



It's that time again – looking back at another successful Wellesbourne Wings and Wheels..... this time it was not such a breeze!
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© Clive Hanley

Charles, Daniel and Eric with the world's biggest Radio Control kit - I bet you didn't know that 655 was really controlled from the ground all the time!

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The 655 Maintenance and Preservation Society Committee wish all our members plus supporters a very Merry Christmas and a Happy, Prosperous and Safe New Year

ENGINEERING REPORT

By Derek Powell

Scanning through the diary and then looking out of the window to see that my back garden resembles the Everglades, I am amazed at just what has been achieved during what passed for the Summer this year. Credit must go again to the people who have turned out on Saturdays, regardless of the conditions.

The spate of problems which we had in the early part of the year were behind us and we buckled down to the outstanding maintenance tasks and of course to preparing 655 for her high speed outing.

First on the list were the brakes. We had known for some time that although they were performing to specification, there were a number of seeps of fluid from brake pistons, so it was decided to bite the bullet and go for a complete overhaul of all eight units, including the replacement of the 96 brake piston seals. With the help of anyone who loved getting absolutely filthy, (i.e. everybody), Fred oversaw this time consuming job starting in April. In all, six units were completed before the approach of the Run Day put a stop to the work.

On May 31st, our usual aircrew of David, Mike and Barry arrived to check out the aircraft and to do a full brake test. As well as this, Barry would give hands on training to a spare AEO for 558 and to Charles Brimson of 655 who will be our AEO on engine ground runs. Some emergency shut down and escape drills were also practised to keep the aircrew current for 558.

The brake test revealed that despite extensive bleeding of the brakes after completion of the work, some air was lurking somewhere in the system and the high speed run we had planned had to be curtailed for further investigation of the problem.

The run also proved that the repair carried out by new recruit John McVey to the 1st pilots ASI had cured the problem of the instrument failing to indicate. This was essential if the aircraft was to be fast taxied on June 22nd.

John and I had last worked together on Victors in the early sixties, he being an instrument fitter, which was just what we needed for our ASI problem.

All through the Spring, Richard Galazka had been labouring mightily to rebuild our damaged number 4 end cap (see last newsletter for details) because we needed it in place for our Run Day, otherwise overheating of the jet pipe tunnel could occur. He had made great strides in manufacturing and welding into place the steel sheeting needed to effect repairs but some U shaped sections required specialised equipment to make them.

Our friends at **Treble R Fabrications** tried but their machinery was too big to make the small sizes we needed. At this point, John Whitehouse of **Surface Processing Ltd** offered to help in finding a company who were able and willing to make the pieces Richard wanted to complete to job. John succeeded in enlisting the support of Steve Sunderland of **Metsec Ltd** who had the required sections made in double quick time and donated them to us without charge. As well as Saturdays, Richard made several weekday trips to Wellesborne to ensure that the end cap was ready and fitted before June 22nd. Some minor work remains to be done before the unit is fully serviceable.

Without the help of the managers and staff of companies such as those mentioned above we would find it difficult if not impossible to carry out work on the aircraft to the standards we have set ourselves.

In the meantime, Fred, Mark and Selwyn had succeeded in removing the air from the brake system with the help of our venerable Hydraulic rig. By June 14th, the aircraft was declared ready to go and it was fingers crossed as the aircrew put 655 through its paces on Saturday 21st in a complete test of all systems including a taxi run on the main runway. They declared themselves happy with 655, so all the hard work had paid off. A full report of June 22nd is elsewhere in the newsletter.

A few minor snags had shown up over a busy weekend and these were added to the list of jobs outstanding. First of these was the failure of the number 4 Starboard fuel tank to register its contents. This is not serious in itself, but the aircraft fuel system collates the indicated contents of all 14 tanks and uses this to indicate the C of G. It is a well know fact that Vulcans can be made to sit up and beg on the ground if the C of G is allowed to move too far aft while refuelling. The fault was traced to a faulty amplifier in the starboard wing but unfortunately we had no spare. Once again the **VOC** came to our rescue and supplied us with a replacement which has now been fitted.

