Bruce Taylor (Edinburgh University Air Squadron 1960-63)

We can all be foolish in our youth. It's much better to be foolish in your youth and discover wisdom in your old age than the other way round! – Lord Tebbit.

I was delighted to find that Keith Dunbar had set up an EUAS website, and I'm happy to contribute a few personal reminiscences and anecdotes of my days as a cadet pilot. I had the privilege and pleasure of flying with the squadron from 1960 to 1963. After all these years I doubt if any former EUAS members remember me, unless it is as the radio chap who set up VHF receivers in our Turnhouse and summer camp crew rooms to allow us to listen in to the aircraft-tower R/T.

Sunny summer camp at RAF Hullavington in June 1961

For Turnhouse I remember that I converted a WWII R1392 to VFO operation, so that it could be tuned to any aircraft VHF channel without a batch of expensive quartz crystals, and installed a modified omnidirectional ground plane antenna from a *Rebecca/Eureka* PPN-2 beacon transponder on the roof of the main C hangar there. For our squadron open days, I hooked the receiver up to a PA system that I had home-

brewed with the big Marconi PT15 output valves and bulky 1200v power supply from the famous Lancaster T1154 transmitter. This allowed one of our flying instructors to give the spectators a continuous running commentary while performing his aerobatic display, much to the irritation of Air Traffic Control!

For the summer camps I provided an STC TR1985 (the same type of set as that fitted in our Chippies), with the transmitter section and 24v dynamotor replaced by a mains power supply and audio output amplifier. However, that supply wasn't rated for continuous operation, and with the noisy cooling fan disabled it suffered a meltdown in the crew room at RAF Chivenor after someone forgot to switch it off overnight!

Happy days at Drip Bridge training camp

Before joining the UAS I had completed an ATC course flying Slingsby Kirby Cadet gliders at RAF Kirton in Lindsey, and enjoyed a marvellous RCAF reciprocal visit to Canada and two radio/radar familiarisation courses at RAF Locking. I also completed a training course at Drip Bridge Camp near Stirling, in which we learned how to use a number of river craft including the flimsy Mk. III collapsible canvas-sided boats that you see attempting the assault over the Lower Waal River in *A Bridge Too Far*. Unlike the courageous paratroopers of the ill-fated Operation Market Garden, we had paddles instead of just rifle stocks to propel them.

Since I held an amateur radio licence, I was keen to operate the superb headquarters station of the RAF Amateur Radio Society at Locking, but when I visited the station building I found it unmanned and locked up. The ATC officer who accompanied me considered this to be an appropriate initiative challenge for a young cadet, and encouraged me to make an entry through an open fanlight above the main door.

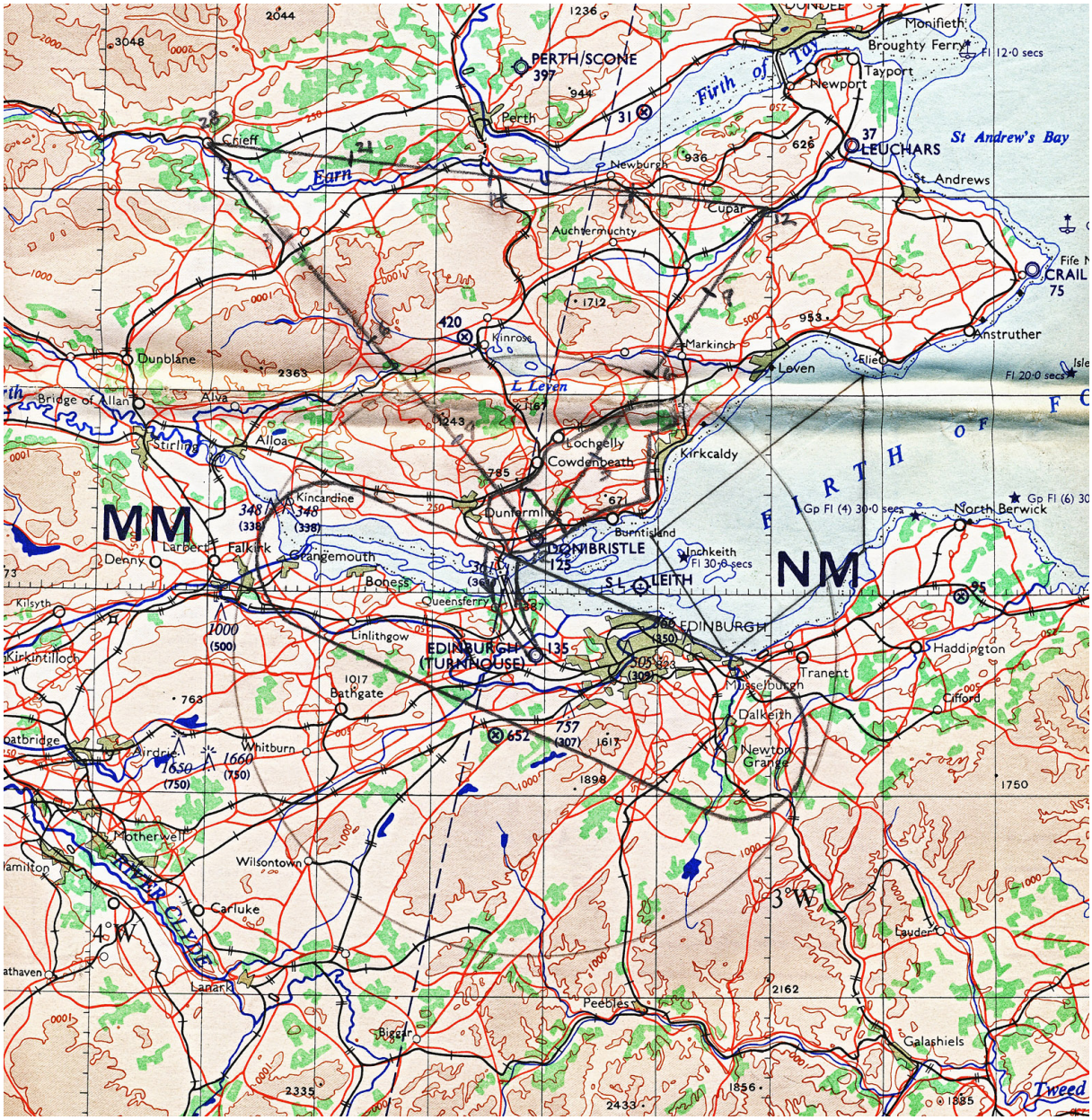
Once inside the station I fired up the equipment, which had the luxury of separate high-power 813-PA transmitters and fine antennas for each HF band, and enjoyed several excellent DX QSOs using the station's rare G8FC call sign. I duly recorded these contacts in the station log and wrote out the QSL cards, before beating a retreat before any red MP badges showed up to put a stop to the fun.

As an ATC flight commander, one of my duties was to drill the cadets on the station's large parade ground. After half an hour of this square bashing, the officer in charge allowed the cadet NCOs to get their own back by instructing them to drill me instead. It was a salutary experience to discover how difficult it can be to execute random orders that are given at the wrong time on the wrong foot!

We had a fair amount of shooting practice at Locking, with a range of weapons including Bren guns as well as classic 0.303 rifles. In those days no ear protection was provided, and after an hour at the range we found it nearly impossible to hear the sound track of the instructional films at the stack (station cinema) that followed. So it's fortunate that later in life I never needed the information about how to survive after a forced landing in the desert or the Arctic, or what to eat and what not to eat in the jungle. It's no wonder I suffered premature hearing loss in later life, which is quite a severe social handicap. When firing Sten guns, it wasn't unusual for these primitive ultra low-cost weapons to jam. Since the Sten barrel is very short, and the gun is fired from the waist, cadets at the shooting range had a tendency to turn around without thinking when their weapon jammed. Fortunately those who were then directly in the line of fire dropped to the ground before the jam cleared!

