RNARS

NEWSLETTER

Royal Naval
Amateur Radio
Society

Autumn 2019

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Front Cover: HMS Monmouth

HMS *Monmouth* is the sixth "Duke"-class Type 23 Frigate. She is the seventh ship to bear the name. She was Laid down on 1st June 1989 and launched by Lady Eaton in November 1991, being commissioned two years later in September 1993. Monmouth has completed a variety of duties around the world including more recently as an escort for HMS Queen Elizabeth to America where the carrier performed F-35 Lightning II flight trials. *Monmouth* is the only ship in service with the Royal Navy that has its name painted in black and flies a plain black flag in addition to the ensign. This is due to the dissolution of the title and the blacking out of the Coat of Arms of the Duke of Monmouth in 1685 following the Monmouth rebellion against James II. As of 2018, *Monmouth* carries the most battle honours of any ship's name currently serving in the Royal Navy.

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www.rnars.org.uk

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Those members who use automatic banking facilities with dates other than 31st of March or April 1st, please contact your bank to change the date of your subscription payment. In this way you are helping to reduce the workload for our Secretaries and Treasurer. Thank you.

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The RNARS is grateful to Phil MØVSE and Wayne G6NGV Taylor of **Shine Systems** for hosting our web site free of charge: **www.rnars.org.uk**

A gentle reminder to everyone:
When the subscriptions changed to £15, it would appear that a few members may have not changed their annual subscriptions from the old £10 when the change came into effect. Can you please check your payment arrangements and update them to the current subscription of £15. **Thank you.**

CHAIRMAN'S CHAT

David Firth
M0SLL@mail.com

BREAKING NEWS!
PAGE 13

Development is moving ahead to have a satellite system installed in the shack, focused on linking up with the Es'hail 2/QO-100 geo-stationary amateur satellite. We have already demonstrated adequate receive capability via a couple of dishes hung beneath our Delta-loop, and this was shortly followed by a neat transmitter aerial. We have had the excitement of setting up and working our DMR repeater with which we can talk to members from around the world. However, with a satellite link we will be able to use RF far and wide with much greater convenience than before. Incidentally, the new DMR system has been gently tweaked for optimum performance improving its RF range into the local community around the HQ shack.

At the time of writing several of our members are preparing to participate in the National Field Event during the weekend of 7th to 8th of September. The competition runs from noon to noon, and it is based in a field near Lymington in deepest Hampshire. Good luck!

A bit of cheer perhaps, to dispel anxious feelings among Ancient Mariners about our shrinking defence capabilities in recent years. Some things have been a-stirring to improve the Navy's outlook for the future with new combat systems and better communications systems entering development. We all shuddered when naive defence cuts deleted Coastal Command, the aircraft carrier, the FAAs fixed wing aircraft, Nimrods, and Type 42 Destroyers with their well-proven multi-point capabilities. Perhaps the message is getting through. It would seem that a lot of people in key areas have been persuaded in the past to make poor choices that have both weakened the defence of the realm, and our interests in guarding our trading supply lines. Let's hope we are turning a corner.

Best wishes to you all, *David*

MEMBERSHIP MATTERS

A very warm welcome to our new members, and to re-joining members.

New Members		
Warsash Sea Cadets	SWL -	5066
Thomas Kenney	G1FAD	5067
John Allan	G4LTH	5068
Jack Hunt	SWL	5069
Edwin Daniels	2E0LLD	5070
Neil Archer	SWL	5071
Ben Taylor	M3ZVP	5072
Graeme Morgan	VK5GG	5073
Mario Kricheldorf	DJ8NU	5074
Bob Davidson	VE1RP	5075
Dale Romagnoli	VE7YTB	5076
Aubrey Meredith	2E0HTX	5078
Charlie McConnochie	MM0OUU	5079
Rejoined		
Prof. Gary Heald	G0VLJ	4396
Ian Hopkins	G4WUH	2832
Changes to Callsign		
Lt Cdr Simon Murray	MM0XME	5065
Bob Blackman	2E0OBO	4884
Resigned		
Vernon Elliott (not operating due to age)	G0IGB	4057
Silent Keys		
Brian Walters	G0OAK	4811
Jack Goodman	G4PIJ	3532
Les Lawbuary (was lapsed)	EA5AVL/G3WMZ	4888
Mick Matthews	2E0BYC	4718
Sepp Langer*	OE3OLC	4675
John Juleff	G4MXU	1892

On your annual subscriptions!

-go for the e-mail editions and have the Newsletter delivered to the comfort of your own computer screen!

YL RADIO OPERATORS

Young Ladies (YLs) In The RNARS
We would like to hear from you

In the last two years there has only been a single article submitted by one of our lady members (Maren). There is a whole 'fleet' of YL operators out there who must have served in the armed forces including the Royal Navy, and who may have thought that when they left, well, that's the end of that. No it isn't. Do you have a story to tell? Are you still operating? If you served as a radio operator or are now a veteran or even a radio amateur, you can still join us as a member. We'd love to hear from you, you may have a story that you would like to share with us. Here is a story for you about a collaboration between the Canadian and Norwegian governments to train and employ a team of YL radio operators on seagoing ships -read on...

WORLD WAR TWO CANADIAN WOMEN SHIP WIRELESS OPERATORS

THEIR UNKNOWN STORIES!

Many years have passed since World War II. It is time to recognize these once young women, who if still living would be in their mid-eighties, for their bravery and job well done!

Maritime historians, the Canadian government and the public at large should be made aware that during WW2 Canadian women served as wireless operators aboard vessels of the Norwegian merchant navy. That they were prohibited from serving in this position aboard Canadian flagged merchant ships was the mindset of the times - perhaps women being considered incapable of handling the responsibilities involved. Whatever the reasons, and

despite all obstacles and preconceived notions, these women proved they could handle communications very well and under stressful conditions during wartime on the U-boat infested Atlantic Ocean.

Of the nine thousand foreigners who served aboard Norwegian vessels during WW II about 2000 were Canadians, according to records received from the Norwegian government archives in Oslo, Norway; this volume of microfiches now being held in the DVA archives in Prince Edward Island. Of these 2000 Canadians, twenty-two were young women who served as wireless operators aboard Norwegian vessels and this fact of maritime history must surely be one of the best kept secrets of wartime! Undoubtedly, the reason knowledge of these pioneer wireless women is virtually unknown here in Canada is because they served aboard vessels of the Norwegian Merchant Navy, "not" Canadian! Unknown not only to the populace in general but to the Canadian government as well. To illustrate this point, at the unveiling of the Battle of the Atlantic Stamp in Halifax, Nova Scotia on May 1, 2005, one of those present was Mrs. Berit Pittman, a Norwegian Canadian, who had at one time been part of Norwegian External Affairs. Mrs. Pittman was provided with the microfiches of the foreign seamen in order to confirm those Canadians who had served on Norwegian vessels when Canada finally approved a benefit package to Canadian merchant navy veterans.

Mrs. Pittman commented that there were no women on the commemorative stamp! Admiral McNeil of the RCN conferred with the Canada Post representative present and in the discussion that followed Mrs. Pittman was asked to provide relevant information to the Chairman of the Stamp Advisory Committee in Ottawa. Mrs. Pittman wrote to Canada Post and their reply was...
'...you are wrong, there were no women involved during the Battle of the Atlantic!"

Perhaps we shouldn't fault history or the Canadian government because, from the little information available on these women, information acquired primarily from old newspaper clippings or word of mouth many years ago, all sources for data have long since disappeared into the mists of time, aside from the Norwegian records that is. After all, the war ended 60 years ago and of the twenty-two girls who served at sea then, only a half dozen were in their very early 20s - which would make any survivors of that group now in their mid 80s! If their stories haven't been told or made known by now they never will be. Even more amazing is that even within their own families often little is known about their wartime experiences.

www.qsl.net/ylradio/stories.html

DIVERSE REPORTS

G3BZU/p

National Field Day 7th-8th September

With the RNARS original call sign, six of our members will be off to set up base camp in a field in the Lymington area where they intend to participat in this RSGB competition. The operating parameters confining the mode of operation to SSB up to a maximum power of 100W over a period of 24hours from 13:00-13:00UTC. The bands in use are -80, 40, 20, 15, 10m, and the operation restricted to 1 transmitter at any one time. We are awaiting the results of their efforts from deepest Hampshire near the sea, so watch this space. Well done to Martin M0EHL, Ian M0LIH, Alan M6LFM, Mike M6POY, Andy 2E0REE,, and Joe G3ZDF -fingers crossed for the weather!

National Hamfest -RAFARS

The RAFARS pitch will be in attendance the National Hamfest at Newark on 27/28 September.

Congratulations

To Lt Paul Lane (aka "Shady") on getting his new callsign **M7PVL**

And to Alan - M6UIT

Who has fitted yet another aerial to his trusty steed; we gather from its size that it is an HF twig. Nice one Alan!

with apologies to Mr R Rover

Anyone for a fox hunt?

There's a wee rumour going about that there might just be an upcoming 'Fox Hunt' in the autumn in the area surrounding the HQ Shack. Watch this space for further news!

Current Situation

Definitively speaking a Watt is where a current of 1 amp flows for 1 second with an applied potential difference of 1 volt. However, I once found an amp in tears on the pavement when I was on my way to school. I asked it what was wrong to which he replied while sheepishly wiping away a little tear that he had lost his way ohm....

HMAS BELCONNEN

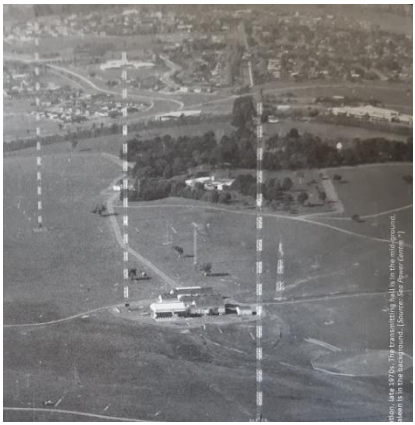
Prompted by one of our Australian Members

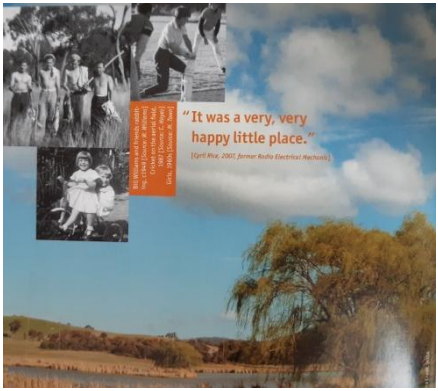
During the first half of the Twentieth century, advances in long range radio communications technology resulted in its increased importance for military use between shore bases and ships on active service.

