happen when flying low - caused by flight into the terrain, wire strikes, or colliding with obstacles** - Pic: Benny Marty.*

the ground. He flew, and he reached his destination safely. But he easily might not have done, particularly if something else had gone wrong. Again, it's almost setting up an overload situation, and I think we'd all have liked to be able to point to a rule which said he couldn't fly.

Next, most helicopters require more hands-on flying than fixed-wing aircraft. This isn't true of the more sophisticated ones, but many rotary aircraft need to be constantly flown; they cannot be trimmed and left to themselves as can aeroplanes. Indeed, this is their attraction, and those who like hands-on flying who are often attracted to helicopters.

But it means that helicopter pilots cannot reduce their workload by trimming the aircraft and leaving it alone. In effect, we have a larger workload from the start, and while that doesn't matter in normal circumstances, if there is any other problem it could make a difference.

Finally, helicopters can land almost anywhere. This fact is a massive advantage. But maybe it can also be a cause of accidents, if it tempts a pilot to just push on a bit further, to leave things a little too late. After all, unless you are in the middle of the countryside with no obstacles and flying into wind, you can't just plonk your helicopter down anywhere.

Usually a little preparation is needed, a bit of a 'recce' if not a proper circuit. It is easy to leave everything a little too long, and that sensible precautionary landing becomes an accident site.

So what can be done about all of the above? Well, after an accident, those sitting safely on the ground frequently conclude that the flight should never have been attempted in the first place. Certainly that was the case with my "Holes in the Cheese" incident – too many challenges at the same time for someone with limited flying experience. So perhaps it comes down primarily to the quality of our 'go/no-go' decisions. Maybe we all, as helicopter pilots, need to look more closely at what every flight involves. For example ... perhaps the weather is marginal, but you know you have the experience to cope with that. But, are you also flying an unfamiliar aircraft? How well do you know the route? Do you have passengers who aren't used to flying? Have you programmed the GPS correctly? Are you planning to use your mobile phone or to text? Are you likely to get distracted in any other way? None of these alone may matter, but together, are the odds stacking up?.....

Perhaps it would help if all these factors were rated on some kind of points system, in the same way that stressful life events sometimes are. Then we could add up the points, and know instantly if a particular flight would be over the limit. But somehow I don't really think that this issue is that simple. It is very much an individual thing, for we all have different capabilities and limitations.

But perhaps we do need to be much more aware of what we can safely do rather than what we'd like to be capable of when it comes to our flying 'go/no-go' decisions. We need to look at the whole picture, and be honest with ourselves. Maybe we all need to be a whole lot braver when it comes to making a decision **NOT** to fly! •

A Neptune Aero Services BAe 146 classed as a Large Air Tanker swoops down to drop retardant on the Sherpa Fire during June 2016. The 3,000 gallon air tanker is one of nine operated by the Montana based company, which enjoyed an exclusive use contract with CAL FIRE during 2017, that expired on December 31.
Neptune/Mike Eliason, Santa Barbara County Fire Dept

CAL FIRE's fleet of 22 S-2T air tankers, with their 1,200-gallon tanks, are the agency's largest aerial firefighter. Therefore it relies on contracting a fleet of bigger aircraft to put the larger fires out. Like the ones that dominated the southern Californian skyline during October and December. When big fires were getting a deadly grip in the wine-rich Napa Valley in California during the autumn, CAL FIRE Spokesman Bryce Bennet told FOX 40 TV Channel "If the fires go on longer and becomes a much larger incident, sometimes our aircraft aren't the right tool for the fight, and that's when we use the larger air tankers."

Two types of contracts

Generally, there are two methods of meeting CAL FIRE's aerial firefighting requirements if it's looking for an alternative to its S-2Ts. They are Exclusive Use or Call When Needed (CWN) contracts. Both CAL FIRE and the US Forestry Service (USFS) tend to stick with the latter, although the air tanker companies are not so keen.

Dan Snyder, Chief Operating Officer (COO) of Montana-based Neptune Aviation Services, which owns nine firefighting BAe 146s, told the author how the contracting system works. "Historically, CAL FIRE operates its own aircraft so they generally issue Call

Large Air Tankers vs very large Air Tankers

Alan Warnes investigates the choices both the US Forestry Service and CAL FIRE have when it comes to fighting the big fires.

When Needed contracts to fill in for the S-2 fleet. We were in an Exclusive Use contract with the state of California with one of our BAe 146 large air tankers, but it ended on December 31. The availability period typically lasts from June to September for the aircraft."

Owning a VLAT would be prohibitively expensive for CAL FIRE, which restricts most of its operations to California. The agency instead offers CWNs to the VLAT companies, which is a risky way of running a business. Snyder continues: "While it pays very well when used, operating your company in this manner without the security of regular income doesn't provide a long-term future."

During 2017, CAL FIRE issued CWN contracts to company's operating the Large Air Tankers (LATs) or Very Large Air Tankers (VLATs). It led to the likes of 10 Tanker (DC-10s), Global SuperTanker (Boeing 747), Ericson Aero Tanker (MD-87s), Coulson Aviation's Air Tanker (C-130 Hercules) all joining the fight.

A CWN dictates a company has 24 hours to respond, while an Exclusive Use demands 30 minutes. Snyder, Neptune's COO since January 2010 adds: "The risk goes to contractor, operator and builder of the asset. It works well with helicopters, where one day it can be firefighting with a bambi-bucket, then another day hauling

equipment on to buildings or logging.

"CWN drives prices up, because the operator doesn't know how long it will be flying. You cannot operate longer term, because no financial institutions will finance you. The problem is how do you invest, how do you hire when you don't know when you are going to work? So not knowing when you are going to get paid really screws up your revenues and budgets. In the short term, the company gets a great amount of money, but it doesn't work for either side longer term."

Both CAL FIRE and the US Forestry Service (USFS) work this way – they don't offer any Exclusive Use work now – they are all CWN. Snyder sums up the Exclusive Use contract: "It provides an exclusive mandatory availability period when you are on contract and will be paid, unless the aircraft breaks. "The USFS and CAL FIRE pay a daily availability rate (DAR), so the aircraft and pilot will sit on alert and be ready to fly. The DAR needs to cover all the costs of crews, maintenance of aircraft, other overheads and taxes.

"On top of that you get a flight rate, when the aircraft actually flies. That should cover all the associated costs related to flying the aircraft like time being used on engines, on landing gear. They have a guaranteed asset, that they can do what they want with, on contract.

Unlike the Very Large Air Tankers (VLATs) the LATs don't have to waste retardant or burn fuel for the minimum landing weight, as the Boeing 747 or DC-10 does

"When the Napa Valley fires broke out [October 8-27], California was looking for any and every asset it could get its hands on. At that time of the year, Neptune were still under Exclusive Use contracts with the US Forestry Service and Optionally Use Contracts where they could call us up to fight fires. When CAL FIRE called, we didn't have anything but P-2s available. Only a week earlier we had held our P-2 retirement event, so instead we returned two P-2Vs to service and sent them to California."