I first flew solo in a Chipmunk at RAF Hullavington in June 1961, which is when the fun really began. I also greatly enjoyed the subsequent summer camps at RAF Valley in 1962 and RAF Chivenor in 1963, as well as the Christmas and Easter camps at RAF Turnhouse, and our temporary operation from East Fortune during runway work at Turnhouse. It was in Trenchard Block at Turnhouse that I first enjoyed private billeting and being awakened by a batman with a cup of tea each morning, although it must be said that the quality of the tea left something to be desired! Perhaps this was part of what was meant by UAS cadet pilots having the status and privileges of officers, but not the rank.

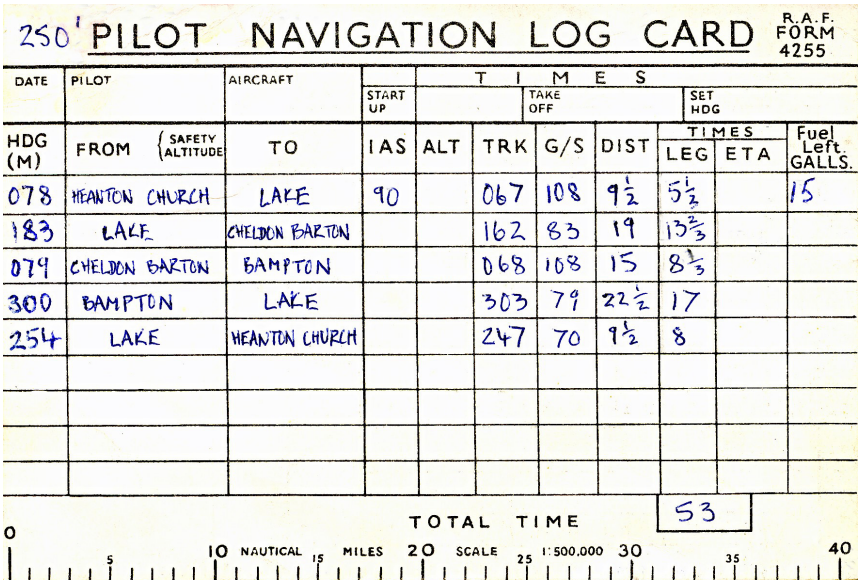
The first photo shows some of us relaxing in the summer sunshine at Hullavington, while revising such unpronounceable checklist mnemonics as MFFHHB (My Fat Friend Has Hairy Balls; for Mixture, Fuel, Flaps...) and waiting for the next friendly raid by the rival Bristol UAS boys. They were caught out by having unwisely boasted of their mischievous plans in careless chat with an officer in the mess bar, unaware that he was one of our flying instructors from Edinburgh! *Praemonitus Praemunitus* is the perceptive motto of the RAF Intelligence Branch, so they never got to carry out their plot to remove the wheels from our cars.



Among my early souvenirs I also found my 1960 RAF 1:500,000 chart for the area around Turnhouse, marked up to show the control zone and the unrestricted airspace allocated for our aerobatics and forced landing practice over in Fife. The chart also shows the routes to and from that zone, keeping the Forth Bridge on our left in both directions. The Donibristle-Cupar-Crieff triangle on the chart was a typical short cross-country circuit. My log card for that flight reminds me of how the little 145 hp Chipmunk had to struggle against even quite minor headwinds. Flying at a constant IAS of 90 kts, the calculated ground speed was 115 kts on the Crieff-Donibristle leg and only 64 kts from Cupar to Crieff.

On some sorties my gliding experience proved useful, for the thermals over Grangemouth oil refinery (and later Kincardine power station) provided a welcome boost to the Chipmunk's modest rate of climb. (Over 7 minutes to 5000 ft)

Here is another old log card for a short cross-country circuit from RAF Chivenor. This one was to be flown following the terrain contours at 250 ft AGL, while avoiding scaring the mink in the nearby farms, which we were told could cause the adults to eat their young. Today I'm astonished that an inexperienced cadet pilot like me was allowed to do that kind of low flying, solo over an unknown route near populated areas!



250' PILOT NAVIGATION LOG CARD R.A.F. FORM 4255

DATE	PILOT	AIRCRAFT	TIMES: START UP	TAKE OFF	SET HDG					
HDG (M)	FROM (SAFETY ALTITUDE)	TO	IAS	ALT	TRK	G/S	DIST	TIMES LEG	TIMES ETA	Fuel Left GALLS.
078	HEANTON CHURCH	LAKE	90		067	108	9½	5½		15
183	LAKE	CHELDON BARTON			162	83	19	13⅔		
079	CHELDON BARTON	BAMPTON			068	108	15	8⅓		
300	BAMPTON	LAKE			303	79	22½	17		
254	LAKE	HEANTON CHURCH			247	70	9½	8		
								TOTAL TIME	53	

0 5 10 NAUTICAL 15 MILES 20 SCALE 25 1:500,000 30 35 40

Our COs (in my period Sq Ldr George Doak, succeeded by Wg Cdr Mike Bradley), our flying instructors, and my fellow cadets were all fantastic people, and it was a great privilege to fly with them. Our CFI was a remarkable navigator, both in the air and on the sea, and his eagle eye could spot other aircraft when they were only tiny specks anywhere in the sky. He was also a serious professional who followed all the rules very strictly. I remember when he refused to let me take off just because a little red thread was missing from the left canopy panel jettison lever!

Some other instructors had a more cavalier style. During my period with EUAS, Ferranti had a ground radar at Turnhouse but the Tower did not, although it did have a CRT VHF direction finder (now called VDF). So we regularly practised QGH approaches in clear weather, to be ready to descend through cloud when necessary. Part way through one such exercise, the Tower announced rather sheepishly that they had unfortunately forgotten about us, and could we please let them know where we were now? My instructor answered their question by taking control and making a screaming 173 kts descent over the Tower, pulling out from the power dive right in front of the big glass windows!

Spirited high jinks were pretty common in the Turnhouse bar at that time, and these were tolerated as long as the cost of repairing any damage was put on our mess bills. In retrospect, using the metal flotation ball from a toilet cistern for an indoor rugby game proved to be rather an unwise idea, especially because the mess suffered a severe fire just after many of us had contributed to the cost of having it renovated.

The Turnhouse VDF was a boon when anyone got lost above cloud, since (due to the extra weight of its radio) the RAF version of the Chipmunk carried only 18 gals of fuel, instead of the 24 gals of some civil variants. But sometimes the VDF was out of action, and had to be replaced by a vintage rotating H-Adcock system housed in a mobile caravan. In WW2, the 10-second signal procedure used by Dönitz' U-boats had been largely defeated by fast British DF operators. But it took some time to get a bearing with the manually operated equipment, and the Turnhouse operator was sometimes frustrated by our snappy R/T transmissions. Little did we know that in approaching Runway 26 we were flying near a secret underground Sector Operations Centre below Barnton Quarry! In 1964 a smaller Royal Observer Corps two-level bunker was constructed near the entrance to RAF Turnhouse, and this remained in service until the end of the Cold War.

In 1962 RAF Valley had a Precision Approach Radar (PAR), which gave me my first experience of flying a Ground Controlled Approach (GCA). This was done with me wearing a hood to simulate IFR conditions, while a QFI in the rear seat kept a visual lookout that I wasn't flying a crazy path into some obstacle. Later I spent some time in the PAR cabin to see the ground controller end of such a talk-down. The Bendix GCA units of that period used electronic valves, which generated a lot of heat. So the operators kept the radar units pulled out from their housing cabinets, so that they would run a little cooler for increased reliability.

The main runway at Turnhouse at that time, which had been extended from 3900ft to 5900ft in 1953 to accommodate the Vampire FB5s of 603 Squadron, was 13/31 (now 12/30). This wasn't well oriented relative to the prevailing wind direction, which was frequently a problem for our Chippies since we weren't allowed to take off or land with a crosswind component of over 15 kts. So instead we often used the shorter runway 26/08 that crossed over the main one. As large civil airliners and the Ferranti jets had to use the longer runway, and the approach speeds of these aircraft were much higher than ours, some agile air traffic control was required to avoid an *Angels One Five* type incident at the intersection! It was also very important to maintain a time delay between the takeoff and landing of heavy aircraft and our Chipmunks, since dangerous invisible wingtip vortices could persist for several minutes, and could drift downwind from one runway to another.