While the brakes were being attended to earlier in the year, it was noted that some of the mainwheel hubs were showing signs of corrosion. Fred has undertaken a rolling programme to remove each wheel pair for total strip down and examination. Each hub will have both tyres removed and the hub will be inspected, cleaned and any corrosion removed and treated. The hub will be re-sprayed before the tyres are replaced using new "O" rings and valves. The completed assembly can then be pressure tested. Any defective tyres will be replaced during the process, a task made much easier by the **VOC** allowing us access to their stock of serviceable but non airworthy tyres. This task will itself require many more hours of work.

A small problem that has existed ever since we started work on 655 has been that the contents of the AAPU fuel tank have failed to register when the tank is full. Its not that serious but we have never had the time to look at the problem. The fact that we can investigate this now is an indication of the progress which has been made on the restoration of all the various aircraft systems. Checks on the wiring showed that the fault lay in the high level float switch and not in the indicator. The tank was drained and then removed from the aircraft to allow removal of the switch assembly. Two problems were immediately obvious. Firstly, fuel had been leaking past the seal and into the switch chamber, and secondly the micro switch itself was faulty. Several years ago, we were allowed to remove equipment from XM607 at Waddington and we salvaged some float switches from the number 1 main fuel tank. These proved identical to the AAPU tank switches and we were able to affect a repair using these parts. 655 may not have gone to the Falklands but at least we can say that a bit of it did!

Anyone who was able to come to Wellesbourne for our Run Day will have seen our refurbished bomb hoist being demonstrated by Daniel and dad Charles. It was known however that the petrol tank fuel gauge did not work and so it was removed for repair. At this point it was discovered that the tank contained much debris and corrosion from its 25 years stood in a builder's yard in nearby Shipston-on-Stour. Something had to be done about it. Once again, John Whitehouse from **SPL Ltd** offered to help and took the tank into his workshops. In a matter of days it was returned to us in pristine condition ready for painting and refitting. The repaired fuel gauge will be fitted at the same time.

Another outstanding job was the stripping, priming and repainting of the two liquid springs on the main undercarriage legs which were showing signs of corrosion. These units take the main weight of the aircraft and the pressure of the oil in them is at an incredible 22,000 psi - so corrosion is not an option. This very messy job was undertaken by two of our newer members, John McVey and Nigel Jenkinson, and was completed over four weekends.

Both the Power Flying Control Units (PFCU) which operate the rudder have, over a period of time, developed leaks of the hydraulic fluid from the main ram seals and have also shown evidence of internal leaks in the servo systems. Terry Herrington of the **Boulton Paul Association** was approached with a request that they take our units one at a time for overhaul. He readily agreed to this and **Smiths Aerospace Ltd** will allow the overhauled units to be tested on the factory test rig. This rig has been in use to repair and test all the PFCU's which are fitted to 558. The first unit which is actually the auxiliary unit has been removed from 655 and is now with the BPA at Wolverhampton.

All through the period covered by this report, work has been progressing on the complete restoration of our Sentinel aircraft tug. As mentioned in previous newsletters, this enormous task has been shouldered by Roger Bowen and Dave Gladwin with such help from everyone else as needed. It would be easy to fill the complete newsletter with the work which has been done and I hope that at some future time we can do an illustrated feature to do justice to the amount of effort which has gone into this task.

As usual I would like on your behalf to thank all the working members for their efforts and for the various Companies who have been generous with their support of 655MaPS.

On my behalf, a big thank you for continuing to support 655MaPS.

Wellesbourne Wings & Wheels

Sunday 22nd June 2008

All photos courtesy of Clive Hanley

In the past, we have often heard that visitors have been 'blown away' by the sight of 655 performing on the Run Days – this year the same words were used but for an entirely different reason.....

We knew we were going to potentially have a few weather related problems on the Saturday when a couple of our invited guests who were to be flying in indicated that Sunday's winds were likely to be too strong for them. Sunday dawned dry and clear but, you guessed it, WINDY. The first casualty was one of the 655 MaPS tents, which, despite the efforts of everyone, simply was not up to the task in the prevailing wind and collapsed into several pieces. By the end of the day, our four tents were reduced to just one and a half.....

