

TSR2 Memories

Don Rowland

What is today the BAe Systems factory in Edinburgh was built in a great hurry in 1943 by the Admiralty (don't ask) for the Air Ministry. It was run from the outset by Ferranti Ltd making a single product, the Gyro Gun Sight (GGS) for aircraft which was produced on a batch system. Many thousands were made. It was a stable product in that any enhancements were introduced en bloc to create a new Mark.

The General Manager was one John Toothill, (later Sir John) who, like all the other managers and foremen had moved to Edinburgh from the Ferranti factory in Moston, Manchester but by 1945 it became obvious that unless new work was found closure of the Edinburgh factory was inevitable so he set about finding new products. One of his most significant achievements was the setting up of an extensive Research and Development facility. This was so successful that it tendered for, and won, the contract for what we would now call the avionics for the TSR2.

On the production side the problems were different if less dramatic. In GGS days batches followed a standard path through the factory, the product was well known and stable and standard production control methods such as pin-boards, Stripdex (ask Granny) and manual records were the norm. Newer products were far more complex, batch sizes were much smaller and designs were under constant development.

The Production Manager, Sydney Holmes, was well aware of the extra demands these were making on production and was always looking for improved methods of production control. The dénouement came when we got a contract to build something like three dozen radar units (Type 86?) in the late 1950s. Each consisted of a control trailer complete with staff amenities, packed full of electronics with a radar dish on top. Some years later we discovered there were over seventeen

thousand sub-assemblies in each and the product breakdown extended over seventeen levels. To cap it all, the design was not stable and there was a constant stream of mods. Like so many products of that era the end result was late and over budget and we were left with redundant material in stores

This convinced Sydney Holmes there just had to be a better way of controlling production and he set up a small team with the remit to go away for six months and see if computers could be used for production control. The team consisted of George Denholm, a Cost Accountant, John Martin from R&D who had some computer experience, and Greg Stewart (actually Gregor Macgregor Stewart - being Scotland we had two 'Greg' Stewarts) from Production. They must have produced a favourable report because towards the end of 1961 Sydney Holmes gave authorisation to add three more to the team with the remit to produce a computer based production control system! Just like that.

The three new starts - none of whom knew a single thing about computers - were Brian Fisher from Production, Brian Macinninie from Drawing Office and myself, a Methods Engineer from Work Study. In practice it did not work out that way. John Martin moved on to join Ferranti Computer Department in London, whilst George Denholm decided production control was not for him and he would investigate the use of computers in costing, which was accepted. This left one beginner (Greg) and three rookies. With more experience we would probably panicked or headed for the hills. In our innocence we just got stuck in.

As an aside, I had been involved in trying to improve the wages calculation process which was in danger of collapsing under a mountain of paper. It cried out for electronic calculators, amongst other things, which in those days were well into the future. In the midst of this I was one of a group of young graduates taken on a tour of the Ferranti factories in Manchester ending with a talk on the new computers the firm was making. Memory suggests it was given by C M Berners-Lee, possibly a forebear of Sir Tim Berners-Lee. At the end the opportunity for questions arose and, full of enthusiasm, I

opined this was the very thing we needed for wages calculation. Oh, dear! I was shot down in flames! "These are scientific instruments" I was told. "They are far too important to be used for calculating wages". It has always struck me that those two sentences encapsulated the reason why, fifty years on, IBM is still in the computer business and Ferranti is not.

As I said, we just got on with the task, admirably led by Greg but there was one awkward snag in that we had no computer. John Toothill was quite clear on this but firm; when we could show him that a computer can be used for production control he would willingly sign a capital requisition but not before. He was as good as his word but until that happy day we were computer nomads, buying time on various machines.