The new 8400ft main runway at Turnhouse, which was completed by BAA in 1977, is almost parallel to the older short one but well to the north west of it. The asphalt of the former 26/08 runway is now used only for vehicle parking and helicopter operations. The RAF finally left Turnhouse in 1997, and for many years our hangar served as a cargo centre, but it has now been demolished.

When planning a flight, we normally allowed a minimum fuel reserve of 45 minutes, which seemed to go rather quickly when I was lost (which did happen more than

once, especially when cloud closed in when flying to RAF stations that didn't have coastal landmarks). Before takeoff, it was very important to check that the small holes in the sides of the fuel tank vent fairings on top of each wing were clear. In the case of a blockage, which could also be caused by icing, fuel could be syphoned out of the tanks after inverting the plane during aerobatics. Since the fuel then escaped from a vent slot underneath the fuselage it was invisible to the pilot, and the only indication of this problem was the abnormal rate at which the fuel gauges were decreasing.

In those carefree motoring days before MOT testing, speed limits and seatbelts, old cars were often passed down from one generation of Edinburgh students to the next. One baker's van with chain drive to a single rear wheel, and very mediocre brakes, had been on the road since the 1920s. My own ride was a dilapidated 1937 Series I Morris 8, purchased for the £25 that I had earned felling trees as a summer job. I recall that I was the object of a full Holland House meeting and severe reprimand, after naively rebuilding its oil-soaked 23 hp side-valve engine on the pristine lawn in front of that prestigious new university hall of residence! I also got into trouble after I strung a Windom long wire HF band antenna all the way from Holland House to Salisbury Green. Didn't I understand at that young age that you have to ask people in authority before you go ahead with such wild schemes? To make the antenna invisible I had used rather fine wire for it, but as a result it failed to survive a gale that hit the Pollock Halls, and it entangled some vehicles on the ground when it fell.

With my hard-earned lumberjack pay I also bought a Mk.2 Model 8 Avometer and an Elora half-inch square drive socket set via a discount scheme brokered by RAFARS, the RAF Amateur Radio Society, and both items are still valued possessions. The AVO was the Rolls-Royce measuring instrument of its day, and still works perfectly but is now a collector's item as it has long since been surpassed by more modern technology. On the other hand the socket set, made from superb German steel, still retains its utility and has suffered no deterioration in more than 55 years of use and abuse. Who can honestly say that they've never used a screwdriver as a chisel, or hammered a socket as a bushing drift?

In 1961 I was roped in to provide a mobile PA system to lead the Students' Charity Procession at the end of the annual Rag Week. Since the EUAS Open Day gear was too bulky for this, I fitted the Morris 8 with a powerful ex-RAF transmitter modulator converted with a low impedance output transformer. On the roof rack of the car I mounted four "real" Tannoy horns (in RAF parlance, all PA systems were called Tannoys!) borrowed from the West Lothian Education Authorities, plus a superb horn loudspeaker lent me by Greigs, an electrical factor in Bathgate. On entrusting me with this loudspeaker, Greigs exhorted me to take great care of this expensive item. With the drag coefficient presented to the headwind by the huge forward-facing horn, the journey along the A8 back to Edinburgh was particularly slow!

While I was inside the Charities Office finalising the plan for the procession, I heard a huge bang from my car parked outside, and was horrified to see smoke pouring out from the precious horn. Some student prankster had popped a lighted squib into it, so that the firework had exploded right inside the long narrow neck and blown the hemispherical diaphragm outside in. In spite of this the PA system still performed fine, as gauged by the range at which the people lining the streets could be seen laughing at my bawdy jokes. I will never forget the experience of turning my dilapidated jalopy from North Bridge into a Princes Street that had been totally cleared of traffic by the police, and that was lined five deep on either side by hundreds of expectant spectators. But my face was very red indeed when I returned the damaged horn to Greigs the following week.

As a keen radio amateur I had equipped the car with VHF transmitting gear, which took up the entire rear seat area. On one drive out from Edinburgh to our temporary base at East Fortune I was intercepted by a police car, since the officers thought the transmitting antenna looked very suspicious. They accepted my explanation that I was "listening to aeroplanes", and correctly pointed out that I was doing a continuous sideslip because the rear wheels of my car didn't track the front ones. (I discovered that a previous owner had replaced one leaf spring with that from a different model). After fixing that, the car scraped through the MOT when testing started in 1961, and I drove it down to RAF Hullavington, and then to London and back, with very few mechanical problems. My maximum indicated speed on the recently opened Preston By-pass was about 45 mph, and I was very envious of the mess bar tales of better-heeled cadets, who related how the slipstream folded back their MG wing mirrors above 100 mph on the A1.

On the Sunday break on 25 June during our summer camp at RAF Hullavington I also attended the 1961 RSGB Mobile Rally at Longleat House in Wiltshire, with talk-in by G3GYQ/A on 144.15 MHz. At the rally I parked my Morris 8 in the grass fields among the dozens of other participating vehicles. On returning to the car after the event I opened the door, sat in the driver's seat, but was then surprised to find that the ignition key wouldn't turn in the switch. Then I noticed that my radio transmitter was missing, and it finally dawned on me that I was in someone else's car! All Morris 8s of that vintage were exactly the same blue/black colour, and the door locks were so worn that apparently they could be opened with any similar key.

One day I discovered that the special VHF antenna on the roof of the car had been completely flattened. At first I suspected vandalism while the car was parked in the driveway of our house, but eventually my dad admitted that he had taken the Morris 8 to his golf club to show off this antique vehicle to his mates! I was amused to learn that he'd planned to do this without my knowledge, but was caught out by forgetting that the private road to the clubhouse passed under the Edinburgh-Glasgow railway through a tunnel with very low headroom.

1961 was a very exciting year for amateur radio, with the launch of the first amateur satellite from Vandenberg Air Force Base on December 12, exactly 60 years after Marconi first spanned the Atlantic by wireless. This was the very first private non-military satellite, and the first secondary payload to be launched into its own orbit from a rocket. Many years later it was revealed that the amateur satellite launch was approved as it provided a good cover story for the primary payload, which was a secret CIA Corona 9029 spy satellite! Along with 570 other amateurs in 28 countries, I spent many late nights tracking the satellite by doppler shift and recording the telemetry on 144.983 MHz.

Around this time, our Chipmunks started to be equipped with dayglow fluorescent panels. This material was very expensive then, and the offcuts were much in demand by EUAS members with motorbikes, who also appreciated the RAF issue bonedomes. (A reversal of the early days of flying, when many pilots adopted leather motor-racing helmets as head protection)

Later I borrowed money from my generous father to invest in a new Ford Anglia 307E van, bought for £379. (At the time, commercial vehicles were not subject to purchase tax, which made them very much cheaper than private cars). A few hours' work with a Monodex steel sheet nibbler allowed me to fit large side windows, transforming the van into a very practical estate car, in which I toured much of Europe for eight years with youthful joy and no serious technical problems at all.

When visiting Paris in the early 1960s it was relatively easy to park in city centre streets, and I usually stayed in rundown ultra-cheap hotels in the side streets just off the Champs-Elysées, such as the Rue Washington. Today parking in that area is a nightmare, and the hotels have been renovated to a standing quite beyond my means. Having decided to visit the Palace of Versailles, I innocently swept my van through the imposing golden entrance gates past the gendarmes and bumped across the uneven flagstones up to the main entrance, oblivious to the frantic shouting and blowing of whistles by the guards that were pursuing me. Today I think they would simply have opened fire... Well, why were the gates open if naive youngsters like me weren't supposed to drive in there?

In those days, crossing between European countries often involved rather thorough customs checks, as well as passport controls and currency exchanges. Italians could be particularly rigorous, and one official wearing a uniform like a 5-star general insisted that the transmitting gear in my van required a special import carnet. Another Italian customs officer spent a long time examining the short wave communications receiver mounted under the dashboard, although this inspection appeared to be an excuse for admiring my girl friend's legs. The solution was to go around to enter the country via another border post manned by less zealous officials.