The Belconnen site was selected and built in 1938 to play an integral role in naval radio communications. Officially opened on 20th April 1939 and known affectionately as "Bels," the Belconnan Naval WT Transmitting Station was the most powerful radio transmitting station in the southern hemisphere. It was kept operational 24/7 every day of the year for a total of 66 years, providing the strategic backbone of Australia's communications infrastructure with the rest of the world. Bells made its first operational transmission on the 22 of December 1939, and for the duration of the war communicated with merchant and fleet shipping around the world.

Bels had a very powerful 200kW RF transmitter operating on the LF band at 44kc/s which was deemed powerful enough to break through atmospheric noise problems and to be received by submerged submarines. The aerial was supported by 600-ft high masts spaced out at a quarter of a mile apart in order to support the massive aerial, sited east-west to maximise distances deep into the Pacific and Indian Ocean. The great advantage of LF transmissions is that the radio wave follows the earth's curvature, whereas short-wave was less reliable – bouncing off the ionosphere causing `gaps' in reception areas. To those of us familiar only with ship borne radio, "Bels 44" was positively awe inspiring. Together with Rugby it could communicate with the British Fleet and merchant ships around the world. The aerial-coil room alone occupied as much floor space as a small house. Such was its electromagnetic induction power that an isolated hand-held household fluorescent tube would light up in its vicinity. At full-bore, it generated so much heat that its output valves had to be water-cooled to prevent meltdown.

HF transmitters were also installed at Bels. In the beginning two 20kW and one 10kW rising to a total of 48 during the operational lifetime of this busy WT shore station, all due to the rapid technical improvements in HF systems technology. A few of the HF transmitters were used for the `Ship-Shore' service. They were so state-of-the-art that they were tuned to ten pre-set frequencies, any one of which could be called up by 'sparkers' at HMAS Harman in the time it took to select one digit on a telephone dial. Bels worked as the outstation to HMAS Harman -the Comcen.





Living and working at Bels was a very lonely occupation, because it was quite a distance from the nearest town which was Canberra. Belconnen was the next thing to a remote sheep station way out in the outback. The transport driver was the only connection to the outside world for the families who lived in married quarters. He would make two trips a day taking mail and stores to Harman and at the same time taking kids to school, wives and mums to the shops for vital provisions, and sick sailors to hospital. On the way back he would carry bread and ice for the ice boxes. For the 35 people living on the base they found that its isolation was one of its strengths, there was a very strong sense of community, but In 1995, and bowing to the pressures to modernise and for a joint services approach by the Australian government, the Navy left Belconnen after 56 years of service, yet the site remained in service under the day to day management of a civilian defence contractor until it was finally decommissioned in 2005 -many years of service that included WWII, the Korean War, the Vietnam War, every day naval communications, and relaying the 1956 Melbourne Olympic results to the world. The last message was sent from Belconnen on 17 June 2005.

Culled from different sources including:
Defence Heritage Australia

Naval Historical Society of Australia

WHAT'S IN A WATT?

Onno Benschop, VK6FLAB

"We need more power. I'm giving her all she's got, Captain! She cannae take anymore."

I'm sure your Scottish ancestors are rolling in their graves right now, but in our community of radio amateurs we have a tendency to advocate the use of more power. More power fixes all problems and hides all sins. Another way to look at that is to think of the station with more power as an alligator, all mouth, no ears. Before you dismiss this as another advocacy for QRP or low power, let me point out that more power creates more interference, more potential for harm, more electricity consumption, more wear and tear and more cost.

Previously I've spoken extensively about QRP communications, making contact with 5 Watt or less, but let's have a look at how much less. I managed to contact a station on the other side of the planet with only 5 Watts, Perth to Cuba and for me that was proof positive that all this was possible, even feasible. We're doing much better than that.

One measurement is to calculate how many kilometres per Watt you achieved. My example of 5 Watt between Perth and Cuba is the equivalent of 3592 km per Watt. The maximum distance to the opposite side of our globe is about 20,000 km and my contact did nearly 18,000 km. If you think that's amazing, I should warn you, my contact was special, for me, but as low power contacts go, it's not that amazing.

The first solid state radio contact made across the Atlantic ocean managed over 76,000 km per Watt. That was on 18 September 1956. You'll find the radio on display at the ARRL Laboratory, together with the bug and station log showing the contact between Chelmsford, Massachusetts and Copenhagen, Denmark between Gus W1OGU and Bo OZ7BO, on a radio made of two germanium transistors and built by Gus W1OGU, Al W1OSF and Dick W1UBC, who built the diminutive gadget on a lark to see if they could Work All Continents with it. If you can copy the 40 microwatt CW beacon run by the North American QRP CW Club, you too can join in the fun. The current record stands at just under 22 million km per Watt when Bill W4ZV managed to copy the code word OMAHA from the N2XE beacon from New London, North Carolina. Just to be

clear, we're talking about a signal that travelled the equivalent of 22 million km using 1 Watt of power. If you think that was amazing, Pioneer 10 managed to achieve 1.3 billion, that's 1.3 thousand million km per Watt in 2003. Mind you, that record was achieved with a slightly bulky antenna, the Deep Space Network. Are you ready for more?

The current record stands at just under double the Pioneer 10 record, just under 2.6 billion km per Watt. That was achieved by Dick KL7YU and Bill W7BVV who made contacts between Alaska and Oregon in December 1969 and January 1970. A distance of 2655 km using one micro Watt. Yes, you can throw a Kilowatt at the problem, or you can take your time, do some work and have some fun with low power. You can call it QRP, or you can call it just enough to get the job done

SEPP LANGER - SILENT KEY

From The Chairman MFCA
Werner Pfeiffer, OE6NFK

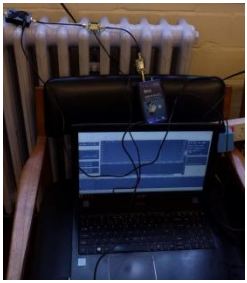
SEPP Langer

Ing Sepp Langer, OE3OLC, MFCA017, MF843, RNARS4675

We have received sad news from the Marine Funker Club Austria of one of its oldest members, Sepp Langer, who passed over the bar on July 22nd aged 93 years. Sepp was the last Austrian radio operator of the MFCA to have served in the Kriegsmarine during WWII. He will be greatly missed

STOP PRESS

RNARS SatComms Success! *On September the 3rd, 2019 at 19:00 Ian, M0LIH made the first satellite QSO from the HQ Shack with Frank, DO1VF linking up with the new Es'hail2/Oscar 100 satellite over the Middle East. Signals were transmitted on 2.4 GHz using an SDR-Radio running on Ian's laptop to an Adalm Pluto SDR, and then through 2 pre-amps and an amplifier to a dish mounted outside the Shack. Signals were received through the BATC WebSDR at Goonhilly Down on* ***https://eshail.batc.org.uk/nb/***



FUTURE MILITARY COMMS

Andrew Tunnicliffe army-technology.com

Warfighter Information Network Tactical: the tactical network backbone

While a future military communications network of battlefield secure smart phones may yet be out of reach, the US Army's Warfighter Information Network Tactical programme (WIN-T) is the army's current "tactical network backbone", according to manufacturer General Dynamics. It offers soldiers secure voice and data communications on the battlefield without the need for fixed infrastructure.

Communication technology is evolving, but also creating new threats. We explore the latest developments in communications networks and technology. [US Army/William Banton]

First deployed in Iraq in 2004, WIN-T meant soldiers "had a high-speed, inter-operable voice and data communications network at the battalion level", General Dynamics says. It offered soldiers the ability to stream real-time video, view a topographical map of friendly forces, send texts requesting medical assistance, digitally call for artillery support, and access mission command apps like command post of the future and tactical ground reporting system.

The apps meant soldiers could personalise what they were using to achieve their operational objectives. They use the likes of Google Earth, and drag and drop functions to share data with colleagues on the ground and back at command.

Integrating 5G into the defence infrastructure

Meanwhile, the introduction of 5G networks is gathering pace, opening up a new era of possibilities – and threats – for military communications. Like the roads and skies of the world, communication channels are increasingly populated. Although 5G is the next generation of mobile communications intended to address that, it also means there will be more capacity and therefore greater demand.

While 5G offers potential unlike anything before it within the military domain, undoubtedly the biggest single threat it brings is jamming and signal interception. Man-portable radio is set to be the stand-out beneficiary, with the prospect of communications even in the world's hardest to reach environments with the expanded and enhanced spectrum it boasts.

However, with increased capability and capacity comes the obvious test: will it be possible for the military to utilise the network to its full potential given the growing data appetite of the commercial sector? That remains to be seen.

The data war

The battle for data supremacy has already gained pace, with the *South China Morning Post* recently suggesting the roll-out of 5G could revolutionise military communications, "raising the stakes between those developing the [new] technology", and ultimately change the warfare and cyber security landscape. Recent legal action taken by the US against one of China's biggest mobile communications and tech companies, Huawei, and concerns in Europe of the company's influence prove the growing importance of communications in today's increasingly technologically advanced climate.

It seems that, since the days of the Iraqi insurgency and Afghanistan conflict, the attention of the world's militaries and those leading them is shifting back to the more conventional image of war –state on state conflict. Command and control has arguably never been more important, or so more challenging. Communications has always been the defining factor of conflict, but never more so than today. How countries respond to that challenge will be the determining factor in global influence.

THE ROYAL NAVY'S FUTURE SYSTEMS

.gov.uk

The UK government have announced its plans for the development of the Royal Navy's Future Operating Environment'

The government's own consortium of the MoD, DASA, Dstl, and the Royal Navy have launched a multi million pound funding competition to search for the future Naval operating environment. The competition was formally launched in London on 19 June 2019.

The Defence and Security Accelerator (DASA) has launched 'Intelligent Ship - The Next Generation' multi-million pound competition for the future Naval operating environment. This competition is seeking proposals for novel and innovative projects that enable and facilitate the wider use of 'intelligent systems' within future warships, with the potential for wider use across defence.