As the stallholders and early visitors began to file in, the wind showed no signs of abating and there was much muttering and frowning as various pieces of equipment and paperwork flew across the airfield. The practice on Saturday had confirmed that 655 was fit and well and the taxi from one side of the runway to the other went without a hitch, but even at those very low speeds the crew commented on the effects of the wind.

Mention should be made of our friends at the Air Training Corps, coming this year from 1640 Squadron at Banbury and 1368 Squadron at Warwick. Unbeknown to us when originally setting our date for the Run Day, we couldn't have chosen a worse weekend as many local ATC Squadrons were away on exercise, so those that did support us were arranged at relatively short notice. We are always indebted to these guys and gals for giving up their time to man the pay point and to look after car parking and as usual they were a credit to themselves and the ATC as a whole.

Also in attendance was Air Atlantique, this time bringing their de Havilland Dove giving pleasure flights throughout the day. It was a delight to see such a classic aircraft performing in what were not particularly pleasant conditions – watching it taking off in c40kt crosswinds reminded us of the nickname often given to RAF aircrew of "The Crabs". We were again delighted to make use of the public speaking prowess of Mr Dave Rowland who provided the commentary for the day's proceedings and whose enthusiasm and knowledge only serve to add to the occasion.

And so to the 'Wheels' element of the day. This year, Richard Galazka made all the arrangements (as well as spending many, many hours on the end cap refurbishment as described in the Engineering Section) and we ended up with another stunning assortment of Classic Vehicles from cars to buses to lorries plus a fine array of Military hardware. The owners, many of whom had not been to our event before, were more than happy to display their pride and joys and as usual were always pleased to chat to anyone who cared to stop and look. The Morgan Club brought along a number of their beautiful cars, causing much drooling during the day.



Tucked away amongst the classics was the famous Dad's Army Van, displayed by the Patrick Collection.



With a steady stream of visitors deciding to brave the wind, the time came for 655 to do her first display with the customary slow taxi up and down the runway to give people the chance to experience the sight, sound and smell of a Vulcan under power. The run went off without incident, the crew of Squadron Leader (Retired) David Thomas, Wing Commander (Retired) Mike Pollitt and Squadron Leader (Retired) Barry Masefield pronouncing themselves to be very happy with the aircraft - but were still wary of the effects of the crosswind.

This year we thought we would try something a little difference to entertain the crowd between taxis. Derek had seen a display by a group of ATC cadets calling themselves The Red Barrows (goodness knows where they got the idea for the name from) who, for those that missed them, do actually display to music on the ground – with red wheelbarrows! They made the journey from Manchester on the day and what we didn't know was that the trailer they usually use to transport the barrows had got a puncture the day before so they had to cram their 'equipment' in with the cadets in their minibus, which can't have made for a comfortable ride. Their efforts were much appreciated on the day and we hope to see them again in the future.

As the time approached for the second and fast taxi, the crew deliberated on what they were going to be able to do in the frankly very difficult conditions. The trouble with having achieved such spectacular manoeuvres in the past (i.e. lifting the nosewheel) and thus setting people's expectations is that when conditions or circumstances mean that this can't happen there can be a noticeable air of disappointment. However, when preparing for any fast taxi, the crew have to consider three things:

1. Safety
2. Safety
3. Safety

Given the variable crosswinds at 30-40kts, the relatively light weight of the aircraft and the recent significant amount of work on the brakes, they had to look at their options. After taking everything into account they decided to still perform the fast taxi, but sensibly not to try and lift the nosewheel on this occasion. The crowd, of course, did not know any of this. At the allotted time, 655 started up and taxied to the end of the runway, turned through 180 degrees and stood there. The noise grew (as did the cloud of dust and exhaust smoke behind her) and then she was off, accelerating quickly down the runway until it was time to throttle back and hit the brakes. Everything was there, the power, the noise, the grace the majesty – but no nosewheel-lift. Despite that, the brakes were still very hot when she returned to the cross-runway and to the now customary applause from the crowd as the crew de-planed.



We'd like to reassure everyone that there was absolutely nothing wrong with the aircraft, indeed afterwards the crew and MaPS engineers pronounced themselves delighted with the way she had performed.

