ISSUE 1

Christian Aviation Network – Newsletter

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In this issue

One Millibar drop can equate to one passenger's mass in a regional airliner

Welcome to this specialized forum!

THE purpose of this and subsequent newsletters is to provide specialized information to a targeted readership. This initiative follows in the wake of steady growth of the Christian Aviation Network SA website which was launched in September 2012. Christians now have a voice in aviation after all!

This will help establish a forum for safer and better aviation practices, foster a sense of community among Christians in the aviation industry and in due course serve selected Christian missionary projects.

Christians in aviation openly confessing faith in the Lord Jesus Christ are expected to suppress convictions and opinions, or be marginalized. The tendency is world-wide and has taken root in our schools and the workplace. Aviation is no exception. Meanwhile unbelievers including scoffers, backstabbers and connivers are not only openly tolerated, but encouraged.

Scriptures like Psalm 37 remind us we do not have to tacitly accept the status quo. But, we need to "fight back" in a different way. Our way of 'overcoming' is by winning people over for the Kingdom through serving and setting the example; through excellence in business and at the workplace, by the way we treat friends and family members and last, but not least, colleagues and clients who may be downright hostile at first.

According to 1 John 5: 4 whatever is born of God, is victorious over the world. We need to uplift one another. Whilst the love of money is 'the root of all evil' we ought to realize we cannot serve the needy unless we prosper. This forum will facilitate and foster generosity towards the Lord's harvest fields whilst creating opportunities for empowering each other in terms of careers and businesses. May you be richly blessed and rewarded through your association with the Christian Aviation Network!

What's so precarious about DA?

To grasp the impact of high Density Altitude/s (DA) in soaring summer temperatures, we need to revisit the basics. Unequal heating of the earth's surface by the sun is the source of all weather patterns – remember? When a parcel of air in contact with the surface is energized through long-wave radiation the atmosphere tends to redistribute the heat.

With cooler air stationed in upper layers of the atmosphere, the heated parcel will rise, creating a kind of local vacuum or 'thinning' of the environment. The air pressure will drop, observed by a drop in the barometer reading, or QNH as aviators know it. (Continued next page)

Density Altitude - Continued

The effect on atmospheric pressure for each Mb drop is equivalent to 30 feet rise. It might not seem like much, but for an aircraft like the fifty-seat De Havilland Dash 8 the effect is like forfeiting 56 kg in terms of payload. That's equal to one bag of cement or light passenger per Millibar!

However, the real impact is due to heated air particles being further apart in any given parcel of air as ambient temperatures rise. For each Centigrade temperature increase the air thins or becomes less dense, equivalent to 118 feet rise. This might seem like "old hat" till we consult the performance graphs to see the insidious effects of high DA.

High DA can translate to 1,850 lb less useful load in a King Air 200!

A King Air 200 is for instance one of the few light commercial aircraft certified in accordance with FAA Part 23 performance requirements, actually capable of complying with the higher airline related four-segment Part 25 climb requirements. At 15 degrees Outside Air Temperature (OAT) the climb gradient would be three percent. This reduces to 2.1 percent at 25 degrees Centigrade OAT and only 1.2 percent at 35 degrees. Examining the safety performance parameters from the reciprocal perspective is even more of an eye opener. To maintain the same 2.1 percent safety margin – corresponding with 25 degrees, at 35 degrees OAT – the maximum take-off weight must be reduced to from 12, 150 lb to 10, 300 lb!

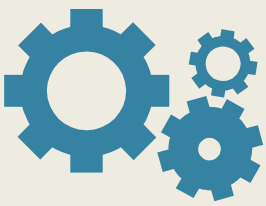
In the charter environment the 1,850 lb reduction in load carrying capacity, whether or not useful load or payload can make the difference between life and death or at best result in a flight being delayed, if not cancelled altogether! (In the next newsletter we will consider further effects of high DA on piston engine aircraft).

Tips on engine care

Shock-cooling of high-performance piston engines has often been blamed for cracked cylinder heads. Some engineers contend that might not be entirely factual, as the aero engine has been designed for sudden vast ambient temperature differences, such as flying through ice and rain.