The future sees elements of automation, autonomy, machine learning and artificial intelligence being more closely integrated and teamed with human decision makers.

The aim of this competition is to de-risk and evaluate technologies and approaches that could provide alternative, revolutionary future fleet concepts that can maintain or enhance UK military advantage within complex, cluttered, contested and congested operating and data environments.

£1m is available to fund multiple innovative proposals that form phase 1, with an additional £3m potentially available to fund follow-on phases.

12 June 2019

'Unjammable' UK internet technology to be tested by Royal Navy

Joseph Archer

A new technology developed by British scientists which uses light rather than radio waves to transmit internet data is being considered by the Royal Navy after trials showed it was immune to interference caused by enemy jamming systems.

The Edinburgh University spin-out, pureLifi, recently secured a £7.8m cash injection from Temasek, the Singapore investment fund. The company, formed in 2012 after pioneering research by Professor Harald Haas, an academic who is currently the university's Chair of Mobile Communications claims the technology is “1,000 times” more powerful than current Wifi systems, uses less energy and has big advantages for use during combat.

The Telegraph 27 August 2018

The Future of Naval Communications

SEA.co.uk

SEA’s common **External Communication System** is in service with the UK Royal Navy and will be fitted to all in-service and planned submarines.

SEA is a Frome based company which has produced its concept of 'The External Communication System.' It is a modular, reconfigurable comms' system utilising open interfaces and standards that can be added as part of an upgrade or as the core of a new communications system

on both ships and submarines. Billed as a continually developing system concept in their published range of equipment solutions, designed to ensure it can exploit new technologies as a pathway to providing system improvements and enhanced capability with legacy and existing systems, and future systems using embedded network solutions, such as sub-system level integration, configuration, control and monitoring.

Next generation computing technology for the Royal Navy

savetheroyalnavy.org

Working closely with the navy, BAE Systems is funding 'Project Dragonfly', a £20 million investment in new technologies to ensure the warships of the future harness the rapid developments in Artificial Intelligence (AI) and Human-Computer Interaction (HCI).

Developing combat systems will help manage the flow of data from the ship's sensors and control of weaponry. With upgrades to the Combat Management Systems (CMS) giving the command team better tools to improve the speed and accuracy of decision making. This is especially important as high-end threats from missiles get faster and low-end asymmetric threats become more complex. Cheap computing power, open architecture and partial use of commercial off the shelf (COTS) technology has the potential to dramatically reduce initial cost and allows a much cheaper path for upgrades or addition of new capabilities.

BAE Systems are rolling out a new standard for Combat Systems fitted to RN vessels. *Shared Infrastructure* uses common consoles and open-architecture software running on a high-bandwidth network connected to server farms that provide redundancy and backups. The hardware can easily be replaced or upgraded and is resilient to damage or partial failures. The new open architecture... will in future adopt an 'app store' model whereby approved third-party software [can be integrated as and when required.]

[Nov 2018]

SEA STORY - continued

Eric Bray M0HFF

Chapter Seven - At War, Almost.

The war kicked off two hours early, at eight a.m. It began with screaming sirens followed by the call of 'Action Stations, Action Stations!' over the p.a. As we were already in the EWO, we didn't have to go vary far! "I hope you've got your -." Pete began. He was interrupted by another tannoy message preceded by the siren. "Anti-flash on. Anti-flash on. Clear the upper deck. Prepare for NBCD state One, condition Red. Close all watertight doors and hatches! Close all external air ventilators. Switch to recirculated air. Launch the C.A.P..."

Screech, thud, lurch, pssst, then again, as the two Sea Vixens that were lined up on the cats were flung into the air, to form the Combat Air Patrol. In two's and three's, the rest of the EWO staff trickled in, closely followed by Taff the Tiff, and Chiefy, until we were packed into the place like sardines in a tin. Chief Widdicombe pushed through, evicted R.S. Garfe from his chair, and sat down, looking thoroughly cheesed off already. R.S. Garfe promptly evicted Slinger from his perch on a bench, where a B40 acted as a rather lumpy backrest. Jacko Jackman tried it on with me, but I rebuffed him with a terse "I'm on watch!" Then I fiddled with the UA8 to prove it. "Right, what's happening?" Chiefy roared over the general hubbub. "Not much, Chief. There's a Shackleton lurking at long range, we think it's the one that is pretending to be a 'Bear' (A Soviet long-range bomber/ missile launcher aircraft). There's nothing else stirring," Dave replied.
"Have the Ops room got it?"
"Sometimes. It's ducking in and out of extreme range."
"Fire up the jammers. Have them on the spot for the 104's. (F104 'Starfighter', a very fast jet used as a substitute for anti-ship missiles.)
"Already done. I'm just waiting for them to come on line."
Taff scrambled through the crowd, and went up to cosset his beloved Klystrons, as Dave Burfman made a quick head count. "Anyone seen Williams?"
"I'm jammed into the tea cubby, Dave!" Dave scooped up the A.I. mike, "Ops, EW, closed up, over."
"Roger.".came back the acknowledgement and Pete grabbed the mike from him. "OPS, EW, Fox 104 Starfighters, playing at being Kangaroo anti-ship missiles, bearing red 90, Closing. I think there are three of them, over."
"Roger EW." The hull began bouncing, as power came on, then we leaned sharply into a turn towards the 'missiles', to reduce the target area. "Jammers on line!" Dave called."Hit 'em!" From Chiefy.
"On!" A big fuzzy ellipse grew on my UA8 CRT, and there was an angry hissing noise in the headphones. "Ops, EW. Jamming missiles."

“Roger, I was about to tell you to! Wait for me, next time!” Pete yelled, “Tell Taff the blocking filters aren’t working too well, I’ve got fifty percent noise on the UA9.”
“Ops, EW. Chiefy says if we wait for you, with missiles, its too late, over!” As Pete released the mike, there were three crashing roars from outside, as three jets blasted past, verging on supersonic speed. “See!” Pete concluded, pushing his luck. “Jammers off!” Chiefy called. “Do you mean stand-by, Chief?” Dave queried.
“Sorry, yes. Standby.”
“Done.”
“Taff, we’re on stand-by!” Willie yelled up the hatch, “and Pete says the UA9 filters aren’t very effective.” A muffled reply came back. Pete tossed me his headphones. “Listen and learn. That’s a 104.” I heard an irregular tack, tack, tack-tack, tacketty-tack, tack, sound. “He’s using his search pattern, a sort of raster scan, while he’s turning. They will probably come past again, before they go home for fuel.” (104’s at high speed are thirsty beasts.) The tacketty-tack became a constant steady drone. “He’s locked on.” Pete used the mike again. “Ops, EW, 104’s inbound from starboard.”
“Roger. Do not jam.”

We were slowing down again, and turning back onto our original course. From outside, three roars sounded, as the 104’s cruised past again, on the way home, their job done. Shortly after, the Shackleton/Bear began to fade, as it also moved off. I reported it to the Ops room. “Well done, EW!” The message came from the bridge. “The 104’s would have missed, their radars were blinded. One pilot reported that his set burned out at three miles. ”Shortly after that, the p.a. declared “Reduce to NBCD state two, condition yellow. Stand down from Action Stations, revert to one in two watches. Off watch report to mess decks. Watertight doors below three deck are to remain closed. Three deck and above may be open. Switch to external air. Prepare to retrieve the C.A.P in ten minutes.”

Nothing else happened during that watch, although the ‘orange-suits’ were still prowling about, creating havoc with their smoke bombs, thunder-flashes, and stickers and cards. During the First Dog, we were watching a ‘Bear, lurking in the distance. We were waiting for it to launch its ‘missiles’, when an ‘orange-suit’ dared to enter the EWO.R.S. Garfe immediately evicted him, with the bellowed warning that this was a Classified Top Secret compartment, and he wasn’t authorised to enter it, adding that the equipment might be damaged by the smoke bombs. “But, I only wanted to ask where the nearest heads were!” Orange-suit protested, as he was bundled out. “That fixed him!” R.S. Garfe looked smug. “I can’t be bothered with their silly games, today!” Ten minutes later, smoke began to seep through the door from the flat, outside. Dave cautiously opened the door, saw nobody and kicked the smoke bomb down

the ladder. Somebody else must have done the same thing, because a few minutes later, the p.a. hesitantly announced that there was an exercise fire on the flight deck adjacent to the doorway! I was handing over to Bagsy when 'orange-suit' came in again, was evicted again, then had an angry row with both R.S's in the passageway. Meanwhile the 'bear' was still lurking at long range.

We stayed one in two, four hours on, four hours off, for a week, while all kinds of mayhem were unleashed upon us, including abandon ship drill. Everyone except a skeleton watch had to go to their lifeboat or life-raft station, have their life-jacket inspected, the battery-powered light tested, and the plastic, lung-powered whistle blown. Extra life rafts, loaded piggy-back fashion on top of the regular ones, were then heaved over the side, to demonstrate their usage. They were supposed to roll over the side, splash into the water, self-inflate, self-right, and be ready for jumping into. The raft I was supposed to use wouldn't go. It took four men with two crowbars to get it to roll over the side, when it promptly sank without a single bubble! The next one along inflated on the rails, when the securing straps were released. The wind caught it as it flopped over, causing it to snag on something, where it ripped, deflating itself again in a cloud of talcum powder. Number three rolled neatly over the side, splashed down and detached itself from the two halves of the glass-fibre cocoon. It began to inflate, but didn't self-right. It floated, upside down, for a few minutes, then split a seam, and deflated again.
"Hmm! I think I'll stay inside, and then I won't freeze to death!" Someone muttered, as we were dismissed. "You'd drown, you soft sod!"
"Better that than floating round the oggin in a leaking rubber raft with you!"

Saturday saw us back in Portland, with Cinderella leave for the off-watch half. Not many went, we were all 'crashed out' in our pits, practicing at being corpses! On Sunday, it was obligatory Church parade on the Flight Deck, in the pouring rain. The Multi-denominational Padre emerged onto the bridge wing with a portable microphone, took one look at the drowned rats huddled below, then said a very fast - "Our Father, who art in the mess-decks below. Parade Dismissed!" Then he disappeared back inside, accompanied by a perplexed First Lieutenant and a rousing cheer! We all dived back down our preferred bolt-holes, and went to dry off.