On returning to Dover I was frequently interrogated by customs officials about whether I had done any repairs to my car while abroad. I wasn't charged duty when I once replied that yes, I had repaired a puncture in Besançon! They also asked whether I had bought any goods such as a new camera while touring in Germany, but such questioning was rapidly dropped when I showed them the 1920s Kodak 1A that was the only camera I possessed at the time.

The first section of the *Autoroute du Sud* from Paris had recently been opened, but I wasn't aware that no fuel stations had yet been built on it. Having omitted to fill up before leaving Paris for Lyon, I soon ran out of petrol and had to pull over. I was very relieved when a friendly French family in a 2CV stopped to help, and took me to a nearby country village where we found an old shop that sold petrol in bottles for use by mopeds! I was very touched when they explained that they were happy to give assistance to a British boy and girl in a GB car because they remembered how their spirits had been lifted by listening to the BBC during WW2.

My vehicle GB plate actually read "GB Ecosse", and that attracted even more convivial attention. It wasn't unusual to find that a Frenchman had left a note such as "Vive l'Ecosse!" on the windscreen. In memory of the *Auld Alliance*? But after moving to a new job in Geneva, I found that a RHD converted van was unsaleable there and gave it away to a young hitch-hiker, who drove it back to her home in the UK and ran it for three more years before it finally succumbed to the tin worm.

While at RAF Valley in 1962 I received an invitation to a Royal Garden Party at Holyrood Palace, to be held on Saturday 30 June. So as soon as our EUAS summer camp finished, I grabbed some sleep and set off at 4am to get to Edinburgh in time for the event. But I arrived in no state to be presented to Royalty in uniform, as I hadn't had a haircut for weeks! I made it to an Edinburgh hairdresser's shop just in time, but some of the Scottish nationalist customers were not enthusiastic when the barber told them why he was allowing me to jump the queue.

My meeting with Queen Elizabeth and the Duke of Edinburgh was very memorable. Considering that dozens of people at the garden party were being presented to the royal couple, it was remarkable how the Queen engaged personally with me, and showed such sincere interest in what kind of RAF training I was doing and where I was flying. British Pathé filmed the event, but insisted on calling the venue Holyrood "Castle". The Sassenach cineaste must have confused it with the ruder edifice at the opposite end of the Royal Mile.

I had only previously seen the Queen on Movietone cinema newsreels, and was surprised by how short she seemed when met in real life. This was before my bones were ravaged by osteoporosis (yes, not uniquely a women's problem), and at the time I was much taller than I am today. In fact, I had been one of the squadron

members that were advised not to wear a bonedome when flying the Chipmunk, since there wasn't adequate clearance from the cockpit canopy.

Although the Scottish nationalist movement wasn't strong at the time, the first Edinburgh pillar box to bear the EIIR cypher had been blown apart by gelignite (Queen Elizabeth I never having ruled over Scotland), and the pirate Radio Free Scotland station came on air frequently after BBC TV broadcasting finished with *God Save the Queen* around 11pm. To avoid detection, the RFS transmitter was moved from one location to another between broadcasts, and with the assistance of cadet friends I had some fun tracking it down. We had no political motive in this whatever, but enjoyed the technical challenge and had a suspicion that when we located the transmitter we might find that the person operating it was actually someone that we knew! (Since he passed away back in 2006, I think that I can now reveal that it was indeed the work of a fellow radio amateur called David Rollo, GM3GRG)

To get a fix on the transmitter with only one receiver we had to take bearings rapidly from different locations, and to receive the transmissions in my van I again used ex-RAF WW2 equipment. At the time, the Central Scotland BBC TV transmitter at Kirk o'Shotts operated on Channel 3, with a sound carrier frequency (that was pirated by RFS) of 53.25 MHz. This was nicely within the 50-65 MHz tuning range of the RF26 front-end unit for the Mk.2 Gee system that was used by Bomber Command from early 1943. It had an IF output within the range of the Heathkit GC-1U shortwave receiver in my van, and could be driven by a vibrator power supply running from an auxiliary ex-WD 12v vehicle battery behind the driving seat. For taking bearings at night, I used the superb Kelvin & Hughes 06A illuminated compass that was carried on board the Stirling bomber and other aircraft.

The whole RFS cat-and-mouse game was pursued with much good humour, and was the source of a great deal of fun and enjoyment. One of the amusing incidents was when a local policeman ran up to my van while we were taking bearings in the centre of Broxburn. With the elaborate direction-finding aerials on the roof of the van, and the sound of RFS playing *Scotland the Brave* blaring from the receiver inside the vehicle, it wasn't surprising that he thought that we were Radio Free Scotland rather than its hunters. And the cheerful Scots bobby left us with the impression that if we had really been operating the pirate station he would have encouraged us rather than booked us in for illegal broadcasting!

One of the less appealing features of the Chipmunk was that its Gipsy Major engine was not very powerful, and made a sound rather like an agricultural tractor. If only we could have started our EFT on Jet Provosts! Since the engine hadn't initially been designed to be mounted upside down in a fuselage, it also burned oil voraciously. But muzzled to 2675 rpm it had a very long TBO for a piston engine, and our hard-working ground crew did a marvellous job of keeping our Chippies in good shape.

During my time with EUAS there were only two serious incidents that could be attributed to maintenance. The first was at RAF Valley in 1962, when a cadet flying dual experienced engine failure shortly after take-off. Runway 19 there is directed towards the sea, and we all had rides in the Sea King that hovered nearby, ready to pick up anyone who had the misfortune to come down in the drink. The Chipmunk Pilots Notes stated laconically: "Owing to the fixed undercarriage it is expected that the ditching behaviour will not be good." (Later documentation explained that the plane flips over on its back). But in this case the instructor brought the Chipmunk round sharply and touched down skilfully on dry land. The subsequent inquiry revealed that the engine failure had been caused by a stripped screw thread allowing air to enter the fuel filter. The de Havilland service schedule specified that the filter had to be cleaned out after each 30 hours flying or every 7 days, provoking a failure that could almost be attributed to over-maintenance.

The second engine failure incident, which occurred near RAF Chivenor on 4 July the following year, led to a forced landing in a field. The dead stick descent was well executed, but in still air the Chipmunk requires about 300m to land safely from 50ft altitude. Fields in the English countryside tend to be smaller, and that aircraft (WZ857) had to be written off after it overran into a hedge. Fortunately there were no fatalities.

It was also at Chivenor that I had my first experience of flying a private light aircraft with a tricycle undercarriage, a generous reward for repairing the plane owner's VHF radio. Of course we also practised roller landings with our taildragger Chipmunks in crosswinds, but I always found it very satisfying when a three-point landing worked out perfectly (and most unsatisfying when it didn't!). Owing to the presence of No. 4 Flying Training School, RAF Valley was very busy with jet fighter pilots doing short flights and circuits. To avoid costly errors, the trainee pilots were encouraged to call out "Three greens – landing gear down and locked" on the R/T. I recall one cheeky EUAS pilot joining in by reporting "landing gear down and riveted!" on finals.

Many private planes aren't aerobatic, and have no parachutes and just diagonal seat belts like a car's. But the visibility through their bubble canopies was infinitely better than through the Chippie's greenhouse style. With our Mae Wests, RAF parachutes and full cockpit harness, we were trussed in a plethora of straps and buckles. In practice bailouts on the ground, a QFI would use a stopwatch to time students from a "Jump" instruction to their leaping from the trailing edge of the wing. Although this was just a hangar exercise, I recall one cadet opening the canopy, disconnecting the R/T, but then panicking when he found he couldn't raise himself, not realising that he had omitted to turn the cockpit harness locking lever. One wonders what would have happened in a real emergency.

Our flying instructors followed the spirit of Robert Smith-Barry's *Gosport System*, taking our unbreakable Chippies to their limits to inspire an attitude of "informed fearlessness". At a safe altitude, instructors occasionally treated us to a simulated dogfight, showing how you could throw a pursuing plane off your tail by very tight turns. But we were high-spirited boys, just out of school, and sometimes crossed the line of acceptable behaviour. The cadet pilot who had fun beating up his old school on a solo flight found the CO waiting for him on the tarmac when he returned to dispersal. Didn't he foresee that the headmaster would telephone Turnhouse to ask why a small aeroplane appeared to be dive-bombing his academy?