***A 10 Tanker DC-10, '912' climbs away from the drop zone after dropping its 11,000 gallon load on a fire last September. The Albuqurque company used two Very Large Air Tanker (VLAT) DC-10s during the recent fires, but will soon have four available for 2018 fire-fighting season** - 10 Tanker*

No retardant waste or fuel burning

Normally, CAL FIRE would contract the 3,000-gallon Bae 146 to augment its own S-2T air tankers. Both can rapidly respond to smaller fires and then return to base easily when they are not needed, with minimal cost. The 146's primary mission is for initial attack (attacking fires which have just started) but can be used for extended attack (part of a team trying to put out a big fire) too, which is what the Neptune 146s were used for.

Unlike the Very Large Air Tankers (VLATs) the LATs don't have to waste retardant or burn fuel for the minimum landing weight, as the Boeing 747 or DC-10 does. "However, both are great aircraft for certain subsets of fire missions." Snyder agrees, "They work really well for dropping big loads of retardant. The problems come if the aircraft doesn't get down low [around 250ft], because the retardant will dry before it hits the ground. This creates breaks in the line".

"The VLATs might be able to drop 10 or 11, 000 gallons loads, but if your running ridge-to-ridge 400ft above the valley floor, that valley floor isn't going to get the coverage it needs. So, the VLATs work great in rolling hills and intense mountains, and ridge line drops. But the laws of physics, say you can't point a multi-ton VLAT downhill into a valley and turn it around and bring it back out, even if it has tons of power. "You have to be very careful where you put those aircraft. Whereas the BAe 146 and smaller LATs can get down low into the valley floor and canyons and put in a line for whatever they need to reinforce. That's the fundamental difference between the LAT and VLAT. The 146 is smaller but doesn't have the weight, so inertia doesn't get in the way but instead they can go into places you wouldn't put a big tanker".

VLATs

Very Large Air Tankers can drop an incredible amount of retardant. The

10 Tanker DC-10s have been modified to accommodate a 11,600 gallon tank. It would take ten Trackers to drop that much retardant! Rick Hatton, the CEO and President of 10 Tanker Air Carrier since the company was formed in 2002, told the author: "It is an extensive modification, the DC-10-30 has a significant amount of room underneath it so the tank is big."

Looking at the tankers dropping the retardant, it seems to be a case of opening-up the tank door and letting the load go. But it isn't that simple. When asked how long it take to drop the load, Rick explains that the number varies. "You drop according to the direction offered by the Incident commander via the Attack Supervisor in the lead plane (usually a King Air). They dictate the coverage level they want, which is defined by the number of gallons per hundred square feet of real estate, and it tends to be gauged between two and eight".

"The higher numbers are used for denser terrain like forests, and the lower ones are for rolling terrain where there is grass or live-stock feed. Coverage level 6 we would drop a line of about a mile in length which would take about 15 seconds. We could drop coverage level 8 in about eight seconds with heavier concentration but in a shorter space."

Meanwhile Global Super Tanker's Boeing 747 with its 19,000-gallon capacity, played a big part in dousing the California fires, when deployed to Sacramento on 5 December 2017. During its ten sorties, and eleven drops, a staggering 175,950 gallons of retardant was unleashed onto assignments in Thomas and Liberty. The massive jet, which always attracts the TV cameras when it gets to work, departed Marana-Pinal Air Park, Arizona on 22 December. It was there, undergoing routine maintenance and returned afterwards. Normally it is based in Colorado Springs, Colorado.

During the interview with Fox 40, CAL FIRE's Bennet commented: "Having the 747 in our tool box allows us to lay down a substantial amount of retardant in a short amount of time over a large area." However, at a reported cost of $16,000 per hour to CAL FIRE, it is an asset which has to be called in as a last resort – but when there are billions of dollars of property at risk, it has ultimately to be worth it. In the past the Boeing 747 has put fires out in Israel and Chile, and Global SuperTanker, like so many US aerial firefighting companies, is bidding to export its unique services.

Meanwhile Global Super Tanker's Boeing 747 with its 19,000-gallon capacity, played a big part in dousing the California fires, when deployed to Sacramento on 5 December 2017

Europe next?

Many countries around the world, including France, Portugal and Spain are suffering an increasing number of wild fires during the summer. The US and Canadian aerial firefighting companies can provide an alternative option to the Bombardier 215/415s generally in use across Europe. With tightening budgets and CAL FIRE looking at future strategic alternatives to its current way of working, Europe is now a possible destination. France's Sécurité Civile is currently looking at options to replace its S-2 Firecats in 2022, we could see these new generation LATs and possibly VLATs flying over Europe's fires one day.

Aerial Firefighting North America

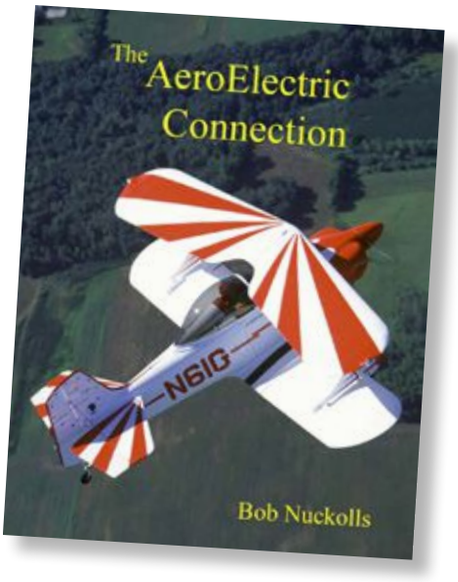
Chief Ken Pimlott, Director, and Dennis Brown, Chief of Flight Operations at CAL FIRE delivered presentations at the Aerial Firefighting North America Conference, which took place at the McClellan Conference Center, Sacramento McClellan Airport in March. Global SuperTanker, 10 Tanker Air Carrier, Neptune Aviation and Viking Air showcased their products during the exhibition. To find out more about Tangent Link's aerial firefighting portfolio of events, please visit: www.tangentlink.com/events/aerial-firefighting

A pair of P-2 Neptunes, operated by Neptune Aero Services were flown to California for the December fires, where they were used for extended attack in December. Both aircraft had been retired a week or so earlier, but were quickly put back into service so they could head west. *Neptune/Keith Charlot*

The AeroElectric Connection

Rev 12 Book

Author Bob Nuckolls has over 50 years of hands-on experience in electronics and aircraft electrical systems.



It is a complete, thorough, and easy to understand book. It is basic enough for the beginner with little electrical experience yet in-depth enough for the seasoned technician who wants to update his/her knowledge to today's levels. The AeroElectric Connection offers a wealth of information on the wiring of homebuilt/experimental aircraft. It is written in a readable, conversational style accessible to both novice and experienced builders alike. If you want to wire your own aircraft - and want to do it safely – this is the book you need.