After lunch, the other half was offered Cinderella leave, but very few went. As the rain had stopped, I went, mostly for a change of scenery. I wandered along the shingle bank from the dockyard, past the helicopter base, and into town, which was deserted A few pubs were open, but of course, I was too young to go in there! All the shops were closed, including the one and only café. I ended up on the seafront, looking at all the seedy hotels and B and B's. A chilly wind drove me back inland, where I drifted aimlessly until the cinema

opened. I dined on a can of coke and a bar of Fruit and Nut, while watching the film, which made such a big impression that I can neither remember the title, nor who was in it. Still later, greasy from a fish and chip supper, I drifted back to Hermes for about eleven, and turned in.

Monday and Tuesday saw us storing ship again. On Wednesday, we set sail, collecting a few more Wessex helos on the way. These were the sub-hunter machines, fitted with a sonar device they could lower into the sea, while hovering. We went to war again, one in three watches, playing hide and seek with the sub, usually finding it, and marking the moment by tossing a live hand grenade over the side at it. Eventually, the sub's Captain complained of a headache, and went home. We stayed one in three, on Thursday, while our Vixens tried to stop our Buccaneers from bombing us. As the Buccs were marginally faster, and liked to fly at zero feet, lifting a trail of water-spray behind them, they were easy to spot visually, but almost impossible to see on radar, they weren't caught. On Friday, we were 'attacked' by a mix of F104s and Phantoms from an RAF base. As these were all supersonic capable, our poor subsonic Vixens didn't have a hope. We had our first real crash-landing, too. The nose wheel of a Vixen collapsed when it took the arrestor wire. It made a terrific screeching noise as it tore the paint off the deck in a long stripe and forced the remaining aircraft to divert, as the deck was blocked and they were low on fuel. If we had been out of range, the crashed Vixen would have been heaved unceremoniously over the side, out of the way, as the fastest way to shift it.

We all expected to return to Portland for the weekend, but our hopes were dashed. We stayed at sea, although we reverted to one in four watches. We were kept busy repairing all the smoke stained paintwork, scuffs, and chips, as well as normal cleaning duties, fitted in around the watch-keeping. On Monday, our stray chicks returned, having enjoyed a 'freebie' weekend, because flying had been suspended while the deck was repaired. It was business as usual, sweeping, scrubbing, watch-keeping, and out of the way keeping. Now we were properly at sea, the tensions relaxed, and it was possible to take an occasional deep breath without getting your head bitten off by someone.

Slowly, we became proficient at our jobs, and could be left to run all the equipment in the EWO without supervision, which eased the load on the rest of the team. Then one forenoon, the R.S. came in, at nine, to see that everything was running smoothly. After the usual bucket of coffee, he accused me of being out of rig of the day. Puzzled, I checked myself. I was in eights, as was everybody else. My fly was done up, I was missing no buttons, and my name tally and badges were all in place. "Pardon?"

“Are you deaf, too? You aren’t correctly dressed!” Baffled, I looked around. “I’m sorry, R.S. What have I done?” R.S. Welch smiled, then. “I had you going, hey? As from ten minutes ago, you are no longer a JRO3, you are a JRO1!” He handed me a chit for the stores. “Go and draw your new badges, and get them sewn on!”
“I’m on watch, R.S.”
“Always obey the last order first!”
“Yes, R.S.” I picked up my pen. (Working pens were rare as hens teeth!), and headed for the door. I finally got back to the EWO at eleven, with my new badge slightly askew on my sleeve. “What took you so long? R.S. Garfe asked. “Sorry, R.S. The Master collared me, and sent me for another haircut! I had to report back to him with a chit from the barber, as proof.” The R.S. looked at the bristle that covered my scalp. “If you cut it any shorter, you’ll have to shave it!”
“That’s what the Barber said, before he charged me two and six to stamp my chit!”
“He didn’t cut it, then?”
“There’s nothing left to cut, R.S.” He laughed. “Get back on watch!”

My first contact came up 1237. “Ops, EWO, Soviet nav. Radar, bearing - - .” Then I was sent up to the bridge, to work out the latitude and longitude of our position, so that it could be entered into the log. This was the first step on the new ladder that went with my new rate. Naturally, I didn’t have a clue where the plot table was, or what it looked like, never mind how to use it! I crept warily onto the bridge, and stalled there. The Captain was sitting in a swivel chair. The four gold rings on his sleeve sparkled in the sunlight that streamed in through the windows that surrounded the place. Another three-ringer stood next to him, while a lowly two ringer dodged around them, doing things. In a corner a midshipman, nearly as old as me, tried to look intelligent.
“Yes?” A PO Seaman I hadn’t noticed, looked at me. “I, - er, came to get the position, P.O.”
“Hurry up, then. Don’t stand there gawping!”
“Yes, P.O. How-, where’s -?”
“Show him, Jones.” An A.B. appeared from nowhere. “In ‘ere, Wacker!” He pulled a corner of a curtain at the rear of the bridge, aside. “Ere’s the table, wiv a map onnit! See? The gubbins inside is worked by this stuff.” He waved a hand at a wall-full of dials that jerked and twitched spasmodically. A label on the main box read ‘Loran’. “Don’t spill nuffin’ on’t chart, or they’ll have yer balls for a necklace. Up sides is latitude, an’ along top an’ bottom is longitude. We’re ‘ere!” He pointed at a dot of light that shone through the paper, on a faint pencil line. “Yer gets parallel rule, puts it straight on line, then rolls it up to dot, an’ reads numbers on side of the map, then yer turns it round’ an does the same across, an’ there y’are! Got it?”
“I think so.”

“So, where are we, then?”
“Here.” I pointed at the dot.
“Yeah, but where on the world are we?”
“Oh! You mean -.” I rolled the rule, read the numbers.
“An’ where’s that?”
I studied the map. “West of France.”
“You got it! Now, push off before t' Ossifers see you!” Quickly, I repeated the measurements, this time writing them on a scrap of paper, then stepped outside the curtain. “You, boy. What are you doing on the bridge?” The Three-ring Officer snapped at me. “Getting the ship’s position for the EWO, Sir.”
“And you are?”
“JRO3 er, sorry, JRO1 Mee, Sir!”
“Don’t you know your own rating?”
“I was made up this forenoon, Sir.”
“Ah!” He studied me. “Your badge isn’t on straight, and what IS up with your hair?”
“It is only tacked on, until I go off-watch, Sir, and the Master keeps sending me for haircuts!” A tiny smile flickered at the corner of his mouth. “One of the new boys?”
“Yes, Sir.”
“Do you know who I am?”
“No, Sir, sorry.”
“I am the First Lieutenant.”
“Yes, Sir.” Do I salute, shake hands, or bow?
“And this Gentleman is the Captain. What do you think
of the view?” The 1st waved a hand at the expanse of ocean
visible outside. “It's – wet, Sir!” The Captain snorted, then looked at me, before glancing at his watch, then the bridge clock, before he rose from his chair. “I’ll be in my sea cabin.”
“Very good, Sir!” The 1st saluted him, while the Middie wrote the event into the bridge log. “Mee, was it? Was it you on watch when the Shackleton was playing, last week?"
“Yes, Sir.”
“I thought I recognized your name. Get your badge on properly, after your lunch.”
“Yes, Sir. I was intending to.” The Captain left.
“Was there something else you wanted, Mee?”
“No, Sir.”
“Well, go, then. You are making the place look untidy.”
“Yes, Sir!” I left, clutching my scrap of paper. As I went into the EWO again, the R.S. accosted me. “It took you long enough!”
“I was talking to the Captain, R.S.”
“Oh, well, I can’t argue with that! Where are we?”
“Halfway down France, and about a hundred miles

from the coast."
"East, or West?"
"West, R.S."
"Good. If you had said east, where would we have been?"
"In someone's garden pond, R.S?"
"Don't get cocky!"
"Sorry. R.S. It would be off the edge of the map, so I couldn't say for certain, R.S." He grinned. "Relax, I'm pulling your leg. Get that position logged before the next watch comes up."

We were at sea for a fortnight before anything of interest happened. I happened to be off-watch, up on the flag deck, watching the sea go past, and enjoying the Spanish sunshine, when we rendezvoused with a Royal Fleet Auxiliary (RFA) to refuel. We came up on the tanker's port side, about a hundred yards distant, matching speed and course carefully. Both of the SAR choppers were airborne, keeping out of the way to our port. Somebody fired a rifle at the RFA, but it was not a bullet that sped across the gap, but a steel rod attached to a very light nylon line. It fell across the low deck, where it was captured by a deck-hand, and tied to a heavier line, which was then payed out, while our light one was hauled in again. The heavier line, in turn, was tied to still heavier cables and a telephone wire. When the knot reached us, it was released, and the heavy lines taken through deck eyes, then to windlasses. These two lines then hauled heavy hoses across the gap, slung on spidery wires from a gantry, rather like a one-sided suspension bridge. The telephone wire was coupled to the bridge, enabling the two Captains to speak directly to one another, without 'foreign' ears hearing what was said. Meanwhile, the two SAR choppers began ferrying nets of stores across from the RFA's heli deck, to our flight deck. The contents then went down the lifts, into the hangar. Every now and then, a bundle of empty nets, in a net, went back the other way. Finally, the process was reversed, the hoses were retrieved, then the heavy cables, and finally the light one, and the telephone line, before the RFA dropped back and sheered off. An hour later, we resumed throwing aeroplanes at the sky, but I was back on watch again by then.

