



IN-FORMATION

NEWSLETTER OF THE DURBAN BRANCH

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NEWS AND EVENTS

Chairman's Chatter

Dear fellow SAAFA Durban Branch member, I write this in this lockdown time, with a little news and an interesting article by John Boardman.

Linda and I used to live in a "lockup and go" townhouse, which has now become a "lockdown and stay" home!

The Sunset Call

Basil Letherbarrow, a long-standing member of the SAAFA, and particularly the Durban Branch, was called to Higher Service on 16 May 2020, at the age of 97.

At the going down of the sun and in the morning, we will remember him.

New Members

We have had no members since our last newsletter.

Transfers Out/Resignations

We have had no transfers in or out of the Durban Branch since our last newsletter.

Basil Letherbarrow

Basil Letherbarrow was a longstanding member of the SAAFA Durban Branch, but he and Sybil stopped attending the lunches when they started feeling that the journey to the lunches were too strenuous for them.

Basil was born on 19 February 1923 and, in case you were wondering and I am pretty sure that you are not wondering but I am going to tell you anyway, Basil was born on a Monday.

Basil served with the Royal Air Force from 1941 to 1943 in various squadrons in England, Scotland, and Egypt.

He also spent two years with 2 Squadron (SAAF) in the Korean War. Basil and Sybil were visited annually by the Military Attaché from Korea, who always brought gifts for him and Sybil. The Koreans have never forgotten South Africa's contribution during the Korean War.

Basil was awarded the following medals:

- a. 1939–1945 War Service and Defence Medal.
- b. United Nations Korea Medal.
- c. South African Korea Unit Citation.

d. American – Korean Medal.

Basil will be remembered as a fine gentleman with a positive attitude who always seemed cheerful right until the last conversation that I had with him just before Christmas. Basil and Sybil moved to a frail care centre and had difficulty moving the Telkom line, and I could not get hold of him for his birthday in February.

Basil's legacy will remain in the SAAFA forever as he made the crosses and stand that are used at the SAAFA Congresses during the Act of Homage.

John Boardman got Basil to manufacture these and used them, without prior permission (in case it was not approved), and this ritual immediately became tradition.

Basil leaves behind his beloved wife, Sybil, his daughter and his sons.

We will miss him

Member's Accounts

We have had a 100% payment record regarding the annual fees for the past four years, so thank you to everyone! Please let us maintain this record and I implore (nice word for "beg") you to pay your subs of R120 at your earliest convenience (fancy words for "do it right now if you have not done it already"). Thank you to those members who have already paid their subs for 2020. All donations to the SAAFA Durban Branch Welfare Fund are extremely welcome!

FNB Banking Account

The SAAFA Durban Branch FNB cheque account banking details are still as follows if you feel the urgent need to make a donation to our Welfare Fund:

SAAFA DURBAN BRANCH
FNB Acacia House
Cheque Account
Branch Code: 210750
Account Number: 62604514556

Lockdown

Congress 2020. Due to the lockdown we find ourselves in, a limited and virtual Congress 2020 will take place on Friday 19 June 2020. Philip Weyers will be representing the Durban Branch. There is a possibility that the other part of Congress, which will include the banquet and awards, will take place later in the year when the lockdown situation allows it.

SAAFA Durban Branch Lunches. The lunches will remain cancelled until further notice. I suspect the criteria to start holding the lunches again will be when the restaurants are allowed to operate normally again.

What we must do in the coming months. We are moving from Level 4 to Level 3 from 1 June 2020. I need not tell you what to do since the government seems to delight in doing that job – in detail, plus you all know what to do anyway. However, I have learned from the example set by Hugh and Claire Paine (Hugh is known to people like me by his nickname of "General") who put themselves in lockdown before there was a lockdown. So, I suspect that regardless of what level of lockdown we are in, we should stay at home as much as possible and limit interaction with other homo sapiens as far as possible until we reach the, as yet undefined, new level of "normal".

Advantages of this Lockdown Period. I am sure for those people who are losing their livelihoods there are probably no advantages to this lockdown, but for others there are other advantages. I found that not eating out and not being able to travel has resulted in significant savings and weight loss. Maybe the biggest advantage is that people and businesses have found new and innovative ways to conduct their business. People are resorting to working from home

and holding video conferences. Our Church Minister holds a 15-minute service over Facebook at 06h00 every morning, and a one-hour service on Sundays at 09h00. This is handy because Linda and I watch it later as I do not want to be awake at 06h00 if I can help it! There are now six times as many people watching his sermons as the membership of our Church, and from all over the country. Necessity has accelerated the rate of innovative thinking.