Each chapter begins with a basic primer on the where and wherefores of the devices to be discussed, then progresses into a discussion of how this information fits into the electrical scheme of our planes. He drops several interesting tidbits from his long exposure to aviation electrics and generally does a good job of removing the mystery of electrical systems. An example of this is found in the "Electrical System Instrumentation" chapter.

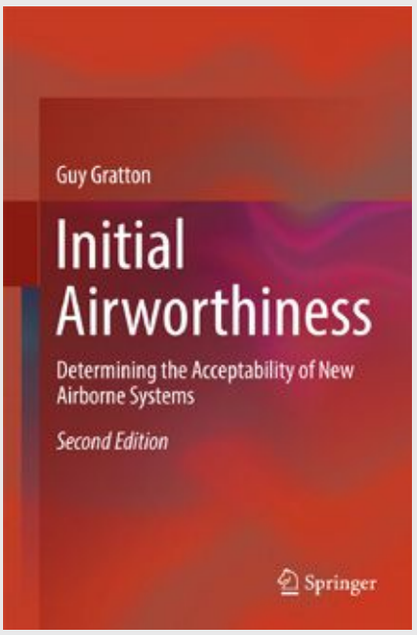
One of the most useful chapters for me was the discussion of the relatively new RG batteries. There is a lot of misinformation concerning the care and feeding of these new-technology units. Another interesting section concerns the use of "fusible links".

Numerous diagrams are provided to demonstrate the principles being explored. The illustrations are well-drawn and are satisfactory to prepare the reader to explain the wiring diagrams at the end of the book. Several architectural wiring diagrams are provided that are applicable to the simplest aircraft all the way to multi-engined aircraft. Each of these diagrams incorporates Nuckoll's trademark "essential bus" which is a feature that provides power to basic instruments and radios even if the battery contactor fails.

For people who build aeroplanes, education is powerful and essential. All pilots realize the consequences of serious electrical problems in-flight, and the necessity of fabricating reliable wiring is recognized by most builders. This book will help you understand how to wire your project so it will perform reliably for a long time. •

eBook File Description:

File Type:	standard pdf ebook
File Size:	16.3Mb
Print:	unlimited
Copy/Paste:	unlimited
Offline Access:	yes
Search:	always
Bookmarks:	always
System Reqs:	Windows, Macintosh, iPad, and more



Global Aviator regular Guy Gratton's book Initial Airworthiness comes out in early May as a new second edition, and is available for pre-order in hardback and as an eBook from the usual places, or publisher Springer at **http://www.springer.com/gb/book/9783319756165**

Initial Airworthiness is a textbook aimed at academics and practitioners who need to understand how aircraft are assessed for safety and fitness for purpose. It covers European and American civil regulations as well as the differences between civilian and military certification practices. All of the major areas of aircraft assessment are covered – including atmospheric structure, pitot-static systems, life support, standards compliance, stress analysis of flight and landing structures, stability and control, aeroplane asymmetry, stalling, and systems – as well of course as enabling subsequent continued airworthiness. Appendices cover lots of standard lookup data such as the standard atmosphere, material properties, unit systems and conversions, and all of those acronyms without which all aviation would be incomplete.

This new edition has added three completely new chapters: on programme management, professional ethics, and the environmental impact of aircraft. The crash-worthiness chapter has been expanded to cover airborne abandonment, and the stalling chapter now includes the spin, spiral dive and tumble and is renamed "departures from controlled flight". Several sections have been updated, including for the new "consensus standard" part 23, developing ETOPS regulations, and light aircraft deregulation around the world. A further addition has been direction to many references for readers wanting to explore topics further. The book also now includes many new references and case studies – in all about 30% more material than the first edition.

AMO's in Africa

Company	Code	Telephone	E-mail or Fax	Fixed Wing	Helicopter Maintenance	Avionics	Piston Engines	Turbine Engines	Propellors	Weight / Balances	Paint	Interior	Sheet Metal Work	Rebuilds	Overhauls	Electrical Work	NDT Testing	Refurbishments	Structural Repairs	Inspections	NTCA Aircraft	Seat Belts	Instruments	R22 and R44 only	Bell Heli Components	Heli Component Overhaul	Design Organisation
WONDERBOOM AIRPORT																											
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AMO No: 1089

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- Avionic Installation, incl TCAS and RVSM
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AGENTS FOR ACK ELT'S

Airbus Helicopters Awarded $273 Million Contract for 35 UH-72A Lakotas for the U.S. Army

Airbus Helicopters, Inc. received a contract valued at approximately $273 million to deliver 35 additional UH-72A Lakotas for the United States Army.

The $273 million contract includes the UH-72A production aircraft, associated technical and flight operator manuals and program management. This procurement is broken into two configurations: 17 UH-72A Lakotas for the Initial Entry Rotary Wing mission at Ft. Rucker and 18 UH-72A Lakotas for the Observer/Controller mission at the Army's Combat Training Centers.

"We are proud that the U.S. Army has continued to rely on us to provide this versatile capability for its aviation fleet. We have an unbroken record of on-cost and high-quality program excellence and support for this aircraft," said Chris Emerson, President and CEO of Airbus Helicopters, Inc. and Head of North American Region.

Airbus builds the Lakota at its Columbus, Mississippi facility.

Since the program inception in 2005, Airbus has delivered more than 412 Lakotas. The UH-72A is a twin-engine light utility helicopter used for a wide range of military operations including border patrol, MEDEVAC, troop and VIP transport, light cargo, Homeland Security.

Available in multiple configurations with the lowest cost to buy, own and operate of any U.S. military helicopter in production, the UH-72A is a key component of the Army's Aviation Restructuring Initiative (ARI) and the primary rotary-wing trainer for the U.S. Army Aviation Center of Excellence at Fort Rucker, Ala.

Lakotas have been employed extensively over the last few months, responding to wildfires in California, and Hurricanes Irma and Harvey.

A number of states across the country are partnering with local authorities using the Lakota to assist in the execution of domestic missions, highlighting the unique versatility of this aircraft and its ability to perform in joint governmental and non-governmental agency operations. •

US Navy plans new multi-billlion dollar submarine

The Ohio submarine will be replaced by the Columbia class submarine and will be decommissioned in 2028

The Columbia-class submarine is being designed to replace the Ohio-class ballistic missile submarines, whose remaining boats will be decommissioned, at a rate of one per year, beginning in 2027. A total of 12 submarines are planned with the Columbia-class taking over the role of submarine presence in the United States' strategic nuclear force.

Construction of the lead boat is planned to begin in 2021. Each submarine will have 16 missile tubes to carry one Trident II D5LE missile apiece. The submarines will be 170.7m long and 13.1m in diameter, making it as long as the Ohio-class design, and 30.5cm larger in diameter. The Columbia class is a next-generation nuclear-armed ballistic missile submarines designed to ensure a second-strike capability in the event of a nuclear attack on the United States.

