The RNARS

NEWSLETTER

RNARS POSTAL SERVICES
SPECIAL DELIVERY
HOME OF GB3RN

Promoting amateur radio in the Royal Navy since 1960

ROYAL NAVY

Amateur Radio Society

Autumn 2024

FROM THE EDITOR

Welcome to the RNARS Newsletter,

The very first thing on my mind is to thank my well-wishers who have sent greetings and messages of encouragement over the last 12 months, I can tell you that I am much better for all those kind words.

It has been a progression from being surrounded by men in green scrubs standing over me, shaking their heads, to helpless laughter on waking up in theatre with staples going in, to smiling when the surgeon asked me to move my foot off his instrument panel, because -in his own words; *"I cannot see what I am doing..."* I also remember the physiologist kindly replaying the video he had been making with a probe inside my chest. "*No,*" he said with a grin, "*see, I told you there's no Borg technology in there, and you haven't been assimilated into the collective -yet.*" It's truly amazing where you can meet a fellow 'Trekkie' these days. I also remember fading out during a discourse about the intricacies of cheesy-hammy-eggy. Seriously, a huge thank you to everyone who looked after me for so long.

This is your newsletter, so if you would like to write in with an article or a dit please email me (greybeard64@gmail.com).

Please send articles in the preferred format of Arial Font, size 10 and that pictures/photos, etc need to be suitable for the paper size of A5. Articles are published at the Editor's discretion, and may be edited or rejected for publication if unsuitable.

The views and opinions of the authors of published articles belong to them and do not necessarily reflect the views of the Editor or of the RNARS Committee.

David

Publishing dates and deadlines:

Spring 22nd March
Summer 22nd June
Autumn 22nd September
Winter 22nd December.

Deadlines: 16th of the month

www.facebook.com/groups/RNARS/

https://twitter.com/rnarshq

David M0SLL

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Front Cover: River Class vessel HMS Tamar coming home at the end of a patrol

Not sure who to contact? Email CQ@RNARS.UK or leave a message on 01329 717627.

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MEMBERSHIP MATTERS – SUBSCRIPTIONS

PLEASE CHECK THAT YOU HAVE UPDATED YOUR MEMBERSHIP SUBSCRIPTION FEE SINCE THE RATES HAVE RECENTLY CHANGED.

Please ensure your name and RNARS number appears on all transactions. **UK**: **£20** or **£6** per year ***due on the first of April*** and to be sent to the Membership Secretary. Cheques and postal orders to be made payable to "*Royal Naval Amateur Radio Society.*" Bankers orders are available from the treasurer.

Subscriptions can be made via **PayPal**. The email of the Society's PayPal account is rnars.treas@gmail.com. Payment can also be made through our website:
http://www.rnars.org.uk/PaySubsByPayPal.html

Overseas members:
Subscriptions via PayPal is the preferred option, see above for details.

Newsletter by e-mail: If you want to receive email Newsletters contact the Membership Secretary for details making sure you include your email address.

The society banks with Lloyds
272 London Road, Waterlooville, PO7 7HN. Sort code: 30 99 20 - Account number: 00022643 - IBAN: GB92 LOYD 3099 2000 0226 43 & BIC: LOYDGB21271.

If you are 25 years of age or under then your membership is free of charge.
GDPR/A: Your details will be held on the society's database by the Membership Secretary. The committee requires your permission with regards to the release of your personal information held on the database to be used only by the Society.

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Personal items submitted by post for publication in the Newsletter cannot be returned unless accompanied by a SAE

A MINI-REUNION

Our former Chairman, Doug Hotchkiss, G4BEQ came up to Portsmouth from deepest Wales to meet a few old friends. Hosted by Joe, G3ZDF, they did a spot of sightseeing and doubtless swung the lamp about times gone by.

Doug pointing out where he was on HMS Belfast on DDay using a copy of the original map

Admiralty

Doug pointing out his name on the Normandy Memorial Wall

WHAT'S GOING ON

Building 512
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a/phone

At the RNARS HQ Shack

Drafty has been busy, as always, especially with those of us currently serving and who have recently been promoted to Petty Officer. We congratulate them on their hard work and training and wish them well as they prepare for departure in their new roles wherever they are bound. With that in mind, the gaps that they will leave in their wakes have been filled until they return once again.

