

Bloodhound News

Issue 4 – October 2014



Bloodhound MKII Simulator Restored



Following a two year restoration project by the BMPG, an RAF Bloodhound MKII simulator is once again operational. The restoration ensures that a major part of the UK's defence system, during the Cold War, can be demonstrated for public interest and education.

Comment

Welcome to Issue 4. As promised Bloodhound News would be published as time allowed so having a year between issues means we have been very busy, as the cover photo shows.

The restoration of the Bloodhound simulator is a significant milestone for the Group and only achieved with support from individuals, sponsoring companies and organisations, they have made it possible.

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There is still more work to do, not only in completing the many other restoration tasks on the Launch Control Post (LCP) and Type 86 radar, but also in ensuring the continued operation of the simulator.

We have received tremendous support but as always more help is needed. If you can contribute in any way then I would be pleased to hear from you. We desperately need help with such things as general publicity and the newsletter.

It is no good achieving something if no one knows about it.

What of the immediate future? We have two tasks to focus on: Eliminating technical risks to the continued running of the simulator and preparing the LCP and Type 86 radar for public display.

Regular progress reports on our restoration work are available on the BMPG's Yahoo Group. Why not join?

Pete Harry

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The MK2A LCP

If your experience of Bloodhound MKII is pre 1985 you will be familiar with the original analogue Engagement Controller's console. From 1985 a major upgrade was carried out by Ferranti to digitise the Engagement Controller and Technical Supervisor consoles. Out went the original Argus 200 computer to be replaced by the Argus 700. The Argus 700, being more powerful, enabled the Bloodhound simulator to be integrated in to the LCP. Originally the Bloodhound simulator was a completely separate system housed in its own cabin. The updated LCP was then known as a MK2A which provided a single push button to use the LCP in its full operational role or as a simulator.

Restoration and Running the Bloodhound Simulator

To run the Bloodhound MKII simulator the MK2A LCP's computer system, display console and other parts of the LCP must be serviceable.

A book can be written on what has been achieved over the past two years and the path taken to get there. The BMPG have also had a great deal of support and good fortune, without which the restoration of the simulator may not have been possible.

Faults with the simulator do occur but reliability improves as each fault is resolved. Components left for twenty years with no power applied and in poor conditions can complain when being switched on.

Fault finding is to component level on equipment but where a board is complex or specialist knowledge is required we rely on a sponsor. A summary of the current status of restoration work is given as an appendix to the newsletter.

The Argus 700 and the reputation of the MK2A LCP for reliability can be confirmed by all who worked with this equipment. Now that the simulator's commissioning faults are resolved we expect to enjoy the same level of reliability!

BMPG Yahoo Group

The BMPG Group is open to all who served on Bloodhound in the RAF, worked for the manufacturers, Ferranti and BAC, or are contributing in a direct way to the restoration of BMPG's LCP and Type 86. To join BMPG's Yahoo Group simply Google (or equivalent) 'Yahoo Groups' and then search on 'Bloodhound Missile Preservation'.

One benefit of joining the group is that you are provided with regular updates on progress with work on the LCP and Type 86, along with additional Bloodhound topics initiated by members.

Computer Conservation Society (CCS)

In restoring The Bloodhound simulator the BMPG have gained the support of

the CCS, the CCS recognising our work in restoring the LCP's Argus 700 which is now an officially supported project. The aims of the CCS can be found here: www.computerconservationsociety.org/about.htm.

The CCS is a co-operative venture between the British Computer Society, the Science Museum of London, and the Museum of Science and Industry in Manchester. In a nutshell the CCS supports projects that restore and maintain 'old', mainly British, computers in a working condition. The Argus 700, as used in the Bloodhound MK2A LCP meets the criteria. A benefit of being part of the CCS is that the BMPG have access to a number of computer experts who could prove invaluable for the tasks that lay ahead in keeping the Argus 700 running.

Working Saturdays

Take place at RAF Cosford and all help is greatly appreciated. If you can join the Saturday team you'll be made very welcome. The LCP and T86 are located 'behind the fence' at RAF Cosford so please email contact@bmpg.org.uk in good time if visiting as a security pass has to be organised.