Next watch, Slinger came in, looking rather pale and sweaty. Hermes was rolling rather more than we had become accustomed to, and the barometer was dropping. The 'planes that were trying to land were missing more often, as the deck heaved and leaned, taking about ten seconds to go side to side, and fifteen for the fore and aft motion. My first duty on beginning a watch, now, was to go to the bridge and get the position for the log. So, after the evening meal, at ten to eight, I was there, with my scrap of paper. A discussion was in progress over whether to turn in early, and try to beat it, or to go north and

west, and go round behind it, then go in later. “You, boy,. Mee, isn’t it? What would you do?” The Captain demanded suddenly.
“Er-.”
“We have all been disabled in an accident, and there is only you on the bridge. Quick, boy, think!”
“I – er, - “ I glanced at the plot. “I presume that ‘it’ is a storm centre, and ‘in’ is the entrance to – ah, the Mediterranean. I don’t know the strength or speed of the storm, or the width of the channel, so I would play it safe, and
let the storm go first, Sir.”
“And?”
“And, er, hope that a more senior Officer, who knows what he should do, can be found, Sir.” The Captain studied me, then turned to survey the view outside the windows. The sea was iron grey, matching the cloud, and very lumpy. Spray was flying as the wind ripped the wave-tops off, and flung them away.
“Good answer, Mee, but I don’t think we will do that. Go about your business.” He turned to the Duty Officer.
“Divert the section still airborne to Gib. Pipe the mess-decks, warn them to prepare for rough weather, then in thirty minutes, go to twenty-five knots, and take her in. Call me five miles off.”
“Very good, Sir.” The duty Officer came into the chartroom.
“Finished?”
“One moment, Sir, and I will be out of your way.” I rolled the rule up to the lighted dot, and read off the latitude scale, then added it to the longitude reading I had already copied. “Done, Sir.” I made room.
“That will be approximately 124 degrees, Sir!” He
spoke to the Captain.
“Very well.” The Captain left the bridge as the Yeoman, a PO Bunts, picked up the p.a. microphone to make the announcement. The duty Middie went round to the ‘flying bridge’, a spur of the main bridge that protruded over the flight deck and allowing ‘Flyco’ a clear view of the deck Thirty minutes later, I was hanging on to the grab-handles on the UA9 cabinet, while my chair was jammed, with all the others, in the ‘tea-boat’ cubby, to stop them from crashing about. The A.I, in sympathy with the general p.a., called, “Prepare to come about!” A minute later, we heeled over, and the deck began throbbing as the power from the engines was increased. Taff the Tiff staggered through the EWO doorway, slid across the sloping deck, and crashed into the B40 desk.
“Everything ok?”
“So far, Taff, there’s something banging about upstairs, but I haven’t had chance to go and see what it is.” LRO Burfman replied.
“It’s probably my toolbox. I’ll go and see.”
“Take it easy on that damn ladder!”
“Yeah,” Taff waited until we were more or less level then made a dive for the tea-boat door. “Who put all these chairs in here?” He demanded, as he opened the door and was buried in an avalanche of furniture. Dave went to

untangle him, then surrounded the chairs while Taff scrambled up the ladder. From upstairs, the scraping and thudding stopped, then Taff re-emerged, and helped Dave stuff the chairs back. “It was my toolbox.”
Hermes rolled again, in a series of violent jerks. From below, somewhere, came a faint crashing crockery sound, then a cheer.
“It sounds like someone dropped the plates!” Taff mused.

The paired p.a. and A.I. clicked on again, and a bored voice intoned, “All hands, all hands. The foc’sle, waist decks, lifeboat decks, and quarterdeck are out of bounds until further notice. Department heads check that all external watertight doors and hatches are closed and dogged. Extreme caution is to be used before venturing onto the flight deck. Only essential work is to be undertaken. Safety lines are to be used, and permission sought from the ‘flying bridge’ on extension 354 before commencing, and on completing, any work.” Hermes settled into an evil corkscrew motion, a ponderous combined pitching and rolling motion, now we were running at an angle to the huge seas. In the EWO, Pete and I clung to the cabinets, Dave was twined round a stanchion, and Taff clung to the B40 bench, eyeing the groaning cabinets, as they lurched and swayed on their rubber shock mountings. At ten, Dave phoned down to the PO’s mess. When R.S. Garfe came to the phone, he asked if we could reduce to minimum watches, as –“We’re not watch-keeping, we’re clinging on like limpets in the surf, up here!” As he spoke, we rolled violently to port, and pitched down, stopping with a violent jolt that rattled everything that was rattleable.

The EWO door flew open, slammed against the bulkhead with a tremendous crash, then rebounded, while a B40 broke free from its mounts, and slammed into the UAZ, between Pete and myself, missing us by inches. It crashed to the deck in a shower of broken glass. Dave recaptured the telephone handset. “Hello? – Ah, it still works! That was a flying B40, it’s now scrap metal. It missed everyone, just! – Yeah, ok.” He put the ‘phone back into the cradle, as Taff scrambled round the bench, and gave the UAZ a hasty check-over. “It seems to work, if you ignore that dent in the drawer front!” LRO Burfman said, “Ok, lads, Pete, you’ve been in roughers before, make sure that Mee gets down to the mess in one piece, then tell Mickey – Two men on watch for the middle and morning, then ‘phone me and tell me who’s coming up at midnight, ok?”
“Right, Dave, will you be ok up here on your own?”
“Taff’s here, too.”
“True!” Pete and I climbed up/down the passage, clinging to everything that was firmly attached, until we reached the head of the ladder
“Wait until she stabilizes, then go down with a rush. Keep tight hold, and be ready to go flying!” I waited.
”Go!”

I half ran, half fell, down the flight of steps, and clung to a railing at the bottom while the ship lurched and thrashed. Pete plummeted down, a hand on either railing, his feet raised, and landed neatly at the bottom. “It takes practice!” He grinned. “Don’t try it now!”
We worked down, a deck at a time, the motion becoming less wicked as we progressed, until it was possible to walk more or less normally, although at visually odd angles to the walls and floor. Down on four deck, in the mess, it wasn’t too bad at all, providing you planned your route in advance.Pete found Mickey and Dave Cheesie playing brag, for matches, in a corner, and passed on the message. He swerved over to the ‘phone. “Dave? Mickey said he’ll be up for the Middle, and Cheesy will do the Morning. Slinger’s puking his guts, and the others are pretty ropey.” Dave must have asked what it was like in the mess. “Compared with up top, like a millpond!”

When we roared through the entrance to the Med, it was buried under a massive electrical storm that made the wearing of headphones purgatory. They were filled with static crashes and an ear-piercing hissing noise, as the next charge built up, culminating in a loud splat as it discharged, matching the timpanic boom from outside. When I came down from the bridge with the position, Pete had looped his headphones round the little desk light, and had the audio turned up, so that he could hear the blips of any probing radar beams. The UA9 screen seemed full of strobes, but when I had been on the bridge, the rolling sea had appeared empty. Nothing had been visible in the evil yellow light, except slanting columns of rain, and the sudden forks of lightning. The rollers didn’t look particularly large until our bow plunged into one, allowing solid water to race across the flight deck, and spray to slash at the windows. The windows were fifty feet above the deck, and two hundred from the bow. That was when I had realized that I was looking at rollers that measured somewhere around sixty feet from top to bottom, if you were daft enough to go and try to measure one! I had failed to find the parallel rule, so had guesstimated the position, based on the last marked one, adding a few minutes of eastward track, and none south, as we were on the estimated track. A chain of circles followed a curving line to the north, identifying the storm centre and track. It was called *Fred*.

Eric

Occasionally things can go wrong!

This could be described as the result of a multi-dysfunctional situation...

"Whaddyamean *we've* run aground!"

BRANCH NEWS - In Brief

Going commando

As part of 1SL's vision for the future he sees more involvement by the Royal Marines in sea operations: Admiral Radakin has said *"we will develop a Future Commando Force, with more of our Royal Marines operating from sea"*. The RMs have already begun a significant structural transformation, to operate less like an Army brigade and move back to their roots as a commando force. They will have a greater role in supporting special forces, spend more time at sea and have a greater emphasis on using new technology on the battlefield. Assuming the new 1SL is supportive of the Future Littoral Strike Ship (FLSS) project, it will provide a forward-deployed base for special operations. The Marines will, of course, retain their core amphibious assault role but the approach to beach landings may have to evolve to survive in contested environments. The future shape of amphibious forces must be refined and work to design and fund replacements for HMS Albion and Bulwark started. HMS Prince of Wales will begin sea trials in Autumn 2019 and subsequently take the lead in developing the QEC carriers as helicopter assault ships in the 'Littoral Manoeuvre' role.

savetheroyalnavy.org August 19

HMS Northumberland heads to Canada on submarine hunt

Heading for Halifax to take part in the biggest sub hunt in the North Atlantic this year is HMS Northumberland, which today left Plymouth behind. The frigate faces a 3,000-mile journey to Nova Scotia to join forces with other like-minded warships taking part in Cutlass Fury 2019. Every few years the Canadian Atlantic Fleet invites NATO navies to hunt submarines in the challenging waters – busy, cold, deep, prone to fog and, in the spring and early summer, icebergs – off their Eastern Seaboard.

royalnavy.mod 27 August

BRANCH NEWS - In Brief

Blind veterans enjoy sports day at Sultan Summer Camp

Traditionally supported by the Fleet Air Arm Field Gun Crew, Blind Veterans from across the UK took part in a Sports Day recently as part of an exciting programme of activities on offer at the HMS Sultan Blind Veterans UK Summer Camp, the Blind Veterans UK Summer camp has been successfully hosted by HMS Sultan since 1996 following the closure of HMS Daedalus. Many of those Field Gunners who were associated with supporting the event prior to the move are still involved to this day. The veterans were gathered as part of a week packed full of fun and exciting activities aimed at encouraging those who suffer from sight loss to remain independent. **royalnavy.mod.uk 7 August**

Captain John Voyce with Veteran John Finlay

HMS Vengeance Catering Team Recognised

The Catering Services Team from HMS Vengeance(Port) were formally recognised when they were presented with the Fleet Catering Award for 2018-2019.

The small, eight-person team are experts in supplying the Royal Navy Submarine Service, pulling-out all the stops to make sure their Vanguard class submarine can keep submerged and patrolling.

royalnavy.mod.uk/news April 3

IN THE NEWS

RSGB

Update on 144MHz and 23cm threat **June 21, 2019**

The **IARU** was represented this week at the meeting of **CEPT Project Team A**—one of the groups leading **WRC-19** preparations—which finished in Prague on Friday, 21 June 2019. Of particular interest were discussions on two proposed agenda items for WRC-23, concerning the sharing of the 1240-1300MHz band with the Galileo satellite navigation system and the proposal from France to study a range of frequencies, including the 144MHz amateur band, for future primary aeronautical applications.

The meeting considered views that the Galileo issue did not currently warrant a WRC23 agenda item and should be first investigated within **CEPT**. However, regarding new aeronautical frequencies including 144MHz, the proposal was unfortunately not strongly opposed by other administrations; this has been carried forward to the higher level CEPT-CPG meeting in August. The IARU and RSGB views with grave concern any proposal to include the global amateur and amateur satellite 144MHz primary band in the proposed aeronautical agenda item; and will be making every effort to fully protect amateur radio interest and seek the support of regulators in this regard. More details at **iaru-r1.org** and on the RSGB's **WRC-19 special focus pages** where you can find all the latest meeting documents and minutes.