Bruce Peebles, electrical engineers just along the road from our Crewe Toll factory, had a Ferranti Pegasus I with paper tape input and output and this was our first machine. Programs were written in Pegasus Autocode. My very first attempt, I recall, proved the computer could be used to calculate Job Time Sheets and, beginners luck, it worked first time. Then we found that Edinburgh Computers, a joint Scottish Widows and Standard Life venture, had a Pegasus II, complete with magnetic tapes. Being professional gentlemen they closed for lunch so Monday to Friday from 1pm to 2pm we developed our programs on that machine and had a pub lunch from 2 until 3, making for nice short afternoons.

Testing could begin in earnest now and we were sent on a four week programming course at Ferranti Computers London office in Berners Street. As far as I am aware there was never a Cobol compiler for Pegasus and all programs were in machine orders. Numbers were stored and worked on in binary being converted from characters on input and back again on output for printing. Software was non-existent so you wrote your own, although we did manage to get hold of a copy of a sort routine written by Mike Whitaker of Ferranti Head Office. So much for 'the Programmers' machine' as the adverts had it - it was all in the hands of the programmers.

The one hour computer time per day soon became inadequate, especially when it came to systems testing and it was then we found our very own Head Office in Hollinwood had a large Pegasus II installation which, being Head Office, lay idle from 5pm Fridays until 8.30am Mondays, a veritable godsend. The fact that we did not have to pay 'real' money either appealed to Scottish instincts. So, as the system developed 9.35am on Fridays would see us at Edinburgh's Princes Street station would see the four of us boarding the Manchester train complete with listings, programs, magnetic tapes and personal belongings. Arrival at Victoria meant a firm's car to Hollinwood, dump our burden in the computer room and then check in at the Old Red Lion Hotel in Oldham (of hallowed memory). Five o'clock saw us back in the computer room and from then onwards we would work around the clock until 8.30 Monday.

After that it was a firm's car, and as like as not the same driver, back to Victoria and the 9.50 something to Edinburgh. We would settle down in a compartment and mull over our listings. You could almost guarantee that, by Preston, there would be four exclamations of 'Dammit. That's the problem!' as one by one the cause of another error was discovered and another long weekend loomed. Looking back, three out of us were not long married and it says a lot for our respective wives that we remained happily married.

Greg had designed a suite of four mini-systems. The usual input, sort, update and print for the delivery schedule was relatively simple and was followed by a more complex quartet to create and maintain a product breakdown file for each product. Then there was a suite to take the product breakdown and convert it into a logical breakdown which, when run against the delivery schedule, would produce a file of item requirements. Put like that it all sounds so straightforward but when we started it seemed like a Holy Grail.

The first two were progressing steadily when we made our first breakthrough. Memory says it was the Drawing Office who contacted us. A young section leader, Jimmy Macintosh, came over to see us and said he had heard we were working on a program. Their section was doing the design work for the TSR2 systems and they were finding it difficult to keep track of all the mods. Could our new program do this for them? Looking back this was the most significant step we could have taken and all the more important because it was user-driven. When I retired, almost thirty years later, the same basic system though much-modified was still in use and Jimmy was as supportive as ever - but the plane was now the Eurofighter.

We now forged ahead on two fronts. Objective one was to create and maintain an up-to-date Product Breakdown for the Ferranti bit of the TSR.2 whilst at the same time, objective two, developing programs to provide a complete schedule of Item Requirements. Here our friends at Scottish Computers came to our aid and besides the lunch time hours we would do evening sessions on their machine. We would get a set of keys from the Operations Manager, Archie Fleming, and arrive around 7pm complete with boxes of punch card file input, tapes and listings (not forgetting tea and milk - no-one took sugar as I recall) with the aim of producing a clean input tape to take to Hollinwood for the coming weekend. In those days Edinburgh professionals just did not work funny hours and the sight of this gang of ne'er-do-wells loading strange looking booty from the office into Greg's car around midnight gave rise to more than one interesting discussion with the Lothians & Borders police.

