



# ***e-DEFENCE ELECTRONICS NEWSLETTER***

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## **BREEDING CENTAURS**

In modern military electronic-speak, a **centaur** is a human/machine combination in which the human uses the power of the machine and artificial intelligence (AI), but reserves the final decision-taking to him/herself. The human's power is enhanced by the machine (as the human element of the centaur had its speed and energy enhanced by the horse element), but the horse's thinking and decision-making power is, hopefully, enhanced by the centaur's human element (it is not only equestrians who may doubt the validity of this latter statement, but let us follow the theory for a moment - *Editor*). The US Department of Defense's DARPA has for some while been working on the implications of this, as recently reported in the AOC's excellent eCrow.

These concern the move to bypass interface problems by plugging the computer directly into the human brain; in one DARPA experiment, a quadriplegic first controlled an artificial limb and then flew a flight simulator. Now, as the article points out, "if your nightmare scenario is robots getting out of control, then *"let's teach them to read our minds!"* is probably *not* your preferred solution". The objective is, however, currently explained as to *improve* human control over artificial intelligence. Teaching AI to monitor its user's level of stress, exhaustion, distraction, and so on, it

is argued, helps the machine adapt itself to better serve the human — instead of the other way around. Teaching AI instantly to detect its user's *intention* to give a command, instead of requiring a relatively laborious push of a button, helps the human keep control — instead of having to let the AI off the leash because no human can keep up with it.

Letting the AI off the leash is a very real military issue, called the '**Terminator Conundrum**'; in summary, if your rules of engagement will “never” allow an artificial intelligence to decide for itself whether or not to kill a human being, then your enemy's AI, which may not be so configured, may well fire first – there are, of course, obvious non-technological parallels in current experience of today's asymmetric conflicts with opponents with drastically different ethical codes. In terms of military electronics, DARPA's neuroscientific research suggests one way out of this dilemma: instead of slowing the AIs down, make the humans' orders come faster. Hence, this development into **human-machine teaming**, as the term is, an aspect of the Pentagon's interest in what's known as the “**Third Offset**”, the aim of which is to counter (i.e. offset) opponents' advancing technology with revolutionary uses of AI.

A linked potential which has not gone un-noticed is that, while technology and indeed AIs can be uncovered by espionage and copied, the human element (so far) cannot, and that is a significant security factor – although, of course, the human being can defect. It is some 25 years since your Editor and Barrie Sherman penned their first book on Virtual Reality, AI and their implications (*Glimpses of Heaven, Visions of Hell*, Hodder & Stoughton), and the technology there described is now pre-history; issues such as centaurs, however, are only now beginning seriously to be addressed.

Turning to eDEN 61, we first of all record, with the greatest regret, the very sad loss of **Lt Cmdr 'Bill' Legg**, curator for many years of the **HMS Collingwood museum** and a most helpful, knowledgeable and hospitable host to all who made enquiry of him – and there were many, who have much for which to thank Bill, not least for keeping the Collingwood flame alive against all the odds; rest in peace, Bill, “duty carried out”.

eDEN 61 goes on once more to span the 20<sup>th</sup> century, beginning with an excellent discovery by **Jeff Jefford** of the elusive '**clapper break**', the means of varying the tone of spark transmitters so that individual sets used by a Squadron could be identified – quite a challenge, with a spark transmitter! We print, as one, the entire series of short articles from the early-post-war '*Wireless World*' which details the use (and abuse) of the Sterling spark transmitter and then explains the 'clapper break' mechanism; many thanks to Jeff for his persistence in locating this solution. We then move on, as promised last month, with a description of the transmitter used by **22 Squadron**, in its experiments with **radio-telephony in 1918, together with all the manuscript notes made by radio officer C E Stewart**; the manual was preserved by pilot **WFJ Harvey**, and our thanks once more both to his son **Rupert Harvey for permission to use**, and to **Mike Dean** for OCR.

