Britain's First Space Rocket
Personal Recollections
By George Todd

The following article is the recollection of George Todd's (90) experience during the pioneering days of the "Skylark" rocket development in form of a letter to Robin Brand, author of the recently published book "Britain's First Space Rocket" [1] which is also nominated for the 2015 Sir Arthur Clarke space achievement media award.
The quoted page numbers within the article below refer to the original issue of the book.

MY STORY BEGINS IN MID-1952, when I saw a London newspaper advert asking if one would like to work in the west country; no clue was given as to what the job was or what skills were required. As a scientific assistant in the Admiralty Research Laboratory (ARL/AGE) Teddington, next door to NPL, it seems I fitted their requirements and still not knowing what the job was, I began (after signing the Secrets Act) in August '52 at the Bristol Aeroplane Co., Filton in a new department named simply: GW. My fiancée (also an ARL employee) came with me to Bristol and being a trained draughtswoman found immediate employment in the Britannia design office. We married in November of that year...

The GW (Guided Weapons) building was purpose designed with four floors of offices & workshops enclosing 3 sides of an open area where we later did weighing and C of G tests. The last of the CTV2 program had recently been completed and work had begun on a strange looking vehicle that later became the Bloodhound ramjet powered missile. I was placed in a team (one of 4) installing instrumentation to measure the engine & vehicle flight parameters. The instruments were transducers acting by a fluid (paraffin?) fed through very small bore (≤ 2mm) tungsten-copper pipes, or strain gauges to monitor vehicle stress parameters. The data were sampled on a simple commutator head by a small electric motor and transmitted via the 465 telemetry system using thermionic valves. That they had to withstand a 40 g liftoff of 4 Gosling boosters is incredible to think of now!

We assembled up to 5 or 6 fuselage segments at a time, which were then sent a mile or so down the road to BAE Patchway where the ramjets were installed. Meanwhile we began work on the next set. When a batch was ready we decamped to Aberporth to launch these top secret devices. At the countdown zero mark the vehicle appeared to leap off the ramp to reach over Mach 1 before the Gosling boosters separated, at which point the ramjets "came on" and the bird flew on to speeds beyond Mach 2. We saw some extraordinary maneuvers at times, with bits falling out of the sky in all directions.

Later, around 1956-7 a new department for Space Projects was formed and I was given some interesting projects to "play with", such as a radome erosion test at the Pendine Sands facility. I designed a small instrumentation box with data transmitted on the RAE 465 system through a spike antenna sticking out of the lid looking rather like a Prussian "Pickelhelmet". This odd-looking device was mounted on a sledge that ran on the mile-long rail through a section where water was released to simulate a "6 inch rainstorm". The aim was to test different types of resin bonded fiber cones for the Bloodhound nose covering the Ferranti radar device. The sledge was boosted to high velocity by a bundle of Gosling rockets; reverse thrust rockets were fired by an onboard timer to stop the device - with a sandbank at the far end to be sure!

Around this time I began to worry about the possible use of Bloodhound as an atomic weapon, and was more than pleased when early in 1958 I was moved to form a new section headed by Mike Taylor and 2 others whose names sadly I've forgotten. This was the beginning of Skylark in BAC Filton as a sub-contractor to RAE Farnborough.
I was given the hardware procurement job and often drove my own Morris mini-bus to Farnborough to collect the latest batch of Skylark body sections. I met and got to know some of the people quite well: Frank Hazell of course, and Fred Grey, Des Warr, Arthur Linder et al, in the RAE Skylark group...

I also did some original work, the most interesting of which the workshop christened the "toilet roll": The Jodrell Bank micro-meteorite foil experiment. I was proud of an economic design that used just 3 simple forms to make the tower supporting the instruments above while providing protection for the unrolled foils. This rather "Heath Robinson" device and many other unique experiment installations for Skylark payloads gave me the opportunity to work with senior professors and many young university PhD students, men who later became leading scientists in upper atmosphere research.

There followed - as you have so accurately documented in the book - several years of successes and failures. When BAC eventually became Prime-contractor I was already the project leader, a post which RAE accepted and even arranged for me to fly out to Woomera to meet my opposite numbers. I think now in retrospect this was a little presumptuous; WRE were not fully informed and was not in the mood to be taken over - yet. This took place later as described on p. 350 of your book. About the same time an independent German mobile rocket launching group had beaten us in a tender to supply and launch rockets in an ESTEC campaign to study the solar eclipse from the Greek island of Euböa...

Among other proposals that left my desk was a plan to dismantle and rebuild the Aberporth Skylark tower in Sweden at Kiruna. Launching Skylark from Aberporth was never really possible, and one wonders how it even got so far as to build a complete facsimile of the Woomera complex! It was said that a member of parliament had asked at question time: "if the honorable minister for defence was aware that the impact dispersion circle of this rocket could cover cities such Belfast or Dublin". It was no surprise when ESRO rejected the BAC plan and called for design proposals for a suitable launcher in Kiruna to which we didn't respond.
Soon after this I left BAC following an invitation to head the design and development of BSA Motorcycles - acclaimed to be the world's largest motorcycle manufacturer. My aims to introduce modern management methods (adapting PERT Programs etc., from Polaris) were stymied however by a deeply entrenched "old guard". It was a huge disappointment. After a frustrating year we agreed to part with a golden handshake.