It was also found convenient to have a Drawing Office representative on hand during Product Breakdown updates and Gordon Steel would often join us for the weekend. The file itself was growing steadily and soon the resultant printouts ran to several boxes of listing paper to the point where they were both heavy and difficult to handle. For those whose memory does not go that far back output was on continuous stationery, fan-folded to give a sheet something like A3 size. The only way to get multiple copies was to use multi-part sets interleaved with one-time carbon paper or,

failing that, print the file several times. With the old impact printers and a lack of time-sharing this was not a favoured option.

Getting the printout back to base was in itself a problem, made worse by the fact that the TSR.2 was on the secret list. Thus it was that after one particularly successful weekend trip yours truly got the job of visiting our Security Officer to explain the situation. Now he was an awfully decent chappie who listened intently to my spiel and asked surprisingly few questions. In the end he asked "What about the Test Specifications?". "Major", I replied, "They are not part of anything we possess". "Ah, well then, that's fine then. You can send it all back by British Railways Red Star" was his verdict, which is what we did from then onwards.

Up to that point we had tested the full system on small files and all seemed fine. Now, with a complete Product Breakdown and accurate Delivery Schedule the time came to run a full-blown test and another Friday saw us on the 9.35 to Manchester once more. Creating the Logical Breakdown seemed to go on and on and the following stage, calculating the unsorted item requirements filled up tape after tape. The final sort and merge though, normally the Achilles heel, went like a dream. I seem to recall that the resident engineer, Bill Owens, knowing the importance of the run, had given us his home phone number. Thankfully we did not have to use it once. The last lap, printing the output, kept the printer busy for ages to the point where we wondered just what we had unleashed but spot checks indicated all was well so we headed home on Monday greatly relieved.

I think it is fair to say that delivery of the output to Production Control caused mixed emotions. At first taken aback, like ourselves, by the sheer volume of output the more they studied it the more its value became appreciated. They now knew accurately, for the first time for a major product, how many of an item, from an RF block to an 8BA washer, they had to have in store at the start of a fortnightly period to meet the delivery schedule.

For a while, I gather, Sydney Holmes was the star of the Management Dining Room whilst ICS - Internal Computer Service - as we were known, could do no wrong. The supreme accolade came, unofficially of course, from the firm's inveterate gambler for a program to win the Treble Chance, on the basis that he would 'see us right' once he was a millionaire. Of course it was not long before reality set in once more and the first of many requests for improvement came in.

As far as I am aware none of us kept a diary or took notes. I, for one, certainly did not but I believe it was at this point we took on an operator from Production Control. The system was standing up well so after some training Jock Cowper would do the production runs on night shift at Hollinwood whilst we concentrated on development of the system.

Things went on this way for some time. The system stood up well. This I do know because I had drawn the short straw. It was my home number Jock rang if there were problems and by and large I slept well. Production, we understood, was on target as were costs. Sydney Holmes's foresight had been vindicated and all was rosy. Well, you know the rest. Suddenly TSR.2 was costing too much and we could not afford it. All activity must cease. All that work and all those long weekends for nothing: Just like that.

Luckily for us though, it wasn't. 'Hink' Hinckley, the manager at our Dalkeith factory, was developing computer controlled machine tools and wanted our services out there. John Toothill was as good as his word and we got our very own computer, an FP6000, the forerunner of the ICL 1900 series. Along with it came more staff and our very own computer room from which we extended our services to cover all of Ferranti in Scotland. Pegasus days were almost, but not quite, over yet.

Awaiting delivery of the FP6000 we had built up a Product Breakdown for a Dalkeith product, the Ferranti Inspection Machine, on the Hollinwood Pegasus but the only way data could be transferred to the FP6000 was via punched cards so it fell to yours truly to write the final Pegasus program to create the input cards. The only known installation with a Pegasus and a card punch was back at dear old Ferranti Computers in Berners Street and because the card punch, flat out, produced just fifteen cards per minute night shift beckoned once more. So, from a personal point of view, my final Pegasus involvement was a night shift on the very machine I had taken my first faltering steps in machine orders programming some years before. Perhaps someone, somewhere has a Pegasus II tucked away. At least, just down the road at Cosford, they have a TSR.2.

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