Admiral Lord Collingwood comes home

24 June 2019

A life-like bronze bust of Admiral Cuthbert Collingwood was unveiled recently at its new home in the base that proudly bears his name. He was second-in-command to Nelson during the Battle of Trafalgar, assuming full command upon his death on the deck of HMS Victory.

After the battle, Collingwood moved to Menorca and retained control of the Mediterranean Fleet with distinction until his death in 1810. To commemorate the 200th anniversary of his death, Asociacion Menorca Brittania commissioned Devon sculptress Helen Ridehalgh to create a life-size bust of Admiral Collingwood.

RoyalNavy.mod.uk

IN THE NEWS

Save The Royal Navy

The Closure of GE Rugby electric motor plant threatens supply of Royal Navy propulsion systems

April 2019

In November 2018 GE announced it plans to close its Power Conversion plant in Rugby and move operations to France by the end of 2019. What may appear to be just another industrial rationalisation by a multi-national corporation has potentially very serious implications for the Royal Navy and is a situation that demands government intervention... The GE Power Conversion site in Rugby has been manufacturing electrical components for the Royal Navy since the First World War. (Sometimes referred to as the Rotating Machines, Rugby (RMR) Factory). The site has unique manufacturing capabilities needed to produced quiet and shock-resistant electric motors for naval applications. In the recent past they manufactured the Advanced Induction Motors (AIM) for the Type 45 destroyers and the Queen Elizabeth Class aircraft carriers. They have also made the very high specification ultra-quiet motors needed for submarine hunting for the first three Type 26 Frigates. Around 90% of the current Naval Service fleet have GE-made electrical equipment on board.

Royal Navy trials new missile to target small boats in wake of tensions with Iran. HMS Sutherland, a Type 23 Frigate, fired four new Martlet missiles at a fast-moving speedboat off the Welsh coast to see whether the weapon could be launched from a ship as well as a helicopter. The target boat took a direct hit in the Irish Sea. Carrying a 3kg warhead, the missiles can accelerate rapidly up to one-and-a-half times the speed of sound and are guided to their target by following a laser beam fired from the ship or other assets nearby. Designed to be fired by Wildcat helicopters, the Martlet – also known as the Lightweight Multi-role Missile - is undergoing trials prior to coming into service.

Daily Telegraph 16th July -Dominic Nicholls

IN THE NEWS

China's CSIC expands unmanned surface warfare portfolio with JARI Unmanned Sea Vehicle

The state-owned China Shipbuilding Industry Corporation (CSIC) has revealed in a 21 August announcement on its official WeChat social media account that its 716 Research Institute - also known as the Jiangsu Automation Research Institute (JARI) - has launched a new catamaran-hulled multirole unmanned surface vessel (USV). A full-scale, production-ready example of the USV was recently shown docked at an undisclosed facility. Developed by JARI and CSIC's 702 Research Institute - China Ship Scientific Research Centre (CSRRC) - the platform has been marketed as the JARI Multipurpose Unmanned Combat Boat at domestic and international defence exhibitions for several years.

Kelvin Wong - Jane's Defence Weekly, 27 August

HMS Defender redeployed to Gulf to protect shipping

The Government confirmed earlier this month that the Royal Navy has been tasked to accompany British-flagged ships through the Strait of Hormuz, as part of the International Maritime Security Construct (IMSC). According to the Royal Navy:
"This deployment will ensure that the UK has the flexibility to continually commit a vessel to the international mission. Portsmouth-based HMS Defender will ensure the continuous availability of a ship to reassure and accompany merchant vessels." Defence Secretary Ben Wallace said:
"Wherever the red ensign flies around the world, the UK stands by to protect freedom of navigation whenever is it tested. The men and women of HMS Defender will contribute to the IMSC alongside international partners."

UKDJ -Tom Dunlop, 27 August

IN THE NEWS

BAE wins contract to enhance F-35 Electronic Warfare capabilities

BAE Systems has received a contract from Lockheed Martin to enhance the EW capabilities of the F-35. Under the contract, BAE Systems says it will modernise its AN/ASQ-239 Electronic Warfare Countermeasures (EW/CM) system.

"The F-35 will be in service for decades, and we're committed to providing our pilots with an AN/ASQ-239 capability that affords a decisive and sustained EW operational advantage," said Deborah Norton, VP of F-35 Solutions at BAE Systems. *Our robust, modular architecture enables us to efficiently insert new capabilities, supporting the next wave of technical innovation while proactively addressing total product lifecycle sustainability."*

UKDJ-George Allison, August 22

Cobham to supply aircraft radios for UK Emergency Services Network

Cobham say that it is solution, an evolution of its market-leading RT-7000 tactical radio selected for use by over 20 public safety aviation units worldwide, will simplify installation and ease user adoption by using existing form factors and familiar HMI from Cobham's proven TETRA systems. Cobham say it will also supply highly sophisticated antennas to operate on both the ESN band (terrestrial) and dedicated Air to Ground network. "*As part of the ESN ACS project Cobham has collaborated with QinetiQ to bring world-class test and assurance capability to the team...*

UKDJ-George Allison, August 21

IN THE NEWS

.gov.uk

MOD to develop cutting-edge laser and radio frequency weapons

The Ministry of Defence is developing cutting-edge laser and radio frequency weapons which have the potential to revolutionise the battlefield.

The state-of-the-art weapons systems, known as Directed Energy Weapons (DEW), are powered solely by electricity and operate without ammunition. The systems could be fuelled by a vehicle's engine or a generator, significantly reducing their operating costs and providing unprecedented flexibility on the frontline.

In a Prior Information Notice (PIN) published this week, the MOD announced it is seeking to develop three new DEW demonstrators to explore the potential of the technology and accelerate its introduction onto the battlefield. Laser weapons systems deploy high energy light beams to target and destroy enemy drones and missiles. Radio Frequency weapons are designed to disrupt and disable enemy computers and electronics.

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images -crown copyright

NOTICE OF THE RNARS AGM

Hon. Sec. Joe G3ZDF

NOTICE OF RNARS 59TH ANNUAL GENERAL MEETING

Our AGM will be held 12th October 2019 and all members are encouraged to attend. It will be held in the Warrant Officers and Senior Rates' Mess at 14.00. The timetable of events is as follows:

10.00	**HQ Shack opens for members** **Commodities will be on sale.**
11.30	***Up Spirits* in the HQ Shack**
12.15	**Hands to Lunch**
12.30	**Lunch will be funded by the Society**. All those who wish to partake must inform the Secretary when applying for security clearance or notifying the Secretary of their intention to attend the AGM so he can advise the Mess Manager. Any special dietary requirements should be advised to Joe the Secretary so he can make special arrangements with the Mess Manager.
12.30	**Bar open**
14.00	**AGM in the Mountbatten Suite**. This will be followed by
15.30 approx	**Tea and biscuits** along with the Annual Raffle organised by Mick G3LIK.

Members who do not already hold a valid pass for HMS Collingwood must inform the Secretary by 28th September of their intention to attend giving Name, nationality, date of birth and car details (manufacturer, model, colour and registration) if arriving by car. This is so he can inform Security on the Main Gate.

Members who already hold an Amenity Pass for HMS Collingwood are reminded that they expire on 30th September and that they must have a current pass in order to gain entry.

HOW DO FILTERS WORK?

Introduction
Just as in any domestic product like a vacuum cleaner, water filter, tea strainer or coffee percolator, a filter is a device that is designed to remove unwanted things from the things that we want. There are industrial filters within machines with rotary filters fitted inside them. Indeed, a lot of vehicles use actively rotating filters which dynamically remove particulate matter from the lubricating oil deep inside the engines. In electrical and electronic engineering there are several types of filter split into two similar groups. Either passive filters like their domestic counterparts that seem to be everywhere, but do not seem to be doing anything, and active filters which are designed around dynamic components such as transistors, op-amps (microchips), and so on, that dynamically remove unwanted electrical or electronic frequencies. Like any filter we use them to deliver a purer version of what we want from a clutter of unwanted noise or other signals generated by the processes involved. How do they work?

Purpose of this article
As you might have guessed it is to look at the ideas behind the design of filters with an un-complicated view without the in-depth theoretical information that very often forces a 'brain-wipe' on ordinary mortals who have an interest and perhaps, a reason to find out how they work. There are no assumptions about prior knowledge being a tacit requirement that very often leaves a general impression of frustration. If you are a radio amateur or studying electronics you may already have come across some of the subject matter before.

Filters in general
There are Four Major Types of Filter which include the following:

- Low pass filter removes higher frequencies.
- High pass filter removes lower frequencies.
- Band pass filter removes all frequencies outside the wanted band
- Band stop filter 'notch filter' a specialised band pass filter -very narrow

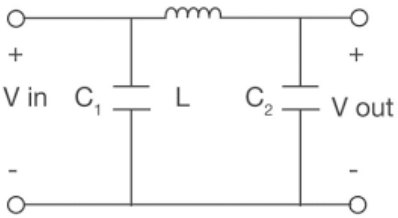
You will find these can be made with passive or active components depending upon what kind of filtered output is required. Bear in mind that absolute values in frequency filtration are not generally achievable, instead we treat them as relative values in relation to a pre-determined level called the cut-off frequency. This gives a good approximation towards what we want, and an

even better way of managing filter output can be achieved using crystal filters which give sharper responses compared to other passive circuit components.

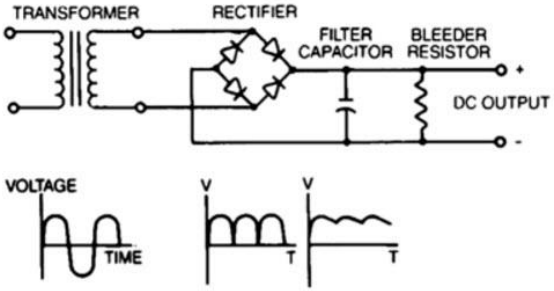
Passive Filters

These circuits are built with ordinary components such as resistors, capacitors and inductors. The more accurate you want your circuits to be, the tighter component tolerances will have to be and hence this usually pushes up the price of components because the manufacturing tolerances are also very much more precise with higher quality controls -more money.