The RAF Cosford Team
Pete Murray (Ferranti), Richard Vernon (MOTE), Neil Cartman (Tech Sup), Dave Scobbie (L Man) and Pete Harry (T86).

The on-site team are supported by Stuart, Gary and Mark Thomas plus Mike Strange.

Surviving Type 86's

When the RAF Bloodhound Force disbanded at the end of the Cold War, four Type 86 radars were disposed of by the RAF. One additional Type 86 was retained by the RAF as a non-working training aid. The four Type 86 radars disposed of were:

- Two Type 86's were sent to RSRE. (Along with a Ferranti trials radar – an ex AD10 with Ferranti mods, not a Type 86).
- One Type 86 was donated to the RAF Museum (Cosford)
- One Type 86 was donated to the Imperial War Museum (Duxford)

The current locations of the four Type 86 radars are:

- Norfolk and Suffolk Aviation Museum – ex RSRE Type 86
- Newark Air Museum ex RSRE Type 86, now derelict, and the Ferranti trials radar on public display
- IWM Duxford. The radar is in poor condition and stored in the open
- BMPG, ex RAF Museum Cosford

Investigation of the remaining Type 86 serial numbers shows that only one is an original RAF Type 86 and that is the radar held by the Norfolk and Suffolk Aviation Museum.

Type 86 – Norfolk and Suffolk Aviation Museum

By the end of the 1990's the number of RAF Type 86 radars had increased with the conversion of ex-Army AD10 (Thunderbird) and Swedish PE-44/R radars (Bloodhound MKII) to the RAF Type 86 standard. The conversion work being carried out by the RAF at West Raynham and Ferranti in Edinburgh. The conversion and upgrade program meant that the RAF Bloodhound Force ended up with a mix of origins for their Type 86 radars. The BMPG's Type 86 is Ser. No 501, ex Swedish.

The BMPG are supporting the Norfolk and Suffolk Aviation Museum as they have an original RAF model of the Type 86. On acquiring the Type 86 it had two missing aerials, the Jamming Assessment and In-Flight Reference aerials. These aerials were removed some time after the radar left RSRE. To make the radar complete again BMPG are working to replace the two missing aerials. The importance of this Type 86 (RAF Ser. No. 104) is that it is the only original RAF Type 86 known to have survived, other survivors are converted AD10's or PE-44/R's radars.



Type 86 Ser. No. 104
Recently undergoing a repaint

The above photo is of the Norfolk and Suffolk Aviation Museum's Type 86 aerial assembly but two aerials are missing.



A complete Aerial Assembly
Spot the difference

BMPG's LCP and Type 86 Provenance

LCP – Ser. No. 1022

From 1970, 1022 was the LCP on 25 Sqn, B Flt, Yellow section, at RAF Wildenrath. B Flt returned to the UK in March 1983 to RAF Wyton where 1022 was the LCP on Kestrel section.

1022 was taken out of operational use for upgrading to a MK2A LCP around 1988, the upgrade being completed for early 1990. The evidence in the LCP was that it was in use 'somewhere' from 1990 to 1991.



LCP 1022, Yellow Section, RAF Wildenrath

Can anyone fill in the gaps for BMPG's LCP 1022? Where was it prior to the move to RAF Wildenrath in 1970 and where was it for the last two years of its operational life, 1990 to 1991?

Type 86 – Ser. No. 501

Following conversion from a Swedish PE-44/R the radar was part of 85 Sqn, C Flt, Yellow section at RAF Bawdsey.

Can anyone add a date or year to 501's arrival at RAF Bawdsey? It is assumed the radar left Bawdsey when 85 Sqn, C Flt moved (in name only) to RAF Wattisham. It is assumed that 501 would have gone to RAF West Raynham some time in 1989.

Bristol Aero Collection Trust (BACT)

BMPG have an agreement with BACT to display the LCP and Type 86 radar at the new Bristol Aerospace Centre, Filton, Bristol. Good progress is being made by BACT and the Centre will open in 2017. For further details on the Bristol Aerospace Centre visit: www.bristolaero.org

BACT are establishing a national standard for Bloodhound MKII exhibits and ensuring that a long term future for a representation of a Bloodhound MKII section is secured. Included in the plan is to have the LCP and the BACT missile/launcher operating for public demonstrations and education on the Cold War period.