A mention is needed here of the folks running the MaPS Merchandise tent – Jan, Lynne and Sarah, plus Ruth on the MaPS Membership tent. Many of you will not be aware but just as 655 did her thing, the day's biggest gust of wind ripped across the airfield, taking our tents (and very nearly our ladies) with it! They held on for dear life and thanks to the additional efforts of nearby MaPS volunteers plus a couple of members of the public (we don't know who they are but our sincere appreciation goes out to them) there was no damage – other than to the tents. We can replace them, but not our ladies!



VULCAN XA 903 at WELLESBOURNE - Part 2

XA903 and the Olympus 593 By Steve Austin

The Olympus 593, designed for use in the Aerospatiale Concorde, was a twin spool augmented turbojet. Developed by Bristol Engine Division (BED) and SNECMA, the 593 was the civil variant derived from the Olympus 320 originally designed for the BAC TSR2. BED was responsible for the engine as a gas generator and SNECMA had authority for the entire exhaust system. Development potential was to be about 40,000lbs of thrust.

The engine comprised of a seven stage LP compressor, seven stage HP compressor, cannular combustor with eight flame tubes, seven stage HP and LP turbines, simple single-gutter afterburner, cascade-type thrust reverser, multi-lobe retractable noise suppressor and multi-flap independently variable primary and secondary nozzles. Mass flow was 450lb/sec; pressure ratio 9.3:1; length (flange to flange) 148.4ins; (intake to exhaust nozzle) c280ins; inlet diameter 47.85ins; weight 5,814lbs.

On 5th November 1965, three weeks ahead of the contractual deadline, the Olympus 593B made its first bench run in Bristol. Back in France, SNECMA started initial tests of the variable nozzles in June 1966 at Melun-Villaroche. Three months later, flight tests started on XA903. The first version of the engine soon delivered thrust of 34,650lbs. The results of initial afterburner tests also met expectations, boosting thrust to 37,180lbs. This performance met the requirements of the aircraft manufacturers.

XA903 is being restored to as it was when testing the Olympus 593 engine which was installed as one half of a Concorde nacelle which was attached underneath the bomb-bay space. The weight of the engine and its ancillary equipment meant that every landing was above the maximum landing weight of 109,000lbs as specified in the pilot notes – XA903 always landed at between 125 - 130,000lbs. The under slung engine also meant that every landing had to be made in a fairly flat attitude to prevent the nacelle from scraping the runway, and also meant that the aircraft nose could not be raised to use the large wing-area for aerodynamic braking. Landings were made at a threshold speed of around 130 knots and the braking parachute was always deployed. The aircraft's nose wheel leg was replaced with one from a Vulcan Mk 2 and thus avoided the 593B's tail cone scraping the runway.

The bomb bay space held two additional fuel tanks holding 400 gallons of fuel that supplied the 593 engine along with a water tank that was used for part of the engine testing. The fuel tanks could be refilled from the aircraft, managed from the port side of 903's cross-feed gallery. The total fuel capacity was 9,782 gallons. The Olympus 593 with reheat used 5,000 gallons per hour with a maximum fuel flow of 3,500 gallons/hour and this meant that there was only sufficient fuel to run the 593 with reheat for about 15 minutes. (The RB199 had a maximum demand of 6,000 gallons/hour, allowing only 10 minutes duration). Fuel could not be pumped back into the aircraft's fuel tanks from the bomb bay tanks.

One of the key functions of the test flights was to gather data from the engine for later analysis. As a result, a vast number of sensors were fitted to the engine to allow the signals to be monitored and recorded for later review. In order to get the signals back into the cockpit and cabin, which was a pressurised section, an external wiring loom was fitted down the port side of the aircraft, allowing the signals to enter the radome for processing and presentation to the cabin area through the front pressure bulkhead.

To reduce the number of wires returning to the cabin, many of the pressure signals were multiplexed onto a single transducer, thus only requiring two wires for those signals. This was performed by devices called 'scanivalves' (scanning valves), which allowed measurement from 48 separate pressure sensors onto one transducer. Signal processing comprised of conditioning equipment in the bomb bay and a DDR600 digital data recorder located in the radome.