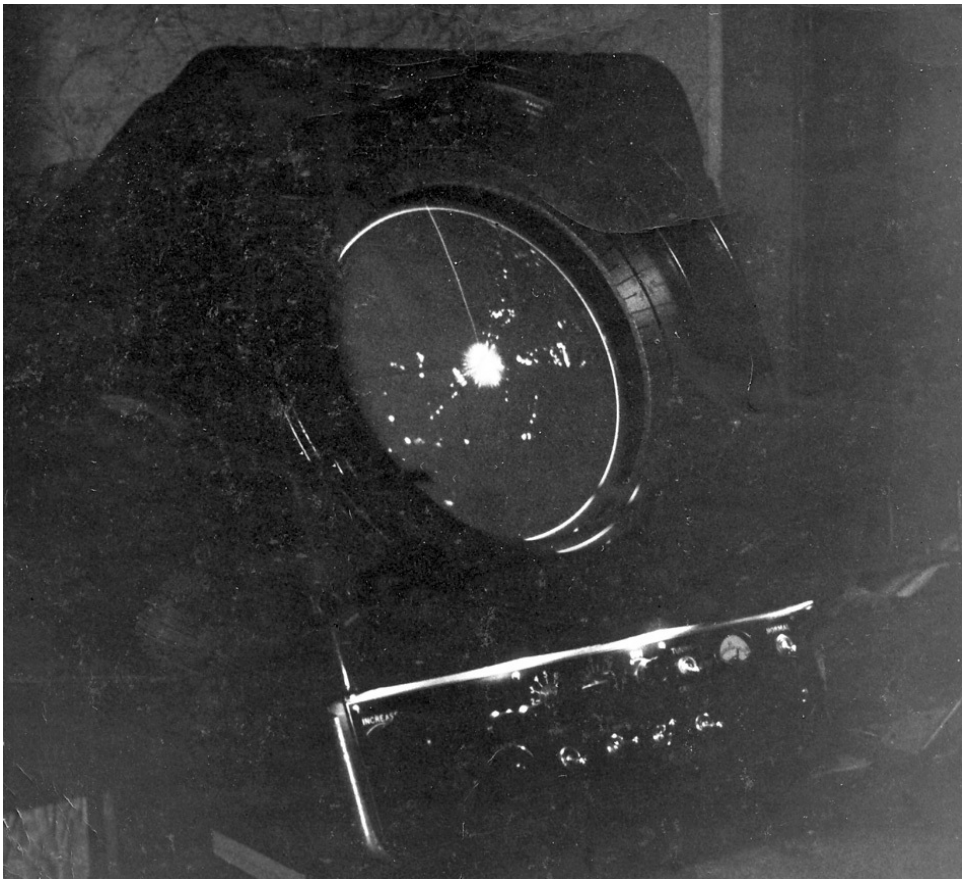
Sadly another enthusiastic student was discharged from the squadron after he clipped the wingtip of a Chipmunk while taxiing, although he was following the indications of a marshaller at the time. We were told that the pilot in command of an aircraft is ultimately responsible for all safety issues during flight time, which is normally defined as including taxiing.

While flying and ground school formed the core of EUAS training, we also experienced such interesting activities as the high altitude chamber at RAE Farnborough. Each of us in the chamber removed his oxygen mask in turn, while the others made notes of his reaction to cerebral hypoxia (which varied from falling quietly asleep to becoming rather violent). The RAE boffins said that knowing our personal reaction would allow us to recognise an oxygen supply failure as early as possible, but I still haven't had the opportunity to test this theory…

There were some mock sighs of disappointment when we were told that the Farnborough centrifuge was out of action, but as compensation we were stuffed into the high temperature test chamber in full uniform, to the amusement of the technician who was sitting there comfortably reading a book while checking out the efficiency of a prototype temp-controlled flying suit. By contrast it was great fun being thrown into a swimming pool to see how our Mae Wests worked. (And to discover just how difficult it is to clamber into an inflatable dinghy wearing waterlogged flying kit!)

At this time, Edinburgh University didn't possess a digital computer but in 1963, in order to integrate some differential equations by the Runge-Kutta method, I was allowed to use the Ferranti Sirius machine that had been acquired by Heriot-Watt College in Chambers Street. (In 1966 HWC was upgraded to a university, and later relocated to Riccarton). I also used that Sirius computer to do astronomical ephemeris calculations for a moonbounce radio communication project. Every hour on the computer was very expensive, so it was fitted with a loud car horn to alert the user immediately an error was encountered. This proved useful because my programme had failed to anticipate that there were some days of the year when the moon didn't rise above the horizon at the chosen azimuth at all.

Later a Flexowriter room was set up near our EUAS Town HQ in Buccleuch Place, where we could punch paper tapes that were sent by taxi and train to Manchester for overnight processing by the Atlas "supercomputer" there. A modern PC is around 100,000 times more powerful than the Atlas, which had only 16K words of core store. What incredible progress there has been in the last 50+ years!



Radar in my bedroom! How crazy can you get?

I had been interested in avionics from an early age, and in 1962 I did some student summer vacation work with STC in New Southgate on S-Band FM radio altimeters, with test flights from Stansted. I still have a few original bits and pieces and documentation from the BLEU (Blind Landing Experimental Unit) at RAE Bedford. In my student days I also installed an X-Band Decca radar scanner on the roof of my parents' house. It was much smaller than the famous Decca Type 80 ("Green Garlic"), but some years later my poor dad still had to hire a mobile crane to remove it after I had left the nest!

After my Holland House days I borrowed money from my kind mother to purchase a second-hand caravan, in which I lived for five years on a beautiful hilltop site just to the south of Edinburgh. As well as being economical this was a perfect location for an amateur radio enthusiast, and during a tropospheric opening I achieved the first

RTTY (radio teleprinter) contact between Scotland and Holland on 144 MHz. During a GPO sales promotion drive, I asked whether I could have a telephone in my caravan. I was astonished that they agreed, and installed a row of telephone poles to bring the line to it. No expense spared in those pre-privatisation days!

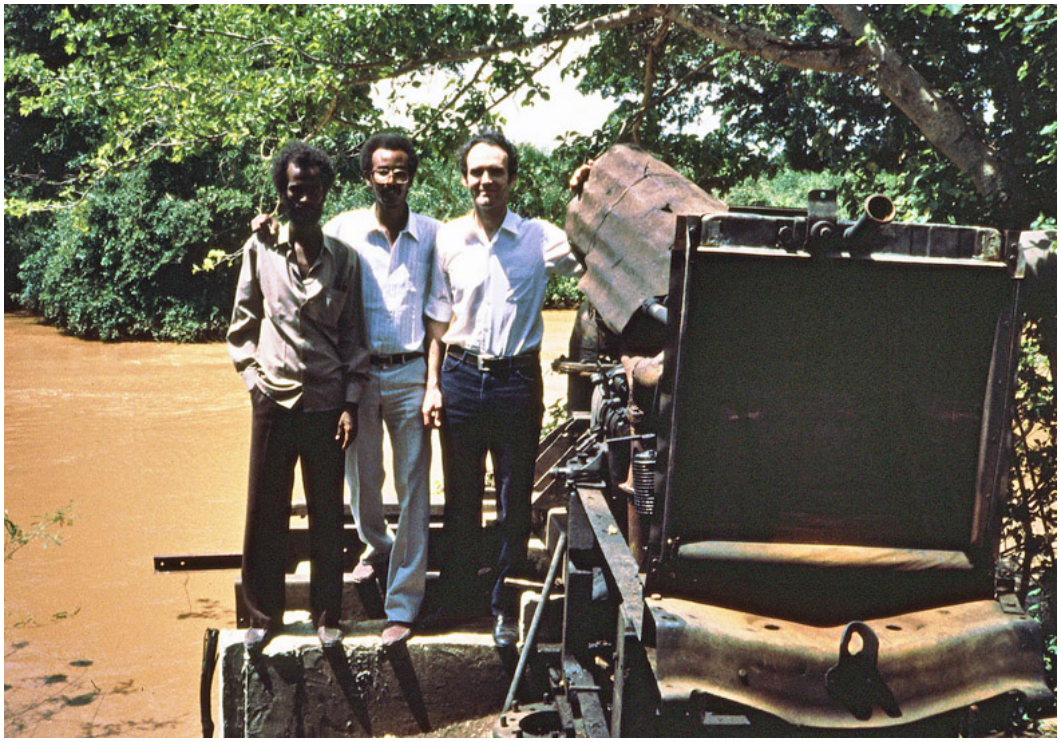
My 1960s student caravan home in Edinburgh

The Edinburgh police were jolly efficient, too. They eventually caught the burglar who had broken into my caravan and made off with my old record player and collection of LPs. The record player was recovered after it was offered for sale by a fence in an Edinburgh pub, little knowing that the prospective buyer was an undercover detective. I was told that the fence invited the detective to his home to see the horde of merchandise he had available, so the constabulary made quite a haul that evening. My ownership of the record player was easily established, because I had built the amplifier myself and taken the precaution of writing my name inside it.