High Altitude Flight

Below is an article by John Boardman regarding high altitude flight which you will no doubt find interesting. John flew Mirage IIIs and was part of the first team that brought the Mirages back from France. Later John converted to helicopters before rising to the non-flying ranks.

Note: This article was written in response to an article that appeared on Facebook that contained several inaccuracies, such as regarding the height limitation of the Mirage, "blood boiling", high altitude flight precautions and the Concorde.

(Various articles from the Internet were used as a source for this response)

Mirage Altitude Limitation

The limit for the Mir 111 is 75 000 ft. This is an engine limitation. As you are most likely aware, the idling speed of a jet engine increases with altitude, and at 75 000 ft the idling RPM of the Mirage engine is equal to the max permissible RPM. If you thus exceed this height there is a serious risk of damage to the engine.

The Blood Boiling Issue

There is a popular theory/myth that one's blood boils at these altitudes. This issue of "Blood Boiling" most likely stems from a misunderstanding (and most possibly – a "dramatization") of the "Armstrong Limit". Here is something on it:

The Armstrong limit, often called Armstrong's line, is the altitude where the atmospheric pressure is so low (0.0618 atmosphere) that water boils at the normal temperature of the human body: 37 °C (98.6 °F). It is named after Harry George Armstrong, who founded the U.S. Air Force's Department of Space Medicine in 1947 at Randolph Field, Texas. Dependant on the atmospheric conditions for the day the "Armstrong's Line," is reached at an altitude in the order of 65 000 ft. As per the definition of the "Armstrong Limit" the pressure experienced this altitude is thus low enough to make body fluids boil at 37 °C, the temperature of the human body.

Now, here is where the misunderstanding (myth) arises. Fluids in an open container will indeed boil at that temperature/pressure combination (the Armstrong Line), however, although the human body is not per definition a closed container, it is nevertheless enclosed by an elastic cover (skin), which prevents bodily fluids within the skin from boiling. Additionally, blood is enclosed within the blood vessels which is under pressure (your heart being the pump). Without going into the technical details (you can Google this) it can be stated that the resultant pressure (sum of your blood pressure and the ambient pressure) will be more than twice the ambient pressure of the Armstrong limit. This pressure is thus more than sufficient to prevent blood from boiling at 18 km (60 000 ft) while the heart is still beating. Saliva in the mouth and fluids in the lungs will boil above the Armstrong line, but blood in the veins, arteries, and capillaries will not boil. Death from vacuum exposure will occur within minutes, but the cause of death will be hypoxia – lack of oxygen – not boiling blood.

Further proof of this fact comes from laboratory experiments with animals and from NASA astronauts who have suffered rips in their pressure suits during EVA (space walks), resulting in parts of their body being exposed to hard vacuum. The result was some local swelling and discomfort, but no boiling blood.

I hope this clarifies the "blood boiling" myth.

Radiation Risk

Our planet is bombarded with radiation from outer space, however, our atmosphere protects us from this hazard. As the air becomes less dense at altitude the level of protection decreases and at high altitudes (50 000 ft and above), radiation becomes a factor to be considered. As the Mirage would not exceed 75 000 ft and only be at that altitude for a short time, the radiation risk was deemed to be minimal. Nevertheless, the white leather overall we wore was coated with crystals to minimize the radiation penetration.

As a matter of interest, radiation was one of the factors that operators of the Concorde had to take into consideration. More on the Concorde follows later in the article.

The High Altitude Kit

During the latter part of the conversion course in France we each did 2 high altitude flights with the rocket motor installed (more on this later). As we would be reaching altitudes exceeding 50 000 ft during these flights it was thus SOP to wear the high-altitude kit for these flights.

The "Kit" in fact consisted of five layers of clothing. First of all was a set of full-length white cotton "long-johns", then a white silk ventilation suit lined with flat perforated tubes through which cold air was blown to keep the pilot cool (mainly to cater for a "Cockpit Standby" situation). On top of this came the partial-body pressure suit looking much like a corset with bladders therein and a metal airtight ring for the neck piece, to which the helmet was attached, with thin steel cables holding it down to the suit. Then came the half G-suit, and over everything the white leather overall. The leather suit was impregnated with some silver type crystals to protect against ultraviolet radiation at high altitude. There were three holes in the leather overall, one on either hip, and one in the front. These were for the G-suit connection (LH side), pressure suit (RH side), and cooling air (front).