The radome was modified to accommodate the 'T' shaped digital data recorder, weighing 600lbs, which converted the analogue electrical signals from transducers (instrumentation) dotted all over the 593B engine and the aircraft, recording the output in selected bursts into a ½ inch magnetic tape in the cockpit. The large array of transducers measured temperatures, pressures, positions etc. with the DDR providing an analogue to digital conversion of the signals, then enabled spot measurement in a switchable mode, using the scanivalves. Instead of continuous measurements, the DDR read each parameter in turn for a brief period and sent the digital signal to the tape – all 600 of them. The DDR tape recorder was a reel-to-reel device using 3M ½ inch by 1800ft magnetic tape, located close to the rear desk. Close by was a separate 14 track 1 inch magnetic tape BS768 reel-t-reel recorder for measuring continuous signals for noise, vibration engine speeds and rotating stall cell, using 3M 1 inch by 1800 ft magnetic tape. The recorders were large and highly visible and were operated with their lids off so that one of the rear desk crew could keep an eye on them, in case they stopped or jammed. A great deal of reliance was being placed on these recorders because the bulk of the testing results were being channelled into them.

For example, the DDR600 was recording the 'life history' every minute of six scanivalve devices, each with forty eight ports of pressure – that's about 288 separate parameters from the Olympus 593B. Of course, besides this were scores of temperature measurements, mostly from Nickel-Chrome/Nickel-luminium thermocouples mounted within the same engine. In order to validate these measurements against test conditions, the DDR also recorded aircraft speed, altitude and engine speeds (LP and HP compressors, all of which were digitised by various signal-conditioning units.

The Olympus 593 test flights had a crew of five; the Captain flew the aircraft from the left hand seat whilst the co-pilot was the engine project pilot. He had the controls and instrumentation for the test engine, including ignition of the 593 from the relight button on the pilot's throttle lever. The rear cabin was totally unique to this aircraft, being designed specifically for the 593 trials. A large panel that contained over 100 instruments and indicators was installed on the starboard side of the rear desk and primarily monitored temperatures and pressures at various stages of the engine. This panel has now been reproduced fairly authentically, along with some of the switches used for applying hydraulic and electrical loads and also for introducing failure scenarios. The two flight test engineers, who occupied the Navigator Radar and Navigator Plotter positions, could both see the panel but had their own individual responsibilities. The Nav Plotter controlled the instrument recorders and kept the flight log for post-flight analysis. The Nav Radar acted as Test Controller, deciding with the project pilot the sequence of tests and in addition controlled hydraulic and electrical loads that could be applied to the test engine. He also kept a general flight test log. The fifth crewmember was the Air Electronics Officer, who carried out limited navigational duties using directional systems (ADF and TACAN), and who also looked after the aircraft's electrical systems. This was an extremely important duty as the Vulcan B Mk 1 was an all electric, DC (Direct Current) aircraft and several B1's had been lost due to electrical problems.

Based on the pilot notes for XA903, it would appear that the following items were inoperative or removed:

- : NBS
- : Green Satin
- : Radio altimeter
- : HF equipment STR 18 B2
- : Zero Reader
- : Gee Mk3 (this was fitted and used until 1965 when it was replaced by TACAN)
- : MK10 Autopilot
- : Airframe De-icing (i.e. wing leading edges and fin)

The biggest obstacle to the restoration of XA903 is the lack of information. At present there is virtually no documented information or pictures of the cabin or cockpit areas and this is preventing progress in restoring it back to its 593 test days authentically. Any information, no matter how trivial, would be most welcome and may be instrumental in restoring this rare nose section to a standard befitting an aircraft with such a fantastic history.

Airfield Visitors

Words and pictures by Charles Brimson

On Friday 22nd August Frankie Spray, one of the airfield's Air Traffic Controllers, was showing some children visiting from Belarus around the airfield. They had a flight in one of the South Warwickshire Flying School's Cessnas and then came over to have a look at the Vulcan. Normally we are not at Wellesbourne on a Friday, but fortunately Charles Brimson and his son Daniel had just arrived to do a bit of grass strimming, so they were able to show the children around and give them a cockpit visit to boot.