Flying on EGT during descends might prevent cylinder cracks, but care must be taken during go-arounds

Cracked areas on cylinder crowns are often found between the spark plug and the inlet valve. This is the area where the temperature difference between the cold incoming fuel-air mixture and the hot ignition is greatest. To alleviate cracks pilots are advised to during descend and approach flight phases with low power settings to reduce the richness of the incoming mixture.



The correct mixture setting should correspond to 1300 to 1400 degrees Fahrenheit on the Exhaust Gas Temperature (EGT) gauge/s on most Continental and Lycoming engines. This practice will also reduce the risk of engine flooding due to overly rich mixture, especially on short final approach.

Care should be taken though that correct procedures for applying power are followed in the right sequence during go-around or missed approach – i.e. mixture/s forward, propeller RPM lever/s forward then throttle/s advance,

(More tips on engine care in the next newsletter).

Meet the Africa Missions team!

Meet Ron and Rina Kinnear. The couple has a knack for going in the opposite direction! Their track record shows that where people have flooded out of war-torn areas, they have actually gone INTO such conflict zones, to participate in reconstructive work from a Christian perspective.

The respectively ordained pastors head the **Africa Missions** Christian ministry north of Pretoria; they are affiliated to the AFM and in-between their missions support and oversee two Bible campuses – one in Sunnyside and one at Haakdoornboom. At 71 Ron has no plans of retiring, with the effervescent Rina, who has an exceptional gift and passion for praying, to edge him on.

Africa Missions is presently preparing for church planting in South Sudan, the youngest country on the face of the earth. If the historic development of Northern Africa is anything to go by the fledgling church there can expect fierce opposition from Islamic forces, the latter intent on rapidly spreading its influence to the south of the continent like wildfire. However, as a former principal of the Soshanguve Bible College Ron will not be leaving new converts in the lurch. He fervently believes in not merely saving a soul for Christ through evangelism, but actively maintaining ties through sound Biblical education and the raising up of church leaders within their specific areas.

Africa Missions has ongoing projects in mainly four East African countries, including the DRC, Rwanda, Uganda, Tanzania and as mentioned, South Sudan in the foreseeable future. The team has left their mark in Zimbabwe, Botswana and Namibia. But, Ron and Rina have also brought the Gospel to places like Surinam, a former Dutch colony in South America. They went there by river boat to encounter people who have never even heard of Jesus Christ. Many got saved and baptized during their visit.

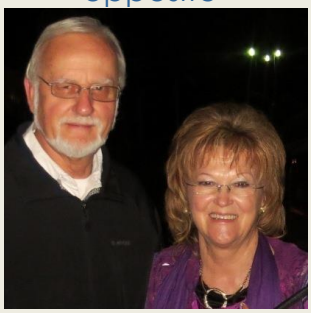
The need for revitalized aerial support was never more evident than when Ron fractured his leg during a follow-up visit to leaders in Rwanda. He suffered for hours before medical help arrived.

Rina has a God-given passion for empowering women. Her ministry **King's Daughter's of Excellence** has attracted attendees from as far as the USA. The team's work can be seen in its fruits. Do visit their website www.africamissions.org.za [More in the next Newsletter)

Soaring temps lead to 'dynamic roll-over' in helicopters'

Many helicopter accidents are attributed to 'dynamic roll-over'. One accident report describes how a pilot had lifted off safely from an airport in the morning to have a site meeting at an historic mining town. When he tried to lift off again the helicopter seemed unable to gain height. It turned 180 degrees before keeling over. The blades disintegrated. Fortunately no one was seriously injured. The pilot mentioned he could not fathom how with lighter load (after burn-off) they were unable to fly. The Bell Jet Ranger 'must have lost power' – which indeed it did, though not through a technical defect. In a nutshell the faithful Allison engine was limited by the inter-stage turbine temperature limit in the higher Density Altitude of the far hotter afternoon. The engine could not generate sufficient rotor and tail rotor r.p.m. to respectively gain lift while counter-acting torque and forces of precession. No matter how experienced you are, do not let high DA fool you!

Ron and Rina Kinnear (below) have a knack for doing 'the opposite'



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