Research conducted before the decision was taken to build the subs including studies to determine the number of boats needed, missiles needed at sea and at station, would it remained undetected by enemy submarines, as well as design and construction possibilities, including adding missile tubes to the design of the Virginia class of fast-attack submarine, building Ohio-class replacement submarines using updated Ohio-class designs, or developing an entirely new Ohio replacement submarine design.

Ohio replacement submarine

It was decided that a new design would be the least expensive option that could meet all of the technical requirements. Columbia's nuclear core will also last as long as the submarine is in service whereas both the Ohio and Virginia class subs would need mid-life re-fuelling of the nuclear cores.

In March 2016, the Navy announced

The first submarine is scheduled to begin construction in 2021 and enter service in 2031. From there, the submarine class will serve through to 2085

that General Dynamics Electric Boat was chosen as the prime contractor and lead design yard, carrying out the majority of the work on all 12 submarines, including final assembly. The company will also manufacture the new tactical missile tubes able to fire nuclear-armed Trident II D5 missiles. The contract award is for the design, completion, component and technology development and prototyping efforts for the Columbia Class Fleet Ballistic Missile Submarines (SSBNs).

Procurement of the first submarine is scheduled for 2021 with completion of the first submarine scheduled for 2030, followed by its entry into service in 2031. All 12 submarines are expected to be completed by 2042 and remain in service until 2084 and are set to carry out 124 deterrent patrols during its service life.

Nuclear capabilities

The Columbia class will have missile launch tubes that are the same size as those of the Ohio class, with a diameter of 2 200 mm and a length sufficient to accommodate a D-5 Trident II missile

Its beam will be at least as great as the 13m beam of the Ohio-class submarines. There will be 16 missile launch tubes instead of 24 missile launch tubes on Ohio-class submarines. SSBN(X) is expected to have a submerged displacement about the same as that of Ohio-class submarines

The SSBN(X)s are to be fitted with the most up-to-date capabilities and stealth to ensure they are survivable throughout their full 40-year life span according to a naval report.

X-shaped stern control surfaces (hydroplanes), sail-mounted dive planes, electric drive (a propulsion system that uses an electric motor that turns the propeller of a vessel) and off-the-shelf equipment developed for previous submarine designs (Virginia-class SSNs), including a pump-jet propulsor, anechoic coating and a Large Aperture Bow (LAB) sonar system form part of the equipment fitted to the new boats.

It is part of a concept aimed at creating an 'all electric' which should reduce the life cycle cost of submarines while at the same time reducing acoustic signature. Turbo-electric drive had been used on US battleships and aircraft carriers in the first half of the twentieth century. Two nuclear-powered submarines were equipped with turboelectric drive but reliability issues during their service life resulted in them being regarded as underpowered and maintenance heavy.

Electric drive does not replace the nuclear reactor or the steam turbines but replaces reduction gearing used on earlier nuclear-powered submarines.

The Columbia-Class will utilize Virginia-class's fly-by-wire joystick control system and large-aperture bow array sonar. The automated control fly-by-wire navigation system is also a technology that is on the Virginia-Class attack submarines. A computer built-into the ship's control system uses algorithms to maintain course and depth by sending a signal to the rudder and the stern.

In 2014, Northrop Grumman was chosen as the prime designer and manufacturer of the turbine generator units used to convert mechanical energy from the steam turbines into electrical energy that is then used for powering on board systems as well as for propulsion via electric motor. •

AIRCRAFT SALES

2008 CESSNA CITATION CJ2+

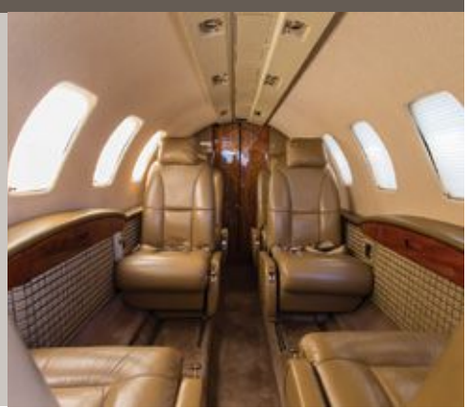
TOTAL TIME: 1500 Hrs TTSN
ENGINES:
1500 Hrs TTSN (Enrolled on TAP Elite)

AVIONICS:
3 x Tube Collins Proline

ADDITIONAL EQUIPMENT:
TCAS II , CVR ,HF ,Proparts

Based in SA

POA



2006 CESSNA CITATION SOVEREIGN

TOTAL TIME: 2350 Hrs TTSN
ENGINES: 2350 Hrs TTSN
APU: 950 Hrs TTSN
ADDITIONAL EQUIPMENT:
FDR, TCAS II 7.1, HF Radio, Dual FMS
Based in Germany

POA

1996 CESSNA GRAND CARAVAN

TOTAL TIME: 7200 Hrs TTSN
ENGINE: 1250 Hrs SMOH
PROPELLER: 250 Hrs SMOH
AVIONICS: King / Garmin Avionics Suite
Based in South Africa

POA

2000 LEARJET 45

TOTAL TIME: 3800 Hrs TTSN
ENGINES: 3800 Hrs TTSN
(Engines enrolled on MSP)
ADDITIONAL EQUIPMENT:
FDR, HF Radio, TCAS II
EXT/INT: As New
Based in South Africa
POA

2003 BEECHCRAFT PREMIER I

TOTAL TIME: 2050 Hrs TTSN
ENGINES: 2050 Hrs TTSN (TAP Blue Engine Programs)
AVIONICS: Collins Proline 21 Suite
ADDITIONAL EQUIPMENT:
TCAS II, EGPWS , Lift Dump Mod.
Based in South Africa
POA

1995 PILATUS PC-12/45

TOTAL TIME: 5700 Hrs TTSN
ENGINE: 2300 Hrs SMOH
AVIONICS: Garmin G600 with the GTN 750 EFIS Upgrade
INTERIOR: VIP Alcantara Interior
Based in South Africa

POA

ASCEND AVIATION

AIRCRAFT SALES

2008 BELL 407

TOTAL TIME: 1500 Hrs TTSN
AVIONICS: Garmin 530
ADDITIONAL EQUIPMENT:
Aux Fuel Tank, Barrier Filter.
Based in the USA

POA

2008 ROBINSON R44

TOTAL TIME: 870 Hrs TTSN
AVIONICS: Garmin 430, King KY196, KT76
ADDITIONAL EQUIPMENT:
Aircon, Intercomm.
Based in South Africa