It was not till many years later that I discovered how many of the Edinburgh University staff had played major roles during the WW2 air war. As with the Bletchley Park codebreakers, they never mentioned their important work until decades after the end of the war. For example, my PhD supervisor Prof Ewart Farvis had been instrumental in countering the Knickebein, X-Gerät and Y-Gerät beam

systems that guided enemy bombers to their UK targets. Ewart was fluent in German, and when he switched on the Alexandra Palace VHF transmitter to jam the beams for one Luftwaffe attack, he overheard the KG 26 aircrew being asked by a bewildered German ground controller to "thump the box", believing that their airborne equipment had simply malfunctioned!

After the invasion of Germany, he was given the temporary rank of Squadron Leader (and a revolver) when he was flown to Munich to interrogate German engineers and scientists. Like myself, Ewart was successfully operated for cancer. That was back in 1986, and before he finally passed away in 2005 (at 93) he enjoyed telling people that he was still alive whereas his surgeon was dead! Even our lab technician revealed that during the war he had been parachuted into Holland to steal a specific component from the Philips factory, and he was awarded the *Croix de Guerre* for "blowing up a few little bridges and things..."



Working for the UN in Somalia. (The river was full of crocodiles...)

After finishing my PhD I did some radar analysis and informatics work with the Ferranti plant at Crewe Toll, which had been set up in 1943 to manufacture gyro gunsights for the Spitfire. At that time the Ferranti Flying Unit at Turnhouse operated a de Havilland DH-114 Heron for executive transport, and I was lucky enough to enjoy flights in it when visiting the Ferranti facility at Hollinwood and the National Physical Laboratory at Teddington. At the NPL, I had the pleasure of dining with Donald Davies to discuss possible Ferranti involvement in the packet switching concept that he was developing there. Little did I know at the time that his pioneering work would be the predecessor of the modern Internet.

Ferranti had designed the highly successful Bloodhound missile guidance system. But the contracts were judged to have been considerably overpriced, and after the Lang Report in 1964 the company had to refund £4.25 million of "excess profits" to the government. The first class Electronic Systems team at Crewe Toll had developed the revolutionary AI.23 monopulse radar fitted to the English Electric Lightning, but the TSR2 cancellation dimmed future prospects with Ferranti, and in 1969 I sold my caravan, repaid my parental debts, and left Scotland for Switzerland, where I've lived ever since.

My hotel in Mogadishu after the shooting started

I was based in Geneva for 35 years, ultimately as R&D Manager for the Timing, Trigger and Control (TTC) system for the LHC experiments at CERN, and served various UN agencies in India, as well as in more arduous circumstances in Third World countries such as Bangladesh and Somalia.

More to improve my French than to help make ends meet, I also did some work translating technical articles for the English version of the international aerospace magazine *Interavia*. A peculiarity of this work was that my translations of the French text often had to be supplied for typesetting before the accompanying illustrations were available. I can vouch that it isn't easy to compose an accurate caption for a photo of a radar antenna that one has never seen!

After retirement I moved to a quiet winemaking village on the Swiss Riviera, where I live with my lovely wife Jennifer and my sons Mark and Kevin. To keep myself out of mischief I've restored a 1972 200hp V8 Alfa Romeo Montreal, still maintain Jennifer's old Jaguar XJ40, and write classic car books for pleasure rather than profit.

Mark and Kevin prepare for a flight in a Robin DR400

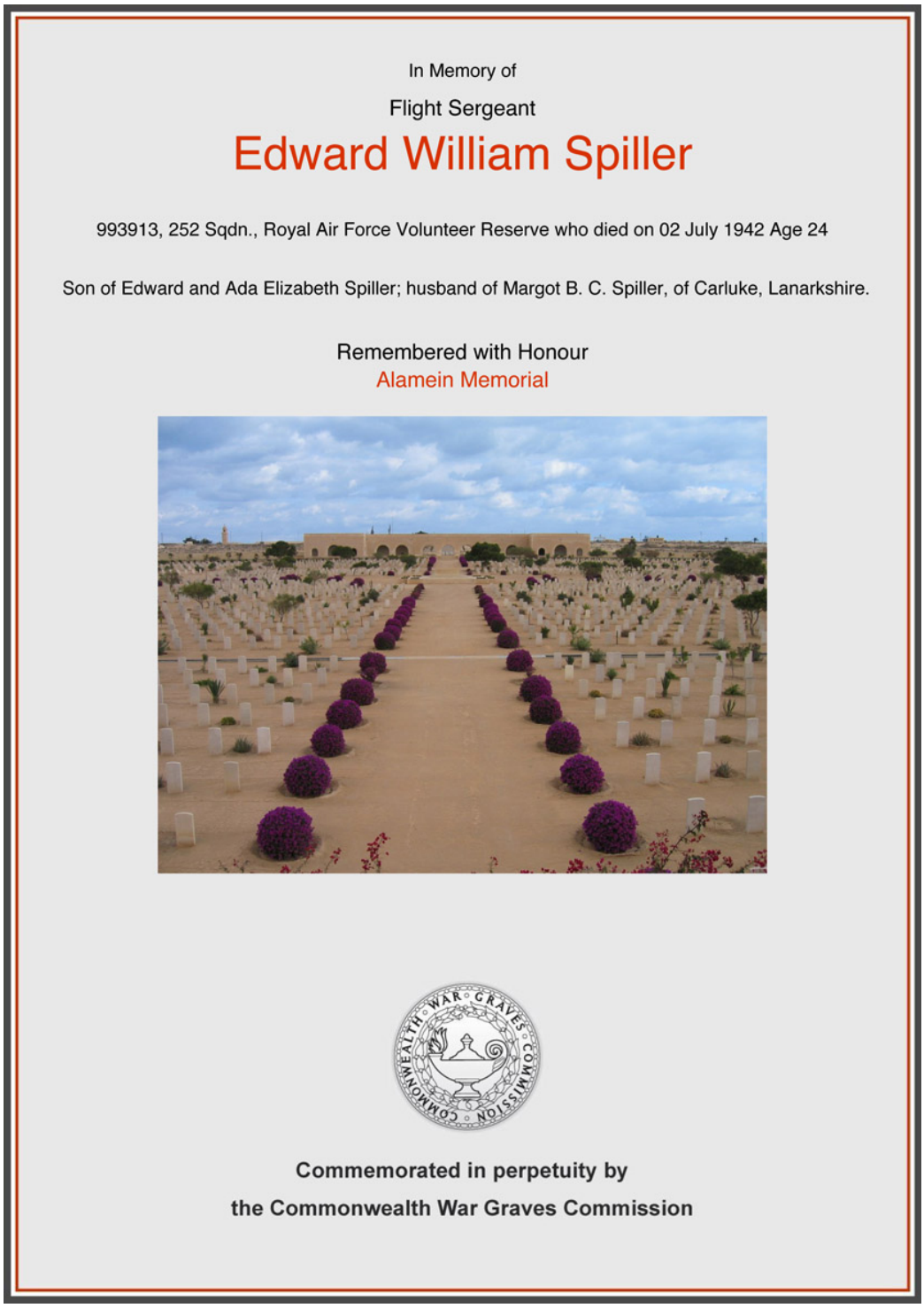
I have many happy memories of my three EUAS years, and the experience was very useful in my professional life. At that time the core flying training syllabus was more concentrated than it is now, everybody had plenty of flying time, and most of us were introduced to aerobatics, formation flying, cross-country flying, low flying, instrument flying and night flying. I hope that in spite of tight defence budgets the University Air Squadrons will be able to continue their role, and inspire new generations of young students for many years to come.