From time to time there are various needs for volunteers to take on a variety of tasks and short term activities. For example, helping with the planning and mini-projects for the annual Open Day in June and turning up to help on the day, or setting things up for the AGM, to assisting the committee in helping them to complete certain extra activities. It does not follow that membership of the Committee is an automatic requirement. Quite rightly, not everyone feels that they can make the kind of formal commitment of becoming a committee member. But our club activities can only get done by willing volunteers who are both enthusiastic about our hobby and willing to share their enthusiasm. Sometimes things are being done quietly by members who see that something needs to be done and who do it without being asked. That is a great help. Please think about getting involved when there is a need to get things done, like helping a committee member to get a task completed, and don't leave it to the few in the Committee who usually end up having to do almost everything for a lack of understanding by others about the nature of our individual commitment as members of our small community.

Newsletter production has been frustrated by changes to the movements of key people and also, because the current Editor is experiencing very serious internet connectivity failures due to the unstable nature of the BT Openreach system. in rural areas. Please bear with me as deadlines may be missed while online sources of news and information crucial to production are unobtainable for long periods of time.

WHAT'S GOING ON

Dates For Your Diary

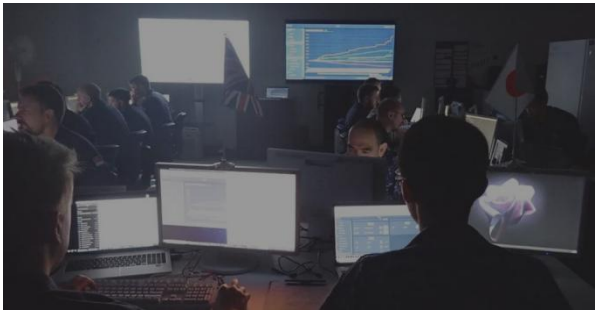
The current outlook in the RNARS calendar. Includes some RN dates of interest. Dates are for convenience, may be provisional and may not be RNARS organised. Nor imply attendance unless stated. This page serves as are a placeholder and is usually the intended or published date for the event as far as the editor is aware. Dates may change in the run up. Please contact the event sponsor where listed for more details or to sign up. Dates may be submitted to the editor for inclusion.

RNARS Christmas bash End of November - See the forum for the discussion

Online Christmas Quiz Early Dec tbc:

1. *Great event; occurs bienially. Can be quite hard to get tickets, but worth going if you can. See the website for details. There is usually an amateur village.*

Royal Navy: Portsmouth-based cyber security specialists fend off "aggressive" hacking attempts



Specialist personnel based in Portsmouth have teamed up with Japanese forces to fend off dangerous cyber attacks.

The Royal Navy team from the Maritime C5ISR Support Unit (MCSU) were an integral part of the operation - involving 41 teams from 17 nations. Personnel at the Cyber Security Operating Centre on Portsdown Hill tested their cyber defence skills during the British Army's Defence Cyber Marvel 3 exercise in Estonia.

MOD RN/The News Portsmouth

IN THE NEWS

Entire Offshore Patrol Vessel fleet at sea or deployed

The Royal Navy's River-class Offshore Patrol Vessels (OPVs) exemplify the fleet's ability to maintain a robust operational presence in home waters and internationally.

the entire River-class fleet is either active or deployed, showcasing these versatile vessels' exceptional readiness and global reach.

The River-class OPVs are currently at sea or ready to deploy at location worldwide, supporting the Royal Navy's global presence.

Royal Navy & RFA vessel status.

Here's where the fleet is currently located:

- HMS Tyne: The Channel.
- HMS Severn: Work-up out of Falmouth.
- HMS Mersey: Training out of Portsmouth.
- HMS Forth: Deployed in the Falklands.
- HMS Medway: Operating out of Portsmouth.
- HMS Trent: Deployed in the Caribbean.
- HMS Tamar: Deployed in the Indo-Pacific, near New Zealand.
- HMS Spey: Deployed in Singapore.

The River-class OPVs were first introduced in the early 2000s to replace the aging Island-class ships. The first three Batch 1 vessels—HMS Tyne, HMS Severn, and HMS Mersey—were initially leased to the Royal Navy, with the goal of increasing operational availability to cover up to 300 days per year.

UKDJ Sept 6, 2024, George Allison

IN THE NEWS

MOD.RN

Royal Navy's UK Carrier Strike Group assembles in the North Sea for major exercise

A powerful Royal Navy task group of stealth jets and warships has assembled in the North Sea to complete critical preparations for a major global deployment in 2025.

The UK Carrier Strike Group with HMS Prince of Wales as its focal point is off the coast of Scotland to carry out Exercise Strike Warrior – military drills that will confirm that the task force is ready for operations.

It is all in preparation for the Carrier Strike Group 25 deployment, which will send British warships, support vessels and jets across the world on the first mission of its kind since HMS Queen Elizabeth led a 49,000