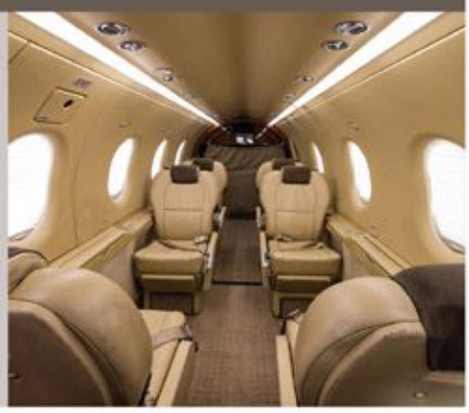
POA

2007 PILATUS PC-12/47

TOTAL TIME: 4975 Hrs TTSN
ENGINE: 1430 Hrs SMOH
PROPELLER: 1430 SMOH
AVIONICS:
Combination of King/Bendix EFIS
and Garmin Avionics

ADDITIONAL EQUIPMENT:
Aircon, Cargo Kit
INTERIOR: 2 + 6 Seating Configuration
Based in SA

POA



2009 CESSNA SKYLANE TURBO 182T

TOTAL TIME: 575 Hrs TTSN
ENGINE: 575 Hrs TTSN
PROPELLER: 575 Hrs TTSN
AVIONICS: GARMIN 1000 SUITE
ADDITIONAL EQUIPMENT: Synthetic Vision Technology (SVT); DME; No Damage History; One owner since new. **Based in South Africa**
POA

2011 CESSNA SKYLANE 182T

TOTAL TIME: 650 Hrs TTSN
ENGINE: 650 Hrs TTSN
PROPELLER: 650 Hrs TTSN
AVIONICS: Garmin G1000
Plus – electric aircon
Based in SA

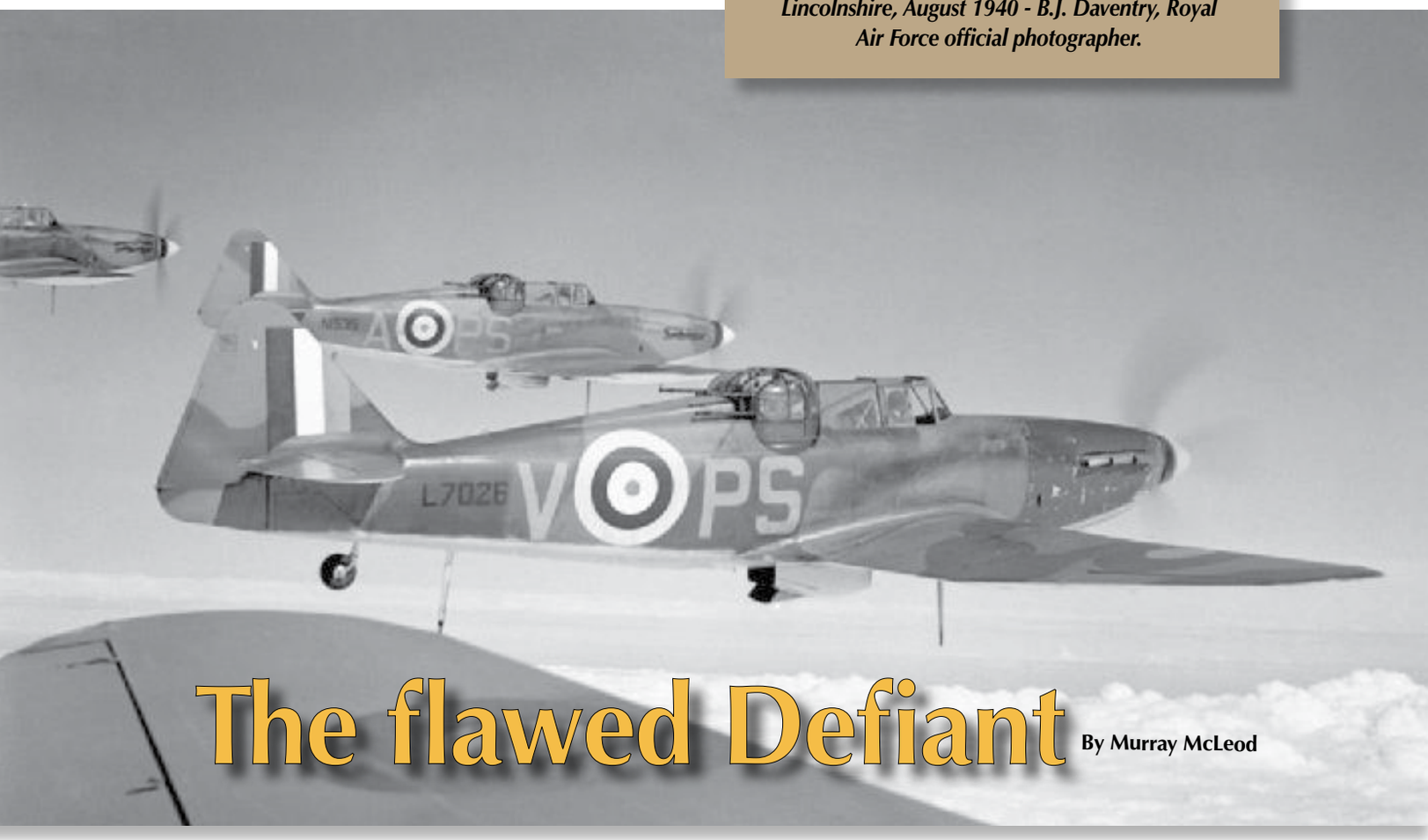
POA

1998 PIPER SENECA V

TOTAL TIME: 1200 Hrs TTSN
ENGINES: 1200 Hrs TTSN
AVIONICS: Garmin G500 EFIS
New Interior
Based in South Africa

POA

Contact Maartin Steenkamp: **C** +27 (0)82 807 6701, **Pierre Kieser** **C** +27 (0)82 577 7815
T +27 (0)11 064 5624 **F** +27 (0)86 673 9129 **E** sales@ascendaviation.co.za



Royal Air Force Boulton Paul Defiant Mk Is of No. 264 Squadron RAF (including L7026 "PS-V" and N1535 "PS-A") based at Kirton-in-Lindsey, Lincolnshire, August 1940 - B.J. Daventry, Royal Air Force official photographer.

The flawed Defiant

By Murray McLeod

During the early-1930s the concept of a turret-armed two seat fighter seemed a natural progression from the current types in RAF service. The genesis of that theory could well be traced to the Bristol F2B, one of the most successful aircraft to emerge from World War I. Its achievements bore comparison with such iconic types as the Sopwith Camel and SE5A.

While the Bristol was to remain in overseas RAF service until 1930, both the Camel and SE5 were rapidly withdrawn from operations following the armistice. Clearly there was no future for the fractious Camel in the civil domain, but the more amenable SE5 did find a niche in post war air races, and with some examples doing service as advertising skywriters.

