



## **Radio and radar in emergency service provision**

### **70 years of radio and radar history**

In this month's Hot Topic we go back 70 years to look at the role of radio and radar in the Second World War and translate this experience to the present day and a perceived need for integrated radio and radar systems in emergency service provision.

Technically it could be argued that Germany won the war. Aircraft, rocket and radio technology were all areas where engineering excellence delivered significant competitive advantage. For example German radar technology was arguably superior though less effectively deployed.

In the US, Motorola drew on its experience of designing and manufacturing car and home radios to produce the first generation of 'walkie talkie' radios for the US infantry and exploited FM as a 'hard to jam' modulation technique borrowing from experience with high power FM broadcasts.

There are many lessons to be learnt from a study of this remarkable period of radio history and its impact on the post war, present day and future radio world. In particular the close coupling at device and system level between broadcast receivers, two way radios and radar products remains as directly relevant today as it was 70 years ago.

### **The valve that won the war?**

In November 1936 the first VHF television broadcasts started from Alexandra Palace in London.

This created a demand for television receivers which in turn created a demand for valves and tuned circuits capable of working at VHF with sufficient dynamic range/gain control and receive sensitivity.

In the late 1930's, NV Philips of Holland had designed a new high gain, low capacitance series of all-glass valves, the EF50 series. These were used to produce televisions that would work more effectively in areas with weak reception.

This valve was also used in radar products and two way radio systems. As such it has been described as 'the valve that won the war.'



### **The radio that won the war?**

When the British expeditionary force arrived in France in 1939 they discovered that the German infantry had significantly superior radio communications, using short wave for back to base communications and VHF for short range exchanges.

In the UK a rapid design project was put in place to produce a dual band short wave/VHF radio that could offer similar capability.

This has been described as 'the radio that won the war'.



### **The radar that won the war?**

In 1939, VHF TV broadcasts were discontinued to avoid the signal being used as a homing beacon for incoming enemy aircraft.

The Ministry of Supply realized that radar was likely to be crucial both for detecting incoming enemy aircraft and to provide information for Fighter command to plan a combat response.

The first radar receivers needed a high gain broadband 45 MHz IF amplifier which was conveniently borrowed from a pre war television receiver design.

Arguably the best known radar system was the series of 'chain home' radar stations

along the South Coast. Without these systems it is generally considered that the Battle of Britain would have been lost and the Germans would have established aerial supremacy over at least the southern half of the UK.



### **The plane that won the war?**

In 1931 Lady Lucy Houston, a former professional dancer and chorus girl known as Poppy to her friends and wife to three rich husbands donated £100,000 to the Supermarine Aircraft company so that they could enter (and win) the Sneider Trophy at a speed of over 600 kph. The same plane provided the basis for the development of the Spitfire.

The Spitfire is generally considered to be the plane that won the war.



This is the famous Grace Spitfire credited with having shot down the first enemy

aircraft at D Day over the Normandy beaches in June 1944 - picture by Darren Harbar

There are many other machines and devices that had a major impact on military effectiveness. For example in 1940 Messrs Randall and Boot had developed the cavity magnetron, a curiously shaped device capable of generating high power microwave frequencies. When combined with a duplex switch developed in the US this provided the basis for improved microwave radars which could be installed on aircraft to provide high resolution ranging and detection. Magnetrons are still used in microwave ovens today.

The ability to produce devices capable of generating power efficiently at microwave frequencies provided the basis for the world's first transportable time-division multiplexed 4 GHz microwave link, used by Field-Marshal Montgomery for secure communication across Europe and back to the UK following the D-Day landings.

Did radio and radar win the war? Well they certainly made a significant contribution but so did the Siberian Winter. History is not a discipline of simple truths.

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