In addition to the above you had to wear special gloves and boots. These were so designed as to prevent them from being lost in the slipstream you would be subjected to in the event of a high speed ejection. The ejection seat had two built-in bottles to act as reservoirs for oxygen and compressed air. In the event of an ejection at high altitude only the drogue chute of the seat would deploy (to stabilise the seat) and you would "free-fall" with the drogue. During this period the two reservoirs in the seat would keep your life-support systems (pressure suit and oxygen supply) functioning. At approximately 18 000 ft you would then be separated from the seat and the main chute would deploy.

Fitting the Kit

Each pressure suit had to be altered/fitted for an individual pilot. There were various standard sizes, but they had to be adjusted to "fit like a glove". We went to a facility near Paris to be "kitted out" with the pressure suits (I think that it was their equivalent of our MMI). We were given a talk/lecture on the suit and then started the long process of the actual fitting of the pressure suit. The adjustments to the "laces" down the back and the full length of each arm & leg of the corset type took some time to alter, then partial inflate the suit - then check for marks on your body - then deflate and carry on to the next adjustment. After all the adjustments had been made the suit was fully inflated and checked that the knots in the laces were secure and did not slip.

Decompression Chamber "Ride"

The next day we were back there again - this time for a "ride" in the de-compression chamber with the kit on. It was a chamber of approx. 2x2x3 metres with a mock-up of an ejection seat in the middle. This chamber was connected via a (approx. 1 metre) butterfly valve to a much larger chamber. Fully kitted out you were strapped into the seat and all the different connections connected - this would now simulate a flight in an actual seat. A check was done to see if the suit connections were "OK" and that the intercom to the observers/operator's stations was working. The door was closed, and door seal inflated. There were a few portholes in the sides for observers on the outside.

Both chambers' pressure was individually lowered. The pressure in the "cockpit" capsule was slowly lowered in order to simulate the differential cockpit pressure in a climb up to 35 000 ft, while the pressure in the large capsule was being lowered simulate an altitude of 80 000 ft plus.

There was thus a large difference in the two pressures. You were then asked to give a “thumbs-up” to the observers – the butterfly seal then was fully opened so as to simulate an explosive decompression in the capsule. The suit inflated immediately (the air around you was briefly “cloudy” due to the sudden pressure drop. (The “cockpit” capsule was now at an atmospheric pressure height in the region of 80 000 ft.) You were then given some time to get used to the pressure suit. Thereafter the pressure in both capsules was slowly increased until equal to ground atmospheric pressure. A de-brief then followed. None of us suffered any after-effects.

Mirage 111 “Rocket Ride”

The Mirage could be fitted with a rocket motor pack that was installed rear fuselage fuel tank bay (the fuel tank had to be removed). This pack consisted of the rocket motor and a tank to hold nitric acid (300 lt) plus a small container with igniting fluid. It would burn for approx. 80 secs. Here is a picture of the static ground test just after it was installed.



The sortie consisted of a max afterburner (Post Combustion, or PC) climb to +/- 36 000 ft (this height was determined by the height of the tropopause on that day). Then a max PC level acceleration to Mach 1,6. On reaching M1,6 the rocket motor was ignited (it gave you a nice kick as at that altitude the rocket motor virtually doubled your thrust) then pulled up into a 25 to 30 degree climb maintaining M1,7 (the rocket motor had fuel for approx. 80 seconds). At this stage the rate of climb was in the order of 20 000 ft/min. The altimeter was "spinning" rapidly so that any altimeter reading would suffer from "lag" - thus altimeter readings were unreliable. During the two flights that I did I had reached approx. 61 000ft when the rocket motor quit still indicating M1,7. with an Indicated Airspeed (IAS) of approx. 350 kts and still in a 30 degree nose-up attitude. At this stage my attention was diverted to the wonderful view of a distinctly curved horizon and a dark sky, I thus cannot confirm what the ultimate height was that I reached, but it must have been in the order of 70 000 ft.

The deceleration process would then commence followed by the descent and recovery back to the Base - all under positive Ground Radar control. The total flying time (chock to chock) for each my flights was 35 mins. If you consider that we had to taxi a long way (at least 3 km in total), the actual “brakes off” to “touch-down” time would have been in the order of 25 mins.

(Note – At full power with max afterburner at Mach 2 the Mirage burns approx. 4 lt/sec AVTUR i.e some 240 lt/min – this means that it would suck a 200 lt drum of fuel dry in less than one minute .