What's the connection with BACT and Bloodhound? BACT was the prime contractor for Bloodhound.

BACT have been busy preparing their Bloodhound MKII and restoring its launcher. With support from the BMPG in obtaining parts for the launcher, Brian Blestow of BACT has done remarkable work in returning the launcher to working condition. The results of Brian's efforts are available on YouTube. Search on YouTube for 'Bloodhound missile tracking', 'lowering Bloodhound missile' and 'raising Bloodhound missile'. You'll be amazed at Brian's achievements.

Scrapyard Bloodhounds

Found in an Essex scrap yard; three Bloodhound MKII's. All are in a sorry state with no boosters and other parts missing. The missiles may have come from Aberporth, the chequerboard ram jet being the clue.

These missiles are for sale, if you can save one email contact@bmpg.org.uk for more information.



Three Bloodhound MKII's
In need of a good home!

85 Squadron Association

Hold annual luncheons in London which is well attended by ex-Bloodhound types. For contact details please email contact@bmpg.org.uk.

Visit to Swiss BL-64 Museum - June 2014

Exactly a year after the last visit three members of the BMPG restoration team made the journey to the BL-64 (Swiss Bloodhound MKII) museum at Menzingen. The purpose of the visit is to gather information, documents and receive training from Gustav Aufdenblatten. Gustav was a civilian computer and software support

engineer who worked for the Swiss BL-64 Bloodhound MKII unit and is currently supporting the Bloodhound simulator in their museum. The BMPG are very grateful to Gustav and the management of the BL-64 museum for all their support to our restoration efforts in the UK.

The following photographs give a flavour of the BL-64 museum. An accurate description is; *'The missiles are now inert and the power has been switched off, here are the keys to your museum'*. A case of 'if only' for the UK.



BL-64 'Hardened' T87 and adjacent Ops Bunker containing the LCP



BL-64 MK2A LCP



Displays of Bloodhound Items

launcher was of a design only used for trials firings. Does anyone recall the gate guard and more importantly when was it removed?



Bloodhound Simulator - BL-64 Museum



Always four Missiles on launchers



An Original E.C.'s Chair!

Gate Guard – RAF Newton

What happened to the RAF Newton Gate Guard? The following photo was taken in the early 1960's. The missile is very Bloodhound MKI looking but is believed to be a test vehicle. The



RAF Newton Gate Guard

Bloodhound Side Loader

Over the years the RAF Museum at Cosford has disposed of most of the Bloodhound section originally donated by the RAF, but one item has survived; the side loader. The following two photos show the condition of the side loader and evidence that it is still in use.



Restored Side Loader – RAF Museum Cosford



Moving a Jet Engine – RAF Cosford

It is good to see a side loader still in use, unfortunately with no missile loading beam.

There has been much discussion on surviving Bloodhound side loaders with photographs in the BMPG Yahoo Group.

Firing a Bloodhound MKII Missile



Bloodhound MKII

Awaiting a trials launch at RAF Aberporth

With thanks to Dennis Buck, Engagement Controller, 25 Sqn, B Flt, RAF Wildenrath.

'When I happened to mention to Peter Harry that I had fired a missile, not in anger but as a routine check of the serviceability status of the missiles deployed in West Germany in the mid 70's, he asked if it were more exciting than the standard defence exercises where aircraft were intercepted by radar and the computer decided if a kill was accomplished.

I have to say that, as any one playing computer games knows, when the scenario is quite realistic and a sense of achievement is obtained even though the missile does not leave the launch pad, it is really exciting.

Firing against a Jindavik was cold and calculated with the target at a reasonable height to ensure success unlike the wily fighter pilots who flew at tree top level.

In the mid 70's I was a reluctant Engagement Controller at RAF Wildenrath wishing I were flying an aeroplane rather than being stuck on the ground but Germany had its consolations during the time of "Fuel Crisis" as any one there will remember.

A missile would be selected at random from one of the three sites and taken

to RAF Aberporth where it would be dismantled and rebuilt which really didn't make it a genuine test of its serviceability. A problem at the time was gaps in the solid propellant which could cause failure of the booster rockets.