Financial restrictions hampered fighter development during the 1920s; and until 1922 Great Britain's sole fighter defence was represented by a single squadron of the Camel's successor, the Sopwith Snipe. As a typical rotary-engined scout from the Great War it was already an anachronism among the new types that had begun to replace it around 1926. The Snipe's successors, typified by the Woodcock, Siskin and Grebe showed some advances but realistically, with their open cockpits and two machine guns, no great changes had occurred.

Meanwhile at Hawkers, Sydney Camm and his design team had created a day bomber that would change completely the current fighter tactics. This was the Hart, which proved to be one of the RAF's most adaptable biplanes and for its time one of the fastest. Its superiority was graphically shown at the 1930 Air Exercises when the defending Siskins tried in vain to catch them. It was patently clear to the Air Ministry that it was time for meaningful advancement in fighter aircraft. Again it was Hawkers who provided the solution. Their response was the Fury; surely the most elegant of biplane interceptors, with a maximum speed over 200mph

Since 1918 the two-seat fighter concept had been largely ignored; so it was a straightforward step for Hawkers to design a fighter version of the Hart. This emerged as the Demon, armed with two forward-firing Vickers guns and a Lewis gun mounted on a ring in the cut-away rear cockpit. But with increasing speeds the problems of accuracy and comfort for the gunner were becoming manifest. This led to a partial solution, with the so-called 'Lobster back' hydraulic turret, which went some way to improve conditions for the gunner.

However, it was not only the fighter crew that were experiencing slipstream problems. Boulton Paul had produced a promising biplane medium bomber, and in 1926 it went

on to equip just one RAF squadron, No.101. The Sidestrand, as it was named displayed remarkable agility for a bomber, which was well demonstrated in mock engagements with fighters at the Hendon Air Displays. But with such aerobatic prowess, life for the front and mid-upper gunners was proving exceedingly difficult.

A solution to the problem was offered with the possibility of installing the French-designed de Boysson turret. But with the French Government showing complete indifference to the project, Boulton Paul were anxious to acquire the manufacturing rights to the turret. It was eventually fitted to the Overstrand, a more powerful version of the trusty Sidestrand; again operated by 101 squadron. Their optimism was vindicated; with the turret proving to be an immediate success, enabling gunners to improve their accuracy by significant margins in air-to-air firing.

Following the clear success of Boulton Paul's turret in the Overstrand, the Air Ministry was keen to explore the feasibility of a two-seat fighter; with all .303 Browning armament concentrated in a hydraulic four-gun turret. Boulton Paul were obvious contenders, as were Hawker; already well advanced in the design of a two-seat light bomber. Their theory behind the concept was that the turret fighter would be merged with numbers of single-seaters, such as the Hawker Hurricane to intercept formations of unescorted enemy bombers. Clearly, the 'enemy' would

An air gunner of No. 264 Squadron RAF about to enter the gun turret of his Boulton Paul Defiant Mk I at Kirton-in-Lindsey, Lincolnshire, August 1940.

Defiant N1671, RAF Museum, 2015 Alan Wilson from Stilton, Peterborough, Cambs, UK - Boulton Paul Defiant I 'N1671'. This is the sole surviving complete Defiant . It was saved by the AHB (Air Historical Branch) in 1944 and stored until 1958 went it began making static appearances. Repainted in to a night-fighter scheme in 1967. Went on display at Hendon when the museum opened in 1972 and moved to the Battle of Britain Hall in 1978 and was there until removed for restoration in 2009. The restoration was carried out to an extremely high standard by MAPS (Medway Aircraft Preservation Society) and the aircraft returned to Hendon in early 2013, now in an accurate and genuine 307 (Polish)sqn colour scheme. This aircraft served with 307sqn as both a day fighter and a night fighter and remains on display in the Battle of Britain Hall. RAF Museum, Hendon, London, UK. 22-3-2015

Boulton Paul Defiant I

be Germany, and the new Defiant would inflict significant damage on the slower bombers. Such a theory offered great possibilities, but in the unforgiving arena of air combat it would be revised in a most salutary manner.

Boulton Paul's submission for the new fighter was well received by the Air Ministry. In 1935 work began on the prototype, a well proportioned monoplane, similar in dimension to the Hurricane, although more angular in the wing area. Like the Hurricane it was powered by a Rolls Royce Merlin, with a predicted maximum speed over 300 mph. In August 1937 the Defiant prototype made its maiden flight, revealing few shortcomings in performance and handling. It was ordered into quantity production, but two years were to elapse before it entered squadron service

Meanwhile the Hawker project, which closely followed the design of the Henley light bomber never progressed beyond one example. In any case, the Hotspur, the name it was allotted was unlikely to offer a superior performance to the Defiant, which saw the Hawker project terminated.

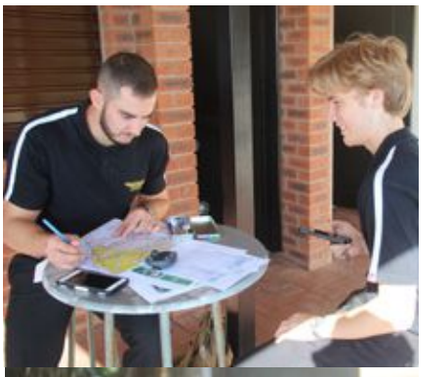
In March 1940 the Defiant entered service with 264 squadron and by May the unit was deemed to be operational. On May 11, operating from Duxford they achieved immediate success with the destruction of a Ju88. The turret-fighter concept seemed to be vindicated but on the following day there was a prophetic omen. After destroying four Ju87s over the Dutch coast, the six Defiants were set upon by the escorting Me109s. Five Defiants were brought down; their loss causing an immediate review of their ability to operate in daylight. Despite these setbacks there was still to be one brief moment of glory for the Defiant.

During the Dunkirk evacuation a mixed formation of Defiants and Hurricanes was engaged in strength by Me109s. In the ensuing melee the RAF claimed the destruction of 37 of the opposing 109s. Such a claim sounds wildly optimistic and there was a suggestion that the Germans mistook the Defiants for Hurricanes. If that was the case it was unlikely they would repeat the error, and shortly afterwards the type was withdrawn from daylight operations. An obvious alternative for the Defiant was in the night interceptor role. Eventually thirteen squadrons were raised, and

during 1940 and early 1941 they pioneered an early version of AI radar. They performed reasonably well and were a factor in night interception until the advent of more effective types, such as the Beaufighter and Mosquito.

By all accounts the Defiant would appear to have failed in its intended operational role. But its basic design was extremely sound, which saw it perform a host of duties, including air sea rescue, army co-operation and target towing. By 1945 it had largely disappeared from RAF service and today just one example remains; appropriately it is a Mk1 night fighter, on display at the RAF museum at Hendon. The lone Defiant is in good company; for under the same roof are two stable mates from the Battle, the esteemed Hurricane and Spitfire. •

Flight Sergeant E R Thorn (pilot, left) and Sergeant F J Barker (air gunner) pose with their Boulton Paul Defiant turret fighter at RAF Biggin Hill, Kent after destroying their 13th Axis aircraft. Note the teddy-bear mascot - *P.H.F. Tovey, Royal Air Force official photographer. This is from the collections of the Imperial War Museums.*



Above: Organiser Mary de Klerk is passionate about these events and it shows.