As they were talking to the children (through a translator) it quickly emerged that these were no normal tourists; the children are all from the Mogilev Region of Belarus which was affected badly by the radioactive fall out from the terrible nuclear disaster at Chernobyl nearly twenty years ago. The high radiation that still persists in the area means that their immune systems are constantly bombarded. The tragedy is, of course, that these children were not even born when the disaster happened, but such is the way of these things, innocent people are cruelly affected. The visit to the UK with our good food and fresh air greatly benefits their health even though they are only here for a month.



The visits for these deserving children are arranged by an organisation called 'Chernobyl Childrens Life Line', and they stay with local families for their month in the UK. We were delighted and humbled to be able to help in a small way with making their stay in the UK a happy one. It was quite something to hear them shouting 'Vulcan' and pointing at our pride and joy!

They enjoyed looking around so much that they came back for another visit on a subsequent Saturday when the whole volunteer gang was present (by now they were staying with a second family), and here is a photograph of them with Fred Barter, one of the MaPS Volunteers.

On Wednesday 27th August we had a visit from two former Vulcan aircrew who are now aircrew on the Heavy Aircraft Test Squadron at Boscombe Down. They flew to Wellesbourne in a very smart looking Piper Navajo Chieftain twin, which we had a good look around whilst it was parked next to XM655.

The pilot, Brian Goddard, has been acquainted with XM655 in the past having sat in the right-hand seat at the pointy-end on many occasions, and he brought copies of his Flying Log entries for us to add to our archives. Brian's colleague, Dave Cherry, was a Navigator Radar on Vulcans but had not actually flown on '655. They were both suitably impressed with their visit, especially of course sitting in the cockpit, and couldn't help but mention how that Vulcan cockpit smell took them straight back by nearly thirty years!



So What REALLY Goes on in the Back?

By 655 MaPS Volunteer Charles Brimson

Last Winter one of my co-volunteers, Eric Ranshaw, and I decided to look into the subject of FRCs, or Flight Reference Checklists to give them their correct name. The FRCs are a very comprehensive series of 'challenge and response' checklists to be used at every stage of aircraft operations (not just flight) and in every type of emergency that an aircrew would encounter whilst the aircraft is in operation. They are a fascinating (and daunting) living record of every action that must be taken in order to correctly and safely operate a nuclear-armed bomber. Even though we are not able to actually fly '655 any more (and we don't have any 'buckets of sunshine' either), we decided that it would be both worthwhile and educational to refine our FRCs in order to enhance clarity and safety with our own ground running operations. We routinely use our Houchin Ground Power Unit (GPU) to provide the two electrical power sources (28v DC and 200v AC) we need to exercise the powered flying controls, bomb bay doors, airbrakes, landing lights, and Rover airborne auxiliary power pack (AAPP) whilst the aircraft is on the pan. We also carry out engine ground runs (EGRs) at least a couple of times a year when the aircraft is towed over to the far end of runway 05/23. In both types of operation, it is essential that everyone involved follows a simple, safe and consistent approach. Eric and I were both aware that the RAF FRCs for the Vulcan were obviously designed for military operational use but that we could, if we were careful, simplify them considerably for our non-military use, without losing sight of their original purpose.

In all three V-bombers (Vulcan, Victor and Valiant), the use of the FRCs is 'led' by the Air Electronics Officer (AEO), he calls the challenge to either one of the two pilots, the two navigators, the Crew Chief on the ground, or himself, dependent on the check being carried out. The FRCs start before the five aircrew climb into the cockpit with external checks like removal of locks, jury struts and engine blanks, and then continue with the establishment of external power and intercom checks. In every case the FRCs firstly establish the correct positioning of a switch or control, then check its operation and the indication of it working, then move on to check the emergency operation of the redundant back up to the relevant system. All this is done in a logical progression from external/internal, engine start, after start, taxiing, etc.