A simple Low Pass Filter (LPF)



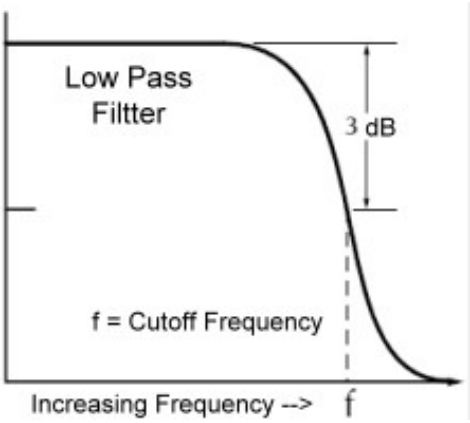
The circuit on the right is a classic low pass filter, so called because it very often is said to resemble a pie crust along the top (sic). This is the classic power supply smoothing circuit with an alternating current(ac) mains input to a transformer, followed by a rectifier, followed by this filter circuit. The idea is that we want a direct current(dc) output derived from the ac input. The component values are chosen so that the circuit produces what we want. In this case the output from the rectifier is a dc voltage with a pronounced ripple that has been left over from the diode rectification process, so this circuit progressively removes the ripple with the result that the output of the filter is a dc voltage. These components have a reactive value at the kind of mains frequency involved; around 50/60Hz.



Here is a partial filter on the right with only a single filter capacitor that is used to filter out the larger swings in the ac voltage at the output of the diode bridge rectifier. It bypasses the 'humps' on the varying ac-dc down to the common terminal. We want a pure dc at the output, so adding a coil to suppress most of the ripple and a further capacitor to smooth out the ripple left behind by bypassing it to the common terminal we end up with a steady dc voltage at the output. The principle is that the pi-filter takes an ac at a frequency and converts it to dc at zero frequency. In other circuits the LPF is used to remove unwanted higher frequencies from a desired input.

LPF Frequency response

As shown in the picture on the right we can see that across the top it is fairly straight and then curves down to the bottom of the graph. What this means that any frequency under the graph, will be passed by the filter up to the point where it reaches the line of the graph. Beyond this curved line to the right all other frequencies are blocked -in theory. We can see the line is not linear and sloping therefore there will be some small inconsistencies at the output of this or any other type of filter.



The meaning of 3dB

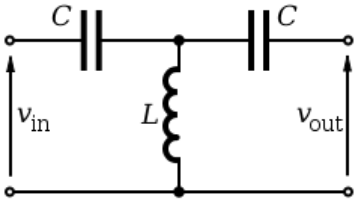
We need to express this variation in a way that makes sense. For example, given the curvy nature of the line, you might assume that halfway down would be a reasonable choice to determine the bandwidth of the filter from zero to that point, and you would be right in principle to make that assumption. But there is a refinement to this in that while the halfway point is quite reasonable we are, after all, dealing with an ac waveform or a band of ac waveforms, some of which we want to block. Technically, the mathematical equivalent of halfway is called the *3dB point*. While in this diagram it appears to be the halfway point as shown, we have to take in to account a normalisation process going on in the background. This is taken to be at a point when the ac waveform rises to 0.707 of the peak value. If for example the peak of the filter's response is say, 9 volts, then we multiply this value by 0.707 to find the (adjusted) 3dB point so that we can work out a reasonable figure for the bandwidth of the filter: At 3dB we can also find the cut-off the frequency.

3dB point = 0.707 x 9v = 6.36v (implies 6.4 rounding up)

As you can see from the graph we can drop a vertical line down from the top to the bottom, and the frequency where the filter has its 3 db point can be read off from the horizontal axis. This gives us a reasonable figure for the bandwidth of the filter -from zero to the cut-off point and for the amplitude that can be expected at that point. A simple way of looking at filters is that they 'tune' out unwanted frequencies by bypassing them to the 0v rail or to earth while the wanted frequencies are passed on to other stages in the 'system.'

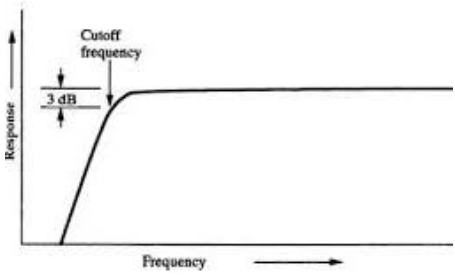
High pass filters

This is the opposite function to the low pass filter. As their name implies, these will block lower frequencies and only pass the higher ones that we require. Let's say that we wanted a frequency of 15MHz from a circuit with a bandwidth ranging from an upper limit of 10MHz down to a lower limit of 5MHz. A high pass filter can be used to block the lower frequencies and select only the higher ones in the band.



HPF response

The same rules apply, but in the opposite sense. all of those frequencies under the line are passed while all the rest; the lower frequencies are blocked.



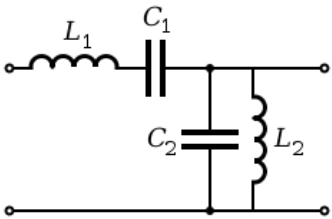
The 3dB Point

This time we can see how the 3dB point is represented on the chart. If we now draw a vertical line through the 3dB point we would obtain reasonable figures for the bandwidth, the amplitude and the cut-off frequency at that point.

The whole point of filtration is to block what you do not want, and as necessary repeat the process with more finely tuned circuits until you get what you want without the rest interfering with your end goal for the signal voltage that you want to work with.

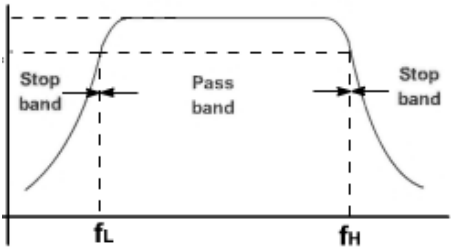
Band pass filters (BPF)

These are quite simply a joint combination of the previous two types of filter. First point is that it is necessary to pass all the high frequencies using an HPF. Next, you add to this circuit at its output an LPF so that you filter out all the unwanted lower frequencies that remain. What is left is the band of frequencies required at the output as shown. f_L is the lowest frequency in the band while f_H is the highest frequency in the wanted band as indicated by drawing vertical lines to the horizontal axes and reading off the frequency at each cut-off point.



BPF response

You should note that these are idealised shaped frequency response curves, in practice they can be quite a bit more rounded. The bandwidth can be measured by using the values of f_L and f_H by subtracting one from the other: **BW = f_H - f_L**

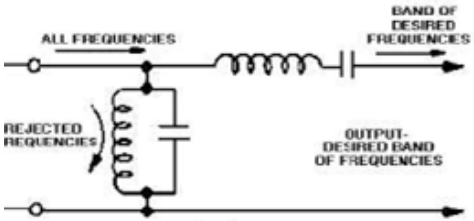


The 3dB Point

Here you can see that it is taken as common to both sides in this BPF and in the notch filter's response shown below:

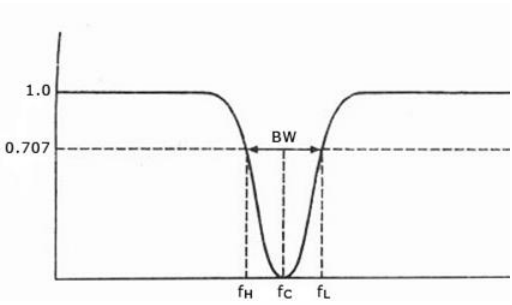
Notch filter

A variation of the BPF which could also be referred to as a *band stop filter*, because that is just what it does. If you can imagine that somewhere in the middle of a very interesting signal there is a lot of strong interference in the middle of it, this is the circuit that will help.



Notch filter response

The required filter response is achieved by feeding the input into an HPF and an LPF simultaneously, hence the notch filter design can be used to filter out such interference, leaving the wanted signal relatively free of any distortions. In the sketch. Here f_c is the centre frequency of the stop band. The first stage of the notch filter behaves like a low pass filter blocking low frequencies up to the point of interference, while simultaneously the second set of components pass the wanted frequencies on the upper side of the interference as shown.



In all cases the values of these passive components are always carefully chosen so that they function as required at those frequencies being processed by the filter circuits, whether they be R, C or L.

BOOKS CORNER

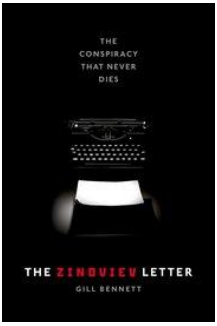
AUNTIE'S WAR - The BBC during the second world war
By Edward Stourton

(Penguin)

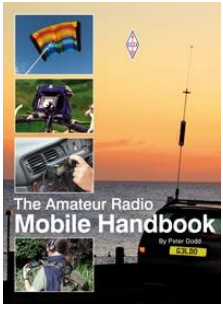
"An engaging, balanced and thoroughly researched history. It is often a moving and amusing tale containing plenty of mavericks and colourful episodes." (Lawrence James, *The Times*)

Managed to get a signed copy from the author..., Ed

The Zinoviev Letter
The Conspiracy that Never Dies By Gill Bennett
(Oxford University Press)



The story of the Zinoviev Letter of 1924 - the great British conspiracy still resonating today. Investigates the murky world of spies and global capitalism in the 1920s. Sheds new light on the Labour Party's history, internal divisions, and relationship with the media, and explains their often uneasy relationship with both security and the intelligence services.



Amateur Radio Mobile Handbook (2nd Edition)

By Peter Dodd, G3LDO

The fascination of taking a radio away from home and making contact with stations both near and far is an enduring one in amateur radio circles. Written by acknowledged mobile expert Peter Dodd, G3LDO Amateur Radio Mobile Handbook is for those who regularly "go mobile**"** or simply want to start doing so.

128 pages ISBN: 9781 9050 8671 9 £11.99 or £10.199 (RSGB members)

GETTING STARTED IN THE RNARS

Getting started means several things; not least of which it means getting involved. To date, in the last three years, we have seen a number of individuals coming in to our radio shack for the first time -as visitors- subsequently becoming inspired to find out more. They have progressed through the exams and are all at different levels of operating competencies from Foundation Level, Intermediate, or Full Licence with all its privileges.

For the exams -Casio fx-115 (or later)
You will need a good scientific calculator and a copy of the appropriate course docket which you can purchase from the RSGB; Foundation, Intermediate, Advanced (or Full). Morse is not compulsory, but you can still find a Morse tutor in the HQ shack if you want to go down this route later on.