Top: Taylan Ayliffe and Chris Gillespie making final preparations.

Middle: Winners of the advanced class Frank and Cally Eckard.

Durban Wings Club SAPFA Fun Rally - Virginia airport 3 March 2018

by Mike wrigh (BCom, LLB)

SAPFA FUN RALLY

This event held on 3 March 2017 was well supported and the Durban weather gods we smiling with a 15 knot North Easterly wind blowing and so a wonderful days precise flying was enjoyed by all with Durban Wings Club under Brendan Adams as the local driving force.

SAPFA some years ago designed a Flying Competition to introduce Pilots and Navigators to the exciting world of Competition Flying and thereby improve their general flying skills.

The competition flown is loosely based on the FAI Rally and Precision competitions.

As this competition is designed for the new comer who participate in the Fun class , those pilots who have already obtained Provincial or National Colours assist the newcomers with their preparation or to compete as Navigators. Pilots with Provincial or National Colours compete in a separate open class.

BRIEFING AND TRAINING

A clinic/mentoring session was held at DWC on the Friday afternoon by Springbok rally pilot Mary de Klerk. She really out a lot into these events and her passion for it all really shines through.

Following this a full briefing was given on how to Fly the Competition by Mary , Frank Eckard and team. At the allotted time competitors each received an Envelope containing a Map and Photo Sheets. A Time Sheet was also be given which will gave the time competitors were required to be at each Check Point. The Map contained the route and checkpoints. Entrants were required to measure the heading for each leg and also insert the timing for each leg onto the map. Pilots were assisted in the Preparation of their Map and fly the course once this is properly prepared.

FLOWN ROUTE

The actual flying of the route, attempting Accurate Navigation and according to the Time Schedule. A photo was provided of each Check Point which needs to be positively identified and a photo of a feature on each leg also needed to be found and marked on the map (Observation).

Scoring is all "negative marking" and the Team who got the lowest score were declared the winners.

John Neilon was the Safety Officer and he made sure that safe fun was had by all on the day.

The aircraft routed down the South Coast via the old DIA site to Amamzimtoti, then inland to and finally back to Virginia via the Coast.

The race ended with a spot landing back at the Virginia Airfields runway 05.We were privileged to be able to watch it all from the bank near the windsock above runway 05.

Overall winners of the Advanced

Above: Alistair Matthews and Brian Laurean in their Cessna C152, ZS-PLS.

Above: Thys van der Merwe and Leon Boutell in C172 ZS-ETO.

Above: Steve Mc Currach and Mark Warren getting their Evektor Harmony ready.

Above: 15 teams and organisers at Virginia airport prior to the start on Saturday.

Left: Winners in the fun section Steve Mc Currach and Mark Warren with Mary de Klerk - Pic Brian Spurr

Class were Frank and Cally Eckard flying a C 182 ZS-DOS

Sportsmans class winners were Thys Van Der Merwe and Leon Boutell in a C172 ZS-ETO

Fun class winners were Mark Warren and Steve Mc Currach flying ZU-TRG and Evektor Harmony.

There were 15 entrants this year which is very good and even included on old Chipmunk from Scottburgh.

By the time the last of the aircraft arrived back Mary and Frank Eckard as usual had all the results downloaded from the GPS loggers which are carried by each aircraft and a final prize giving function was held at DWC.

Frank Eckard the Chairman of SAPFA reminded pilots that South Africa was bidding to host the 2020 world Rally Flying Championships. The event would mark the 100th anniversary of the Aero Club.

Well done to Mary de Klerk and the team and Durban Wings Club for putting together a special event again this year. •

Above: Andrew Lane with his Sling 4.

Above: Pierre and Sandy Van Der Merwe in the Sling 2 ZU-FWY coming in to land.

Above: Dirk Grobler and Russell Mann in their Vans RV-4, ZU-CDK.

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AP/02/2018

1983 308 GTSi

This spider version of the 308 GTBi shared both its line and engine. The fuel injection system gave both models much smoother power delivery. Unfortunately, meeting anti-pollution regulations meant that a few horses had to go, and the cleaner engines were less powerful than the previous carburettor ones. Aware of this situation and the need to re-establish its cars at the top their class, Ferrari immediately began further development of the V8 engine with the aim of increasing power whilst still keeping exhaust emissions within acceptable levels. Fuel injection was adopted on the 308 GTS in late 1980 concurrently with the 308 GTB model, and the model became the 308 GTSi, the "i" suffix in the model designation referring to the fitment of fuel injection.

Visually the new model was almost identical to the outgoing one, although the casting pattern of the five spoke alloy wheels changed slightly due to the fitment of Michelin TRX metric size radial tyres.

However, the imperial size Michelin XWX tyres on 14" wheels, or Pirelli P7 tyres on 16" wheels were available as an option.
As with the 308 GTS targa roof model, the removable roof panel was stowed in a cover behind the seats when not in use, and the rear quarter windows behind the doors featured hinged satin black finished slatted covers.

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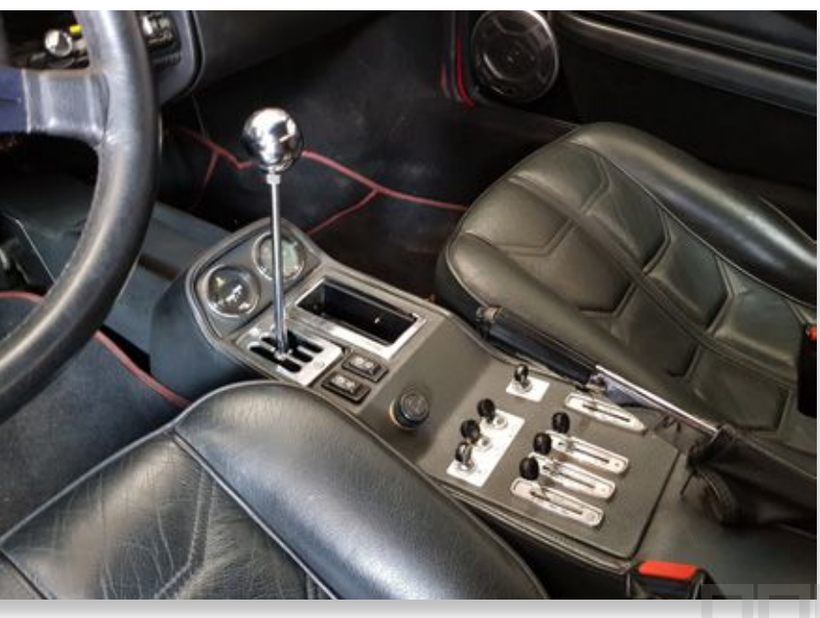

CHASSIS AND ENGINE

The 308 GTSi models had a tubular chassis with factory type reference F 106 BS 100. Disc brakes, with independent suspension via wishbones, coil springs, and hydraulic shock absorbers, were provided all round, with front and rear anti roll bars.