Somehow I managed to convince the Boss I was keen to fire a missile by basically saying in no way did I want to go and flew to RAF Northolt in an ancient Pembroke aircraft and from there took a train to RAF Aberporth.

Days were spent waiting for the weather and other factors to come together until finally I found myself sitting in the LCP looking for the target. Sure enough there it was with the missile locked on.

Thoughts ran through my mind.....I had been ordered not to press the firing button and rush outside to see the missile leave the launch pad and the previous Engagement Controller had missed seeing the "Green" light and the Jindivik had to be repositioned for a further attempt.

Closer came the target, the red light changed to green and just as I was about to press the Firing Button the officer in charge said, "Are you going to fire?" How close I came to missing the window I am not sure but off it went with bit of a whoosh as far as I can recall.

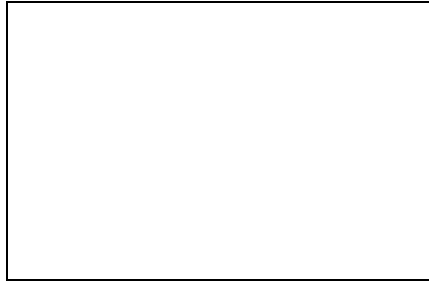
A barrel of beer at my expense rested on hitting the target and as the warhead was removed this was quite unlikely and sure enough the missile passed happily by but well within a kill range judging by the photos I saw later.

Outside there was a trail in the sky and after finding a nose cone as a souvenir I went to the mess to celebrate.

Later the real satisfaction came from being able to tell people I had actually fired a Bloodhound missile when they asked'!!

Bloodhound Leaves Germany

In 1983 the last two flights of 25 Sqn left RAF Germany for redeployment in the UK. The following photos are courtesy of Jim Sewell, OC A Flt at the time.



**Convoy leaving 25 Sqn, A Flt, RAF Bruggen
February 1983
A towed T86 followed by the LCP**

Tales of the journeys made to move Bloodhound back to the UK have now passed in to Bloodhound folk law. Towing a Type 86 back to a channel port and then to RAF Barkston Heath at 30 MPH was challenging enough but forming a mobile road block with police escort across Holland was not appreciated by other drivers! It may be understandable that the Type 86 is no longer allowed to be towed on public roads!

The return of Bloodhound to the UK initiated a program of updates that maintained the performance of the missile system against new threats and capability. Bloodhound was not stuck in the 1960's



Presentation to Air Chief Marshal, Sir Jock Kennedy, Flt Lt Jim Ramsay and OC 25 Wg Cdr Tony Collins on 12th January 1983



Setting up at A Flt's new home, RAF Barkston Heath

The MOTE – A Tribute

One purpose of the newsletter is to cover all aspects of a Bloodhound system and one area not yet addressed is the Missile Overall Test Equipment (MOTE). Ground Radar Technicians being sent on a MOTE course at RAF Newton, or in later years at RAF North Coates, could look forward to a posting to RAF West Raynham. RAF West Raynham was both a Bloodhound operational base and force support unit.

Why a tribute? It is simple because no MOTE remains. The following photos were taken by Richard Vernon at the

BL-64 museum some years ago. Unfortunately the MOTE photographed here has been disposed of!



MOTE – Front



MOTE - Rear



MOTE - Centre Control Panel



MOTE - Fuze Rack (Top)

The 'Analogue' Days

Occasionally visitors to BMPG's LCP at RAF Cosford make the statement, with a tinge of disappointment, 'I don't remember it being like this'? The reason being they were remembering the Bloodhound MKII LCP prior to 1985.

Pre 1985 Bloodhound MKII LCP's were a different world for the Engement

Controller and the Technical Supervisor. Post 1985 everything was going digital! Anyway, for the 'analogue' guys the following photograph should bring back memories.



Engement Controller (E.C.) and the Technical Supervisor at their 'analogue' control and display consoles.

Mystery Photo

Obviously a museum but where is it?



Answer in the next newsletter.