On then to the third of the outstanding series of articles charting the history of **Radio Warfare in the Royal Navy 1900 – 1945**, which **John 'Jacey' Wise** most kindly agreed to serialise here in eDEN, and next, again as foreshadowed last month, to the continuing detective story of tracing **Oboe's** missing man, '**Gav**' **Samson**, ZL4AI/ G5ZZ, with, as promised, the excellent and copious discoveries made by our New Zealand member **Grahame Fraser**, further research by **Mike Dean** and helpful input from **David Robertson**; to illuminate the equipment used at this early stage of Oboe development, we reprint Mike's article on their forerunner, the '**Baillie Beams**'.

Bringing us up to date, *eDEN* 61 then prints several of the news articles on the puzzling **collision between the USS *Fitzgerald* and the container ship *ACX Crystal***. It would seem that most of the several investigations will be reported only in private sessions, which, while respecting the security implications of the *Fitzgerald*, in this instance is unfortunate; a collision between two modern vessels, one a warship equipped with a very capable radar, appears to merit scrutiny in public.

Back to the present day, there follows our **Publications List**, and in *Tailpiece* this month, **Mike Dean** poses the question of the location of interference with a North African radar - in 1939!

Part II this month stems in part from your Editor reviewing the Index of *eDEN* 1 – 60 circulated last month, and considering the gaps in our coverage. We have so far devoted almost no space to two of the humblest electronic items - first, **wire**, and second, the part played in military affairs by the **telephone**. By chance, in the course of research into 'Gav' Samson, who of course worked for **STC**, **David Robertson** mentioned the two immediate post-war books by **Douglas Reekie** which covered contributions made by STC to the Allied effort in World War 2, and in particular Reekie's work "**These were the Nerves**". Recovering these from the back of the bookshelf, with murmured apologies to Douglas Reekie for that disrespect, it was apparent that this work does cover in a very readable format the use of both wire and the telephone, and the related work of the Royal Signals, with some surprising information (for example, where is **Nasratabad** and why was it important?) and we therefore reprint the relevant parts of this work – well worth the read in August! **Tailpiece II** brings us back full circle, to our Autumn Symposium 2017 and the **Battle of Tsushima**, with the **preserved Japanese battleship *Mikasa***, a veteran of that conflict!

As always, suggestions for improvements, offers of articles and all general comments to me at [philjudkins@btinternet.com](mailto:philjudkins@btinternet.com) or [info@dehs.org.uk](mailto:info@dehs.org.uk).

Dr. Phil Judkins, DEHS Chairman.

## **LIEUTENANT COMMANDER WILLIAM ELI LEGG** **ROYAL NAVY**



We are sad to report the death of Lieutenant Commander William Eli Legg Royal Navy, erstwhile curator of the HMS *Collingwood* Museum. Bill carried out this calling for just over 20 years, seeing the museum through a number of ups and downs, but he always remained enthusiastic and put his

all into preserving the Wireless/Radio and RDF/ Radar heritage that he and his predecessors had garnered since at least 1953. Bill was known throughout the UK and abroad for his knowledge of Weapon Engineering history and his willingness to share that knowledge and the resources of the *Collingwood* Museum with all who sought his help. He will be sadly missed by all who knew him.

Bill Legg was born in Somerset in 1934. He joined the RN as an artificer apprentice in 1951 as a member of Series 11 entry. On completion of his 5 years of training, Bill became a Radio Electrical Artificer and served in a number of Ships and Shore Establishments before being selected for promotion to officer. He was commissioned as a Special Duties (Radio) officer in 1966 serving in HM Ships *Rhyl*, *Euryalus*, *Scylla* and *Jupiter*. He also served ashore in *Collingwood*, ASWE, *Dryad*, DSWP and DGSW(N) and had an appointment serving under the Malaysian Government. Bill was selected for promotion to Lieutenant Commander in December 1976 during his service in HMS *Scylla*. Whilst he retired from active service in 1988 he still served in HMS *Collingwood* as a Retired Officer until 1997. Bill had more than one string to his bow and was well known in the WE World for the enthusiastic support he gave to the HMS *Collingwood* Officers Association, especially in organising major social events such as Winter and Summer Balls.

*Lt Cmdr Clive Kidd, Curator HMS Collingwood Museum.*

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