All models were numbered in the Ferrari odd number road car chassis sequence, with both right and left hand drive available. Production ran from 1980 through to the beginning of 1983, during which time 1749 examples were produced in the chassis number range 31309 to 43079.

The transversely mid-mounted aluminium V8 engine was essentially of the same design as that used in the preceding 308 GTS model, but with a fuel injection system replacing the quadruple twin choke carburettors fitted to the former.

It was of a 90 degree configuration, with belt driven twin overhead camshafts per bank, having a total capacity of 2926cc, with a bore and stroke of 81mm x 71mm, bearing factory type reference F106 BB 000 for European market cars.

The engine was coupled in unit with the all synchromesh five speed transmission assembly, which was below, and to the rear of the engine's sump. The gear and final drive ratios were altered to suit the revised characteristics of the fuel injected engine.

It was fitted with a Bosch K Jetronic fuel injection system, coupled to a Marelli MED 803A Digiplex electronic ignition system, incorporating a coil, distributor and ignition module to serve each bank of cylinders.

From this model onwards all world market 308 series cars were fitted with wet sump lubrication. The claimed power output was 214bhp for European market models, and 205bhp for US market examples, which were fitted with power sapping emission control equipment. •

Extensive work has been carried out on this car to bring it back to its former glory. A full report on the work carried out will be supplied to the buyer.

It has only 63 540 kms on the clock, a must for the serious collector.

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By Prof Guy Gratton

Snake Oil

Most industries from time to time suffer from what our American colleagues would call "snake oil" – some magic new product that claims it will transform everybody's lives for the better, revolutionise the industry, and do it all with virtually no investment or new skills. And, which almost certainly won't work.

In my opinion, we are seeing an increasing amount of snake oil in aviation, particularly hinging on one particular type of technology, which we can label "flying taxis". My electronic media seems to throw up a new such project most weeks at the moment, and it is only with increasing amounts of self control, that I am not throwing my various devices out of my office window as I see each next scheme.

Here is how it all goes. Company X has designed a revolutionary single or 2-seat pilotless, electric flying car. Within the next five years, hundreds of these will be in the world's major cities, flying passengers between their offices and homes and other places of interest, it'll all be electric, completely non-polluting – and the team producing this are so good, it doesn't matter that few, if any of them have any experience of aircraft design, testing, or professional operations. Do I sound a little sceptical here?, yes I am – because it feels like I'm being treated as an idiot.

Let's look at what you need to do to achieve any of these magic flying taxi products.

(1) Reliable, safe, affordable, rapidly recharged electric flight.
(2) Vertical Take-Off and Landing (or VTOL) quiet and safe enough to be flown within built up areas.
(3) Autonomous flight, reliable and safe enough to carry commercial passengers.

And having got these three pieces of very clever technology right, you will then need to integrate them all together and certify them.

Let's think about the issue in each of these technologies.

Electric Flight is starting to work now: at the single and 2-seat conventional aeroplane scale we're seeing aircraft good enough to fly in airshows such as Airbus' E-fan, or be used in flying schools such as Pipistrel's Alpha Electro. Obviously there are also lots of electric drone activity going on, but virtually all of this is at a scale one or more orders of magnitude lighter than even the lightest single seat microlights. Electric motor driven fans, rotors and propellers are actually with us, and around six times more efficient than equivalent piston or turboprop propulsion – which is great, except that for energy stored per unit mass a tank of fuel requires about 1/30th of the weight that you need of even the very latest battery technologies. Put this in perspective – a Robinson R22 has an

Snake Oil advert from 1903 before the USA introduced federal drug-claims standards in 1906.

empty weight of 400kg, 235kg of payload including 75 litres or 62kg of fuel – say 75kg with the tank and pumps. For the same performance – but with electrical systems, you'll need 375kg of electrical storage system – so that's put you 140kg (or about 20%) overweight before you start to think about a pilot or any useful payload. And this, of course is in a helicopter – which has a relatively efficient big rotor, not much smaller ducted fans. Aeroplanes like the Slovenian Pipistrel Alpha Electro are making this work , but only with lightweight low performance fixed wing aircraft, not more energy intensive VTOL.

Talking of which – what about the VTOL question? Well we've had VTOL for years, and it works well – in the helicopter; but helicopters rely upon big rotors and are still very inefficient compared to any conventional aeroplane. If you want to get rid of the helicopter's big open rotor, you need fans with much higher airflow velocities – the epitome of this is the Harrier. Ever witnessed a Harrier in the hover and transition? – it's incredibly noisy, and any loose objects around them are sent all over the place: the basic physics of this are only avoidable to some extent by making the vehicle incredibly light, but what about all those batteries? It can't be done – and also around human habitation it's impossible to sterilise the area of all loose objects – your neighbour won't thank you for your taxi to work sending her cat flying through the living room window at 200 knots.

Now autonomous flight – this should be the easiest of all our problems to solve. We've had autopilots of one sort or another since the 1920s, and nowadays most aircraft are flying with some form of terrain, airspace and obstacle database onboard – on more advanced aeroplanes coupled with autopilot and autothrottle systems. Many modern military aircraft are using AGCAS systems and variants to automate ground and mid-air collision avoidance functionality, whilst more advanced drone systems are automating route planning for mission delivery. It's all there – so all we need to do is combine all of that in the same box massing no more than a few tens of kilogrammes, ensure it has 10-9 failure rates, make it sufficiently proof against hacking and hijacking that the chances of "unlawful interference" are negligible. At best a big ask, especially by a startup company with inexperienced engineers who have never worked on safety critical systems before, have no access to ITAR protected American military AGCAS technologies directly, and are trying to deliver it all in a couple of years. Oh, by the way – whilst an F16 pilot can eject when it all goes "worst case", and a drone can be programmed to crash into the nearest lake – these options will never be available to civilian passenger carriage.

And finally how are we going to certify all of this? Assuming that you can solve all these three major technology areas, you are then going to need to satisfy authorities that you can get all of these technologies into the same aircraft, make them work together, and meet public transport aviation safety standards all of the time and every time they fly. This might be something of a tall order for companies who invariably seem to never employ anybody who has ever certified a passenger aircraft before, nor managed an airline safety management system.

Needless to say, I'll continue to watch this sector with a mix of fascination and anger; there are individual ideas and technologies we should all support and hope to eventually use ourselves – personally I'm very excited about a new generation of light fixed wing all-electric training aeroplanes for example. But, that single seat autonomous VTOL air taxi, electrically propelled, certified for unqualified passengers – pure snake oil, and likely to remain so for years to come. •

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