... and Finally

Thanks go to the following contributors for content and photographs:

- Dennis Buck
- Neil Cartman
- Richard Vernon
- Pete Harry (myself)
- Jim Sewall

Copy write of photographs resides with those acknowledge above. No reproduction of any photograph is to be made without the express permission of the copy write holder

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LCP and T86 Restoration

Restoration Comment

The restoration update is now a single page summary as detailed reports, on all aspects of the LCP and Type 86 restoration, are provided through regular updates in the BMPG's Yahoo Group.

The achievement of restoring the Bloodhound simulator means that the LCP's Argus 700 with its input/output systems and the display console are now serviceable. Achieved by the on-site team at RAF Cosford and, more importantly, with the support and assistance from the BL-64 museum, individuals and companies, without whose help we would not have succeeded. Do not think that the BMPG and its Cosford volunteers achieved this goal on their own simply by switching on the LCP and fiddling about.

Once agreement has been reached with all our sponsoring organisations their contributions will be fully acknowledge, initially on a revamped BMPG web site.

I have heard the BMPG being described as 'enthusiasts'. We are more than that but then we are dedicated and enthusiastic about what we do.

Pete Harry

LCP Restoration

The Challenge

After the LCP was left in a field (well the environment was the same) with, more often than not, the doors left wide open, it meant the restoration task had to deal with the effects of dirt, water, condensation and oxidisation. Not ideal for any electronic environment.

It was not only the poor environment made the simulator restoration a challenge, the display console was incomplete. The upper switch panel and the E.C.'s keyboard were missing. It is suspected that someone liberated these items in the interests of their electronic hobby when the LCP was in 'store' and completely abandoned.

1st, 2nd and 3rd Line

Fault finding takes place down to component level as spare units are limited or non-existent. Basically; 1st and 2nd line happens on-site at RAF Cosford while 3rd line is a spare room in Pete Harry's house. In the case of Argus 700 board repairs we have the support of a specialist repair company. The Argus boards suffered terribly due to condensation but a benefit of the technology used means that components can still be purchased. Good old eBay!

Power Supplies

Initially all filter capacitors were changed in the Farnell G Series power supplies in the computer racks and display console. A task that stopped copious amounts of smoke issuing forth if we had switched the LCP on! Occasionally a power supply will still fail but the cause is almost certainly a small bead Tantalum on the power supplies control board. They obviously did not like their environment of the past twenty years.

Board Swapping

A well-known technique used by some RAF technicians! In trying to diagnose faults with the simulator boards were being exchanged, if we had a spare. Unfortunately the condition of the replacement board was not known so one fault was often exchanged for another, or even worse introducing additional faults. In the end a complete set of serviceable Argus 700 boards came together and the software booted.

The majority of the original RAF Argus 700 boards proved to be U/S and a running Argus has only been achieved with loan boards from the BL-64 museum. Our colleagues in Switzerland would send us a spare board if we requested one.

Aural Doppler

Following the restoration of the LCP's Argus 700 and display system, the next task was to restore the aural Doppler. The aural Doppler is processed by cards

in D rack so this was the first foray with the original technology of the LCP, Germanium transistors et al.

The restoration of the aural Doppler and the Timer Relay Unit in Z Rack is now complete. Target Doppler sound, alarms and the one second ticking has returned.

Comms and Headsets

Internal communications in the LCP has been restored and headsets are working. All facilities needed to run simulator exercises, as per operational Bloodhound MKII sections, are complete.

Occasional Errors and Power Trips

Since the simulator was restored occasional display errors and power trips do occur. It is believed this may be mains related and investigations are in progress.

The Winchester Challenge

To secure the future running of the simulator the original Winchester has to be replaced, we have no spares, nor can we obtain any. A program has starting to upgrade the Argus 700 to a SCSI interface and then to solid state emulation. It is the only way forward.

Type 86 Restoration

Woodwork

The main restoration effort has been on the LCP and its simulator but work has continued on the Type 86. Roof decking has been replaced and rotten wood from the sides of the cabin removed.

Corrosion

The Type 86 cabin is constructed from aluminium alloy sheet so no corrosion problems! Unfortunately the cabin roof at the base of the aerial pedestal is sheet steel and is badly corroded in parts. How to deal with the areas of metal wastage has yet to be decided.

Email: contact@bmpg.org.uk