Following a year in the doldrums, on the spur of the moment I visited my former Skylark colleagues; they welcomed me with an offer to start again - which I did in autumn 1968. I began almost where I left off looking after new projects, but with a more outward looking brief towards ESRO and overseas countries in general. In 1969 BAC won a tender issued by the newly formed ESOC facility in Darmstadt. It called specifically for support: a range engineer to lead the launch team in Sardinia. BAC chose to send me, sub-contracted to ESOC, a move I later found had upset the French dominated ESTEC team who were the most experienced group in the business.
My first launch (SN 5/1 with experiments from Bonn University) was a failure and long laughed over in DFVLR (because of a telex sent by a Porz-Wahn headquarters man: "partsuccess". I watched the launch from the bunker doorway and as the spent Cuckoo fell away, saw to my horror the Raven flying on without igniting! I can still recall the acrid smell of explosives mixed with the scent of macchia plants: rosemary etc., scattered all around a large hole in the Sardinian landscape. We encouraged the soldiers to collect as much unburnt propellant as possible and promised a 10er pack of cigarettes per recovered kilo. They found so much we had go to Cagliari to plunder the shops for cigarettes!
After meetings on site with ESTEC/ESOC people, and a very pleasant chap from RPE, it was clear that the ignition unit had not been properly primed. Though none of this could be blamed on me, the affair soon ended when the French led side at ESTEC found that BAC had still not signed the contract! I returned to Bristol via Darmstadt, but not before my wife came out to Sardinia and, being Easter, we took a nice long journey back through Sicily and Rome. The experience brought me in contact with many of the prime movers in the European sphere of "rocketeers", in particular the man who later became my boss: Reiner Klett of DFVLR.
A new man was in charge of the Skylark project, Brian Beattie - the most likable and effective boss I ever worked with or for. The first project I covered on my return was an Earth Resources test flight in Sweden

from Kiruna. The payload carried 5 Hasselblad cameras which were sadly reduced to fragments scattered around the tundra landscape that I later learned to know so well. My interest in "serious" photography was growing at the time, so the thought of all those cameras being dashed to pieces really hurt!!

My most significant achievement was in convincing our design office to investigate the possibility of launching Raven boosted Skylarks from a single rail. NO, not possible, came the reply. I persisted and asked the stress office to "run through the numbers", and was pleased to see that it was indeed feasible. The next move was to ask DFVLR if they would be interested in a test launch of a dummy Skylark from Aberporth - they responded with a plan to transport and assemble their container housed launcher. The launch campaign ran in January 1971 and proved successfully that Skylark could fly from a single rail – released from the bonds of a 3-rail 30 meter high tower!
A Raven motor case was filled with sand, to which a short body Skylark section and nosecone was added to simulate something near a normal weight. When the beam was elevated to the steep launch angle, a mini-waterfall poured out of the back end all over the Cuckoo booster. Wet sand was not a clever idea. It also resulted in an off-center C of G and an extraordinary flight profile at lift-off! Following this success, Moraba was invited to exhibit the launcher complete with a Skylark at the 1971 Farnborough Air-show. I recall some frustrating moments when the shipment of DFVLR containers was lost somewhere in a British Rail goods yard. I went personally with a German colleague through the rows of wagons until we found the missing shipment - he was horrified, fearing that we could be arrested. I do have a nice colour image of the exhibit at Farnborough...
The next most important stage in my personal BAC Skylark history is what I've called "The Ballad of Reading Station" (adapting a well known title). Following a project meeting at RAE, John Furst and myself were discussing ideas for more thrust and higher altitudes as we waited on Reading station for the Bristol train. John was our ballistics expert and together we cooked up a 3-stage Skylark with a Cuckoo as the final stage, and another 2 stage version with a Stonechat booster. During a presentation of these ideas to DFVLR (now DLR) in Oberpfaffenhofen, Reiner Klett asked me if I would like to join his team. It was the chance of a lifetime but a big decision to make. I accepted the offer, and 43 years later we are still here in Hochstadt, a village just 3km away from DLR "O'hofen".

The rest is history - except to say that when I left BAC my bosses were skeptical over my remarks that the future of Skylark lay with the German atmospheric research program.

Your book shows this to be true and later, in a chance meeting at Farnborough, Don Rowley - your page 358 - did actually concede that I had been right...
The years that followed my move to Germany saw me working on the rocket ranges at Andoya, Kiruna and Arenosillo. Being a native English speaker and having already many contacts in the space business, I became more of a coordinator between DFVLR and the various range authorities - enjoying lasting friendships with the several range bosses and university professors participating in the various projects. The Greenland campaign was a special case where it included my surveying the possible site with an SRC representative and a member of the Meteorological Office Copenhagen. In the unforgettable summer of 1974, we (Moraba) built the launch pad with our bare hands, helped by a couple of Bavarian "brickies", but not on the spot I chose!. The campaign that followed (December 1974 through January '75) launching Black Brant and Petrel rockets was conducted in unusually cold weather, down to minus 52 deg C. The auroras however were immense.
My last ionospheric project was the Polar High Latitude Campaign in 197I followed first Texus projects which were basically experiments in preparation for inclusion in Spacelab, Texus 2 (1978) and Texus 3 were my last Skylark "adventures" before moving to Huntsville, Alabama to prepare for Spacelab One mission operations at the Space Flight Center, Houston in Texas. By chance, I was assigned the large format Zeiss Metric Camera Experiment, which involved becoming familiar with Shuttle/Spacelab interfaces with the camera exposure system software, training with the astronauts in handling procedures and monitoring the camera during the flight operations in Houston. I finished the last 3 years in GSOC as configuration manager and administrator of the first Eutelsat before retiring in 1990 aged 65.

I hope this “little” note may add to the Skylark story - compared with your research they are but a few crumbs...
George E. Todd in Hochstadt, Upper Bavaria, August 31st., 2015

Reference:
[1] Britain’s First Space Rocket. The Story of the Skylark (Robin H. Brand)
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