If you have decided to set up a starter shack at home with a brand new licence here are some tips on buying low cost items to get you going: The average radio amateur will generally start with acquiring a small radio such as a dual band VHF/UHF hand held -they are relatively low cost and put you in contact with local nets and repeaters, and you can build up later to an HF radio. A good compromise these days is to start with software defined radio dongle SDR. Above all, get a good aerial!

RTL-SDR Dongle (from £10 and upwards)
The easiest way to access HF and avoid the temptation to spend lots of money on a commercially produced 'rig' is to look at the prospect of an SDR Dongle that can be plugged into a PC or laptop. SDR means software defined radio and this type of radio is a very powerful tool when installed and properly used. Some are just receivers while others are receiver-transmitters. What you have to watch out for is the correct bandwidth. If you want the whole of the HF band then look for a dongle that has a bandwidth starting at around 1MHz going up to 1.3GHz. Others include the LF and MF bands starting around 0.1MHz. It pays to shop around and ask questions. These are USB devices, so will plug into a PC or laptop. Do not forget that you need to connect an aerial and the socket on the side may be an SMA or an un-threaded (push-in) MCX female. Make sure you know before you buy.

Driver & Software
Dongles require software: drivers and software to run both the dongle and the radio. Most require either Windows or Linux operating systems. Download these from an online provider and install them. SDR Console is recommended package because it usually works first time. SDR# is not recommended.

GETTING STARTED IN THE RNARS

VHF/UHF (from around £20) Analogue Radio 1w/4w power

You may be satisfied with a dongle if you are just interested in DXing -long distance signal detection, but what is the point of having a licence and not using it. The best investment you can make at low cost is a handheld dual band radio that allows you to connect with your local networks and with repeaters. The Boafeng UV-5R meets the low cost requirement hands down, and as long as you don't throw it around or tinker with it you should be satisfied with its performance. This is a very good first radio for any mint amateur with a Foundation Licence. This or any of the other low cost radios from this manufacturer. Bear in mind that while it may already have a frequency plan within its memory, you have to type in your own frequency plan using a connector to your PC.

VHF/UHF (from around £50) Digital Radio

This is a progression once you have got the hang of ordinary analogue radio. Nevertheless, if you do not have the technical skills to set one of these up, and you don't have much to do with computers you must rely on someone else to set these radios up. There are different 'flavours' of Digital Mobile Radio each with their own set of protocols. These little beauties can connect you to the whole world out there via the internet! However, these are not that easy to program and the general rule is that you have to find someone who can show you how to do it or who will program it for you. The RNARS DMR repeater callsign is GB7CO which can be accessed via RF locally or via a mini hotspot via your router at home. Alternatively, you may find another type that works with the Fusion protocol developed by Yaesu; an option that suits your abilities.

Raspberry Pi 3 Mini-computer

If you are technically quite savvy you can install one of these. It's a Powerful mini-computer that comes with Wifi and 4 USB ports, with a variety of uses. You could use it as an SDR, aircraft tracker and APRS iGate when used with the RTL SDR dongle, or in conjunction with a digital radio set up.

HDMI-VGA Adapter

You might have to get one of these if you are using an older style of VGA monitor, for example, with a Raspberry Pi or other more up to date computer.

Amazon Alexa

I already had one and watched a video about one of these small devices in the shack. -impressive, but you have to set it up first.

RNARS Nets

Mick Puttick G3LIK

Contact: *mick_g3lik@ntlworld.com* – 02392 255880 **for all changes**

UK	UTC	Frequency	Net	Control
Daily	0001-0400	145.725	Midnight Nutters	M0WRU
Sun	0800	3.667	RNARS SSB net (news: 0830)	G3LIK
	0930	3.715	IOM Net	GD3LSF GD0SFI
	1030	7.068/3.748	RNARS Northern SSB net	M6LWO
	1100	7020	RNARS CW net	G4TNI
Mon-Sat	1030-1330	3.748/7.068	The Bubbly Rats Net	GX3WTP/G0GBI/ G0OKA/M0ZAE
Mon	1400	3.575	QRS CW Net	G0VCV
	1900	3.748 (Pri) 7.088 (sec)	N.W. SSB Net (News: 2000)	G0GBI
	1930	145.400 (S16)	RNARS Cornish Net (Falmouth)	G0GRY
Tues	1600	7.068/3.740	Tuesday HQ Net	GB3RN
	1900	7.028/3.528	RNARS CW Net	G3RFH
Wed	1400	3.748	Stand Easy Net	M6LWO
	1700	TG 23527	Wednesday DMR Net	M0LIH
	1900	3.748	Wednesday Net	G0VIX
Thurs	1900	3.542	Scottish CW Net	???
	2000 GMT	1.835	RNARS Top Band CW Net	G0CHV/G4KJD
	2000	145.575 (S23)	RNARS Scottish 2m Net	GM0KTJ/P
Fri	1600	10.118	RNARS 30m CW Net	SM3AHM
Sat	0800	3.748	G0DLH Memorial Net	G0VIX

DX	GMT	Frequency	Net	Control
Sun	0800	7.015/30555	MARAC CW	PA3EBA/PI4MRC
	1430	14.329 ±QRM	RNARS DX	W1USN/GD0SFI/ GM7ESM
	1800	Echolink	Echolink	VE3OZN / K8BBT
	1900	14.33	N American	WA1HMW
Mon	0930	3.615	VK SSB	VK1RAN/VK2RAN
Wed	0118-0618	7.02	VKCW	VK4RAN
	0148-0648	10.118	VK CW	VK4RAN
	0800	3.62	ZL SSB	ZL1BSA
	0930	7.02	VK SSB	VK5RAN
	0945	7.09	VK SSB	VK1RAN/VK2RAN
Thur	1430	14.329 ±QRM	RNARS DX	W1USN/GD0SFI/ GM7ESM
Sat	0400	7.09	VK SSB	VK2CCV
	1330	7.02	VK CW	VK2CCV
	1400	7.09	VK SSB	VK2CCV
	1430	14.329 ±QRM	RNARS DX	W1USN/GD0SFI/ GM7ESM

RNARS SCENE OF ACTIVITY

FM	**145.40**								
CW	**1.824**	**3.52**	**7.02**	**10.118**	**14.052**	**18.087**	**21.052**	**24.897**	**28.052**
SSB	**1.965**	**3.66**	**3.74**	**7.088**	**14.294**	**14.335**	**18.15**	**21.36**	**28.94**

RNARS COMMODITIES

Mike Moore M6POY

Item	Price
Body Warmer, embroidered with the new RNARS logo, your name and callsign. Colour: Black only Sizes: S to XXXL	£30-00 P&P £4-00
Polo shirt, embroidered with new RNARS logo, your name and callsign. Colour: Navy only Sizes: S to XXXL	£16-00 P&P £4-00
Sweatshirt, embroidered with the new RNARS logo, your name and callsign. Colour: Navy only Sizes: S to XXXL	£16.00 P&P £4-00
Fleece jacket, embroidered with new RNARS logo, your name and callsign Colour: Navy only Sizes: S to XXXL	£21-00 P&P £4-00
Gold blazer badge with **new RNARS logo**	£10-00 P&P £2-00
Lapel badge with **new RNARS logo**	£2-00 P&P £1-00
RNARS Log Book	£4-00 P&P £3-00
Cap with RNARS (new) logo	£10.00 P&P £4.00

Size in inches:

Small 36-38 Medium 38-40 Large 40-42
Extra Large 42-44 2 Extra Large 44-46 3 Extra Large 46-48
4 Extra Large 48-50

A copy of the Order Form can be downloaded from the Commodities page (http://www.rnars.org.uk/Commodities.html)

ORDER FORM

RNARS| Commodities

PLEASE write clearly and use block CAPITALS

Photocopies of this form are accepted

Call-sign | RNARS No: _____|_____

Name: _____

Address: _____

_____

Post Code: _____

Telephone: _____

Email: _____

Advisable to check before ordering as to availability in your size

Item Description	Size	Colour	Qty	Price	P&P	Sub Total
Total Payment £ Enclose cheque payable to: ***Royal Naval Amateur Radio Society***						

Overseas members, please add £5 to cover additional postage.

Send orders to:
Mike Moore M6POY
63 Homewater House, Hulbert Road
Waterlooville, Hants PO77JY
E-mail: Charlie24374@yahoo.com

Please allow fourteen days for delivery and while these prices are correct when going to press, prices do vary and are subject to change

RAFARS & RSARS Nets

RAFARS	Time	Freq	Control	
Daily	1100 A 1830 A	3.71 3.71	GØSYF G3HWQ	GI4SAM MØRGI
Monday	1900 A	3.7	G3PSG	GØBIA
Tuesday	0730 A 1400 A 1900 A	14.27 7.015 3.567	G4IYC	
Wednesday	1500 Z 1530 Z	14.29 21.29	?	
Thursday	1830 Z	14.17	ZC4RAF	
Friday	0730 A	14.055	CW Net	
Sunday	0900 Z	5.403	?	
First Monday of the month	1000 A	3.71	?	
RSARS Nets	**Time**	**Freq**	**Control**	
Monday - Friday	1000 A	7.17	GW3KJW	M3VRB
Monday	1830 A	3.585	GM3KHH (RTTY)	
Tuesday	1400 A	7.17	MØOIC	
	1600 Z	14.18	G4BXQ	
Wednesday	0600 Z	14.143	Various	
	1030 Z	3.615	?	
	1830 A	3.565	GM3KHH	
	2030 A	1.946	2EØBDS	
Thursday	1400 A	7.17	GØRGB	
	1800 A	3.743	G6NHY	
Friday	1830 A	3.583	GM3KHH (PSK31)	
	1830 A	3.565	High speed CW	
	2000 Z	14.055	CW	
Saturday	0600 Z	14.143	SSB	
Sunday	1000 A	3.565	G3JRY (Slow speed CW)	
	1100 A	7.17	GW4XKE	
	1100 A	3.745	GM4FOZ	
Joint Service Net	**Time**	**Freq**	**Control**	
Sunday	0900 A	5.4035	G3RAF	
Tuesday	1900 A	5.4035	G3RAF	
Daily 24/7	DMR-TG23527	DMR TG23527		

RNARS: UK Military & Veterans net on DMR TG23527 Wednesdays at 17:00 local

HMS NELSON

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