Our first problem was not a lack of FRC material in our extensive 655 MaPS library, but a surplus of it! We have no less than three different editions of the Vulcan B2 FRCs, all complete and properly dated. The trouble is that each version is quite different in very particular ways, especially the order in which the checks are carried out in a particular section. We therefore learned our first lesson very early – you can't just pick and choose sections from the three different sets of FRCs, because you could easily encounter a problem where the switching sequence in one edition would cause fuses to blow if you then changed to an alternative edition for the next section! Definitely not a good idea...

The other reason for my interest in wanting to understand the FRCs was to learn more about the role of the AEO which has fascinated me ever since I had started as a volunteer at Wellesbourne. The role of the two pilots is fairly obvious (with the 1st Pilot normally, but not always, being the Aircraft Captain), then there are two navigators with the Plotter responsible for navigating the aircraft to the 'initial point' of the bombing run and the Radar Navigator taking over and using the Navigation Bombing System (NBS) to carry out the bombing itself. The AEO, on the other hand, has three separate strands to his role: he is responsible for managing a good supply of electricity from the various generators to the busbars to enable operation of the powered flying controls and other vital/essential needs; he is also responsible for the electronic defence suite of the aircraft in time of war known as Electronic Countermeasures (ECM); and finally he is responsible for managing the radio and intercom communications. It is the sheer variety of this responsibility that appeals to me. There is not much by way of automation in any of this, it is very hands-on and requires a fundamental knowledge of everything that is happening electrically all over the aircraft even though the aircrew can only move around a tiny part of it in flight. Now of course there is very little call for electronic defence when we are doing an engine ground run (EGR) or slow/high speed taxi on '655, indeed if we were to switch on and transmit with any of the massive jammers in the ECM bay located in the tail cone, there would be an awful lot of upset people in the area who would lose their television and radio signals, not to mention chaos at the airfield itself!

However, the management of the electrical generation part of the role still has to be performed whenever we apply power to the aircraft either from the GPU or through the aircraft's own generators, and it is this part of the AEO's role that I have been keen to learn. We have plenty of written resource in our library; the AEO Electrical Manual, the Aircrew Manual, the FRCs of course, together with all the Air Publications (APs) that we use for routine reference whenever we work on the aircraft. In addition we have our very own Derek Powell who is a font of all knowledge with regard to V-bomber electrical systems, and not one but several former Vulcan AEOs who have all been generous with their time and shared experience. In particular Barry Masefield is unique in that he has spent longer than any other Vulcan AEO in the world in his association with the type – from completing the Vulcan OCU in 1979, and serving on 617, 50 and 44 Squadrons, he was with the Vulcan Display Flight right up to the point that XH558 was sold to the Waltons at Bruntingthorpe in 1993, he then continued to be the AEO whenever either '558 or '655 were taxied, and he is now once again the senior AEO of 558 now that it is flying at airshows around the country. Barry has been very generous with his time and patience in helping me understand the AEO role on '655.

Anyway, back to the FRCs....Eric and I eventually worked our way around all three versions of the 'official' FRCs in our possession, and worked through the practical application of each consulting with other specialists on the MaPS team. Wherever we came across an item that there was no earthly reason we would ever need, such as operating air ventilated suits from the AAPP air bleed, then we would firstly check that removal of this item would not cause a conflict with any subsequent action before removing it from the checks. We also had to be careful to retain every safety check that we could, we don't take chances with 50 tons of Jet A-1, magnesium alloy and Olympus jet engines. We also decided that for future crew training purposes it would be useful to have a photographic representation of the panel/switches relevant to each check in the '655 FRCs. I am sure that any of our readers who have been into the cockpit of a Vulcan will agree with me when I say that it is a crowded and cramped environment that would not do well in today's ergonomically designed world – in fact I don't think that the word would ever have been uttered in Woodford in the 1950s! It is therefore useful to have a photograph handy showing the crew member roughly where he is placing his left or right hand even if he can't crane his neck enough to be able to see it!

Finally, the moment of truth – I asked Barry Masefield to trouble-shoot the '655 FRCs, which he kindly agreed to do when we were testing the brakes prior to our Wings & Wheels event back in June this year. In fact once he had read them through, David Thomas, Mike Pollitt and Barry agreed to let me use our FRCs to conduct the remaining engine starts and short taxi that day to successfully test the brakes. There was only one small amendment suggested by Barry, which turned out to be an improvement that none of the original FRCs featured anyway! A good result....