Family footnote

During WW2 my uncle Ted (Edward William) Spiller served with 252 Squadron, which flew Bristol Beaufighters from Northern Egypt. Ted was born in Aberdeen in November 1917. He never knew his father, an army schoolmaster, since he died of pneumonia when Ted was just 6 months old.

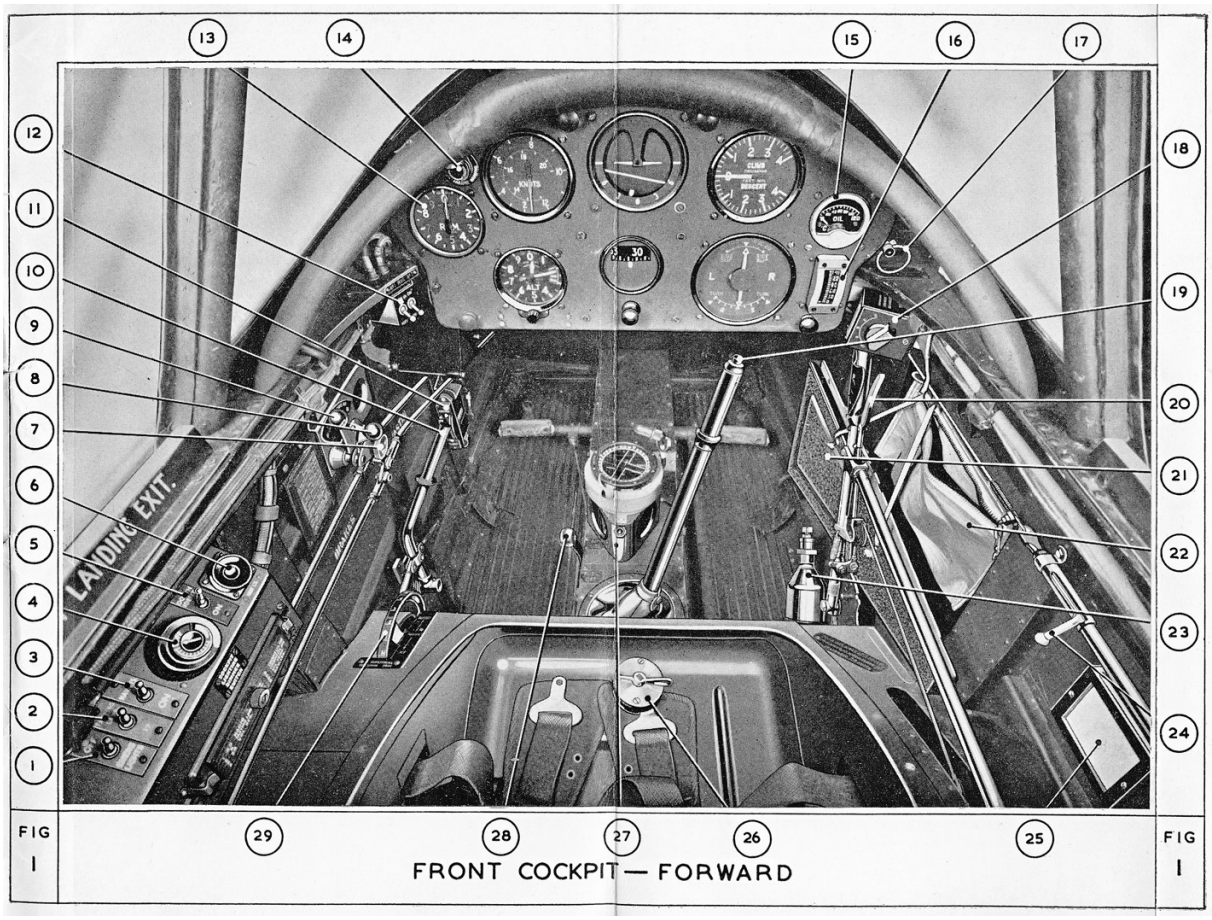
In 1942, 252 Squadron was based in Idku, engaged in attacking land and sea targets and intercepting enemy aircraft flying from Crete to Tubruk. Early on the morning of 2 July 1942, his was one of three Beaufighters that took off for a daring raid on Fuka aerodrome and satellite airfields. This they did successfully, destroying some Messerschmitt Bf109s. But meanwhile, Italian and German aircraft had been scrambled to attack them, and Ted's plane was shot down by Lt Hans-Arnold

Stahlschmidt at about 06h25. His Beaufighter was seen crashing into the Mediterranean just north of Fuka, and his body was never recovered. He was 24.



Ted's death is commemorated in an RAF panel of the memorial at the entrance to the El Alamein War Cemetery. He had married my aunt Margot just six weeks before, and their wedding photo shows him in RAF uniform. Margot died peacefully of emphysema in 2007, possibly a legacy of heavy smoking during the war years.

I don't have any Chipmunk cockpit photos, but I've appended scans of the ones in my *Pilots Notes* (August 1958 edition) for the possible interest of anyone who isn't familiar with the plane, or former EUAS members who may no longer have their copy.



The instruments are uncomplicated, and the controls are light and fall neatly to hand. The only things that are a little unusual are the differential braking system used for steering with the rudder bar while taxiing, and the fuel gauges in the wings that were quite difficult to read at night, especially because they had different figures for when the aircraft was in level flight or sitting on the ground! Although some Chipmunks were fitted with electric starters, our EUAS planes had the Coffman shotgun system. So no auxiliary equipment was required to start the engine, but all four cylinders had to be primed to fire up as soon as the cartridge was detonated.

For training in instrument flying in 1961, we students wore a hood that prevented us from looking outside the cockpit. The instructor in the rear seat would then disorient us by throwing the aircraft around the sky in an unpredictable way before handing over control. These manoeuvres would also topple the gyro based instruments, so that we had to use only the pitot-static ones and the magnetic compass between our feet to figure out what was happening and return to straight and level flight on the required heading.