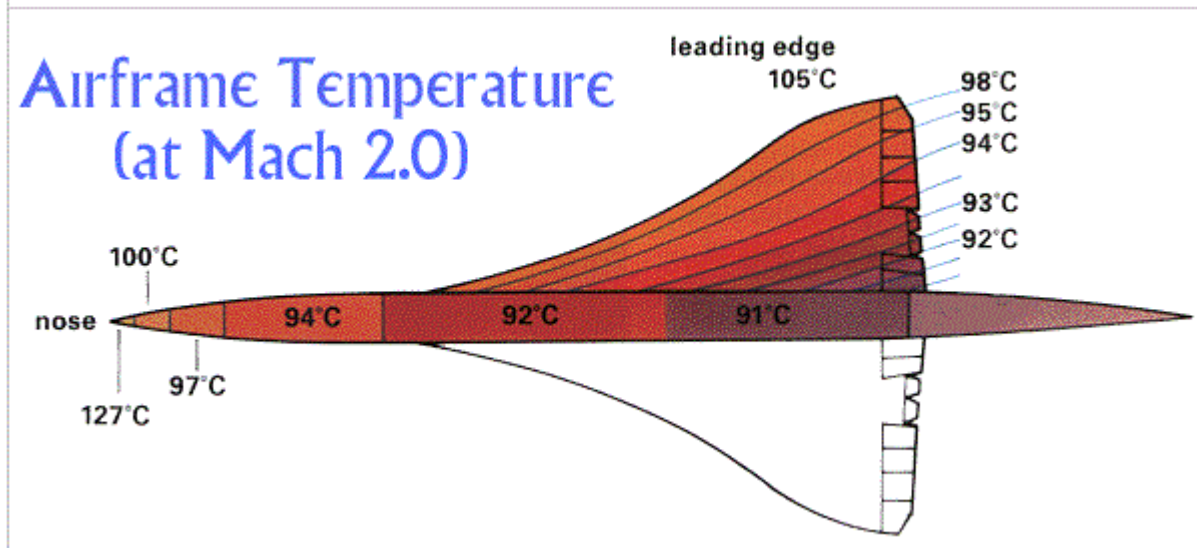
Although the SAAF purchased the rocket motor packs they were never used in the RSA. They were of minor operational value due to the limited radius of action and were a technical nightmare

to operate and maintain.

The Concorde

The designers of the Concorde faced some real challenges in their quest to design this SST. One of the biggest problems they faced was that of the impact heat generated at high Mach numbers and the materials available to withstand this heat. In the end they decided on a Mach 2 aircraft.

The diagram below shows the temperature of the aircraft skin at Mach 2:



Concorde measured nearly 204ft in length and stretched between 6 and 10 inches in flight due to heating of the airframe.

Another fact that they had to contend with was that of the progressive rearward movement of the centre of lift as the Mach No increased from Mach 1 upwards (caused by the progressive rearward movement of the shock-wave on the wing as the Mach no increases). This would result in a nose-down pitching movement which would have to be countered with a rearward movement of the control column, (Note – to maintain level flight at Mach 2 in a Mirage 111 you used nearly 60 % of the available rearward movement of the joystick). The resultant upward movement of the elevons would increase the drag considerably. This problem in the Concorde was overcome by pumping fuel into a rear “ballast” tank. The centre of gravity of the aircraft would be moved up to approx. 2 metres to the rear (dependant on the Mach No) to maintain level flight without elevon input.

Another factor that they had to contend with was the risk of radiation.

Concorde's high cruising altitude meant passengers received almost twice the amount of extra-terrestrial radiation as those travelling on a conventional long-haul flight. Upon Concorde's introduction, it was speculated that this exposure during supersonic travels would increase the likelihood of skin cancer. Due to the proportionally reduced flight time, the overall equivalent dose would normally be less than a conventional flight over the same distance. Unusual solar activity might lead to an increase in incident radiation. To prevent incidents of excessive radiation exposure, the flight deck had a radiation meter. If the radiation level became too high, Concorde would descend to a safe “Radiation Height”.

Editor: Thank you very much John – much appreciated!

CONCLUSION

On behalf of Linda, myself, and the SAAFA Durban Branch Committee, I wish you all well in these uncertain, but interesting and hygienic times.

Finest SAAFA greetings,

Steve Bekker
Chairman SAAFA Durban Branch

Disclaimer: The views expressed in this newsletter do not necessarily reflect the official views of the SA Air Force Association