Charles in his 'new' office
© Charles Brimson

OUR STORY SO FAR

By 655MaPS

Aged 10

By the time you read this, a modest but important milestone in the MaPS' evolution will have occurred as we will have celebrated our 10th Birthday. As with most other 10 year olds, we started off being really small and - after some tears - have now grown up (matured??) into the confident Group you see today.

Many of you will have grown up with us, but for those who have not here's a potted history of some of the key events in the last 10 years:

1998

- Summer – MaPS Constitution drawn up and first members joined
- 11th October – First time XM655 taxied under the control of MaPS

1999

- 25th April – Fast taxi and the nose wheel lifts for the very first time!
- 26th September – Another fast taxi; the nose wheel is gently lifted again.
- Roar of the Vulcan Video is released.

2000

- A major programme of work on the elevons and PFCU's begins.
- 10th September – Open Day and Fast Taxi event.

2001

- Acquire the VW Airstart from East Midlands Airport.
- MaPS cemented relationship with Royal Air Force Association.

2002

- Overhaul of brakes and rudder removed for internal maintenance.
- Elevons and PFCU's all returned and successfully refitted

2003

- Rudder refitted successfully.
- 15th June MaPS Open Day with visits from an RAF Jaguar, the Sea Vixen and The Red Arrows.
- Our second Palouste Airstart was completed.

2004

- Our luxurious donated Portacabin – complete with carpets and all - was received and positioned.
- 20th June – Open Day (complete with rain!) celebrating 20 years at the airfield.
- The pan entrance was extended to allow easier access.

2005

- 19th June – our first Wellesbourne Wings & Wheels event including Classic Cars.
- Acquired our magnificent Sentinel tug.

2006

- Restoration of the tug commences.
- 18th June – Wellesbourne Wings & Wheels event
- 655 at Wellesbourne DVD released.

2007

- Our original Vulcan Bomb Hoist restoration completed.
- Training facilities provided for XH 558 crew – both air and ground.
- 9th September – Members and Supporters Day

2008

- Palousete Airstart successfully fitted to tug.
- 22nd June - Wellesbourne Wings & Wheels event.
- ...and so we go on!

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MaPS Merchandise For You!

We'd never miss a chance to remind you about our range of specially selected merchandise, so here it is. Each item is a reminder of the unique nature of XM655 and, as always, the money raised from their sale goes directly towards the upkeep of the aircraft. Hopefully there will be something in the list that takes your fancy – an unusual Christmas gift maybe, or just something that reminds you of 655.

XM655 Polo Shirt	Dark Blue (S/M/L/XL)	£16.00
XM655 Polo Shirt	Light Blue (S/M/L/XL)	£16.00
XM655 T Shirt	Dark Grey (S/M/L)	£11.00
XM655 T Shirt	Light Grey (S/M/L/XL)	£11.00
XM655 Baseball Cap	Light Beige with Blue Trim	£10.00
XM655 DVD	(Special Price to Members)	£13.00
XM655 Coaster	4 Different Designs.....	£2.00
XM655 Table Mat	To go with the Coasters	£4.00
XM655 Carrier Bag Tidy		£3.50
XM655 Fridge Magnet		£1.50
*NEW*XM655 Mug (x2 designs)		£6.00
XM655 Mouse Mat		£4.50
XM655 Table Candle		£3.50
XM655 Calico Carrier Bag		£3.90
XM655 Pack of Playing Cards		£3.00
XM655 Bronze Notepad		£2.00
XM655 Tax Disc Holder	Black, Red, Blue	£1.50

For each order, regardless of the amount, please add £1.95 to cover Postage and Packing – the more you purchase, the cheaper it is!

You can order items by either:

a) Copying the page, marking those you require and sending it to the address below,

OR

b) Simply send a note with your requirements to:
655 MaPS Merchandise
c/o 25 Binley Avenue
COVENTRY
West Midlands
CV3 2EE

Although we aim to fulfil all orders by return of post, please allow up to 14 days for us to process your order.