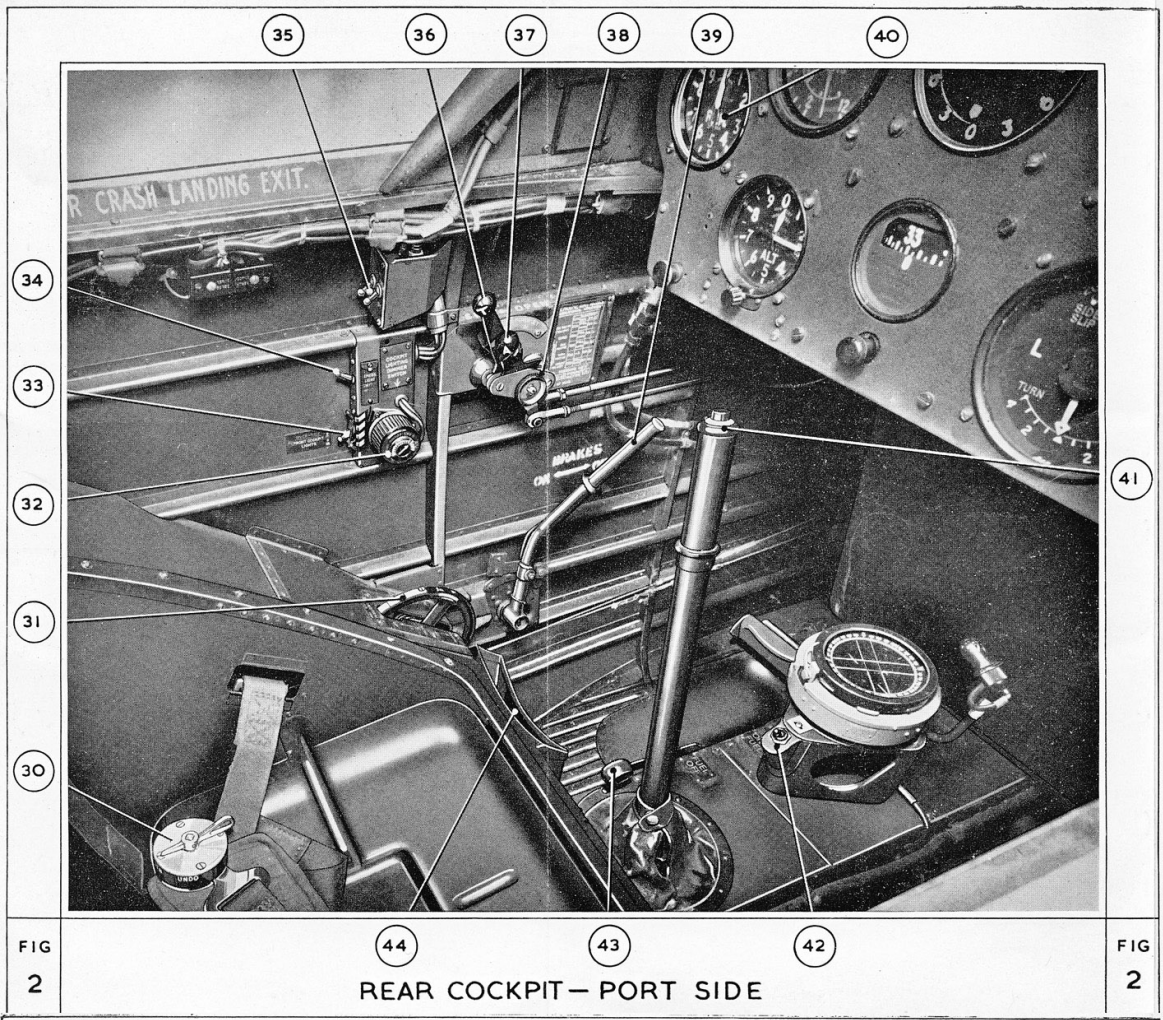


FIG 2 — REAR COCKPIT — PORT SIDE — FIG 2

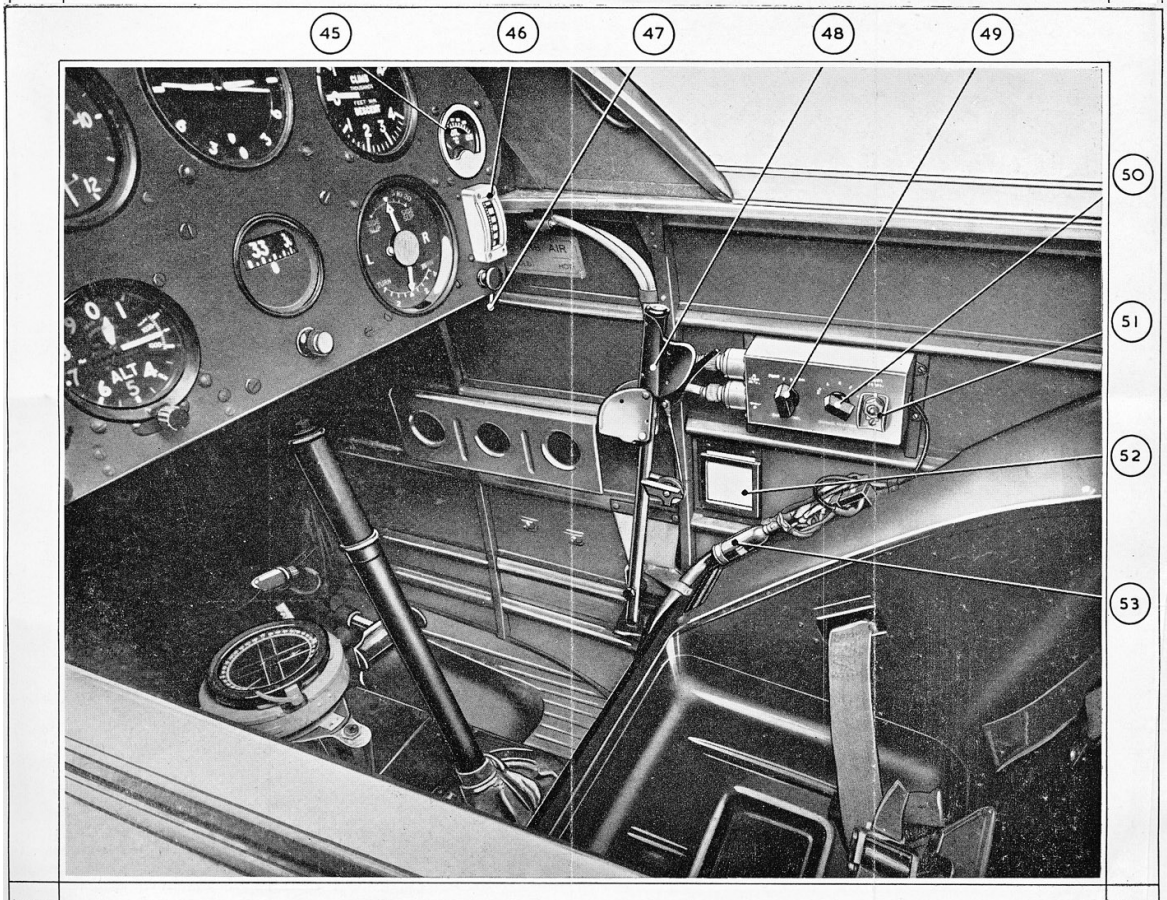


FIG 3 — REAR COCKPIT — STARBOARD SIDE — FIG 3

Here are the keys to the three cockpit illustrations:

KEYS TO FIGS. 1, 2 and 3

1. Emergency lamp switch.
2. Taxying lamp switch.
3. Navigation lights switch.
4. Cockpit lamps OFF and dimmer switch.
5. Identification light switch.
6. Identification light morsing pushbutton.
7. Throttle and mixture controls friction nut.
8. Mixture control lever.
9. Throttle control lever.
10. Brake lever.
11. Ground/flight switch.
12. Ignition switches.
13. R.p.m. indicator.
14. Generator failure warning light.
15. Oil temperature gauge.
16. Oil pressure gauge.
17. Cartridge starter control.
18. V.H.F. radio controller.
19. Press-to-transmit pushbutton.
20. Flap lever.
21. Amber screens stowage.
22. Goggles stowage.
23. Hand fire-extinguisher.
24. Carburettor air-intake control.
25. Compass deviation card holder.
26. Harness release box.
27. Compass lamp switch.
28. Fuel cock control.
29. Elevator trimmer wheel.
30. Harness release box.
31. Elevator trimmer wheel.
32. Cockpit lamps OFF and dimmer switch.
33. Front cockpit lamps override switch.
34. Emergency lamp switch.
35. Ignition switches.
36. Throttle control.
37. Mixture control.
38. Throttle and mixture controls friction nut.
39. Brakes control.
40. R.p.m. indicator.
41. Press-to-transmit pushbutton.
42. Compass lamp switch.
43. Fuel cock control.
44. Maps case.
45. Oil temperature gauge.
46. Oil pressure gauge.
47. Air-intake heat control.
48. Flaps control.
49. V.H.F. change-over switch.
50. V.H.F. radio controller.
51. V.H.F. muting switch.
52. Compass deviation card holder.
53. Mic-tel socket.

NOTE.—(i) In the front cockpit the following items are hidden by the seat: Maps case, Pilot's Notes stowage and Tel-mic socket.

(ii) The following items are not shown: Pressure head heater switch, generator test switch, safety flap over cartridge starter control.

After I completed my squadron service, Kitty Tyson made sure that I returned all my flying kit to RAF Turnhouse. But I still have one memento of my EUAS years:

It's a Mark XIVA altimeter with sector-type Kollsman window, still working perfectly as a mantelpiece barometer 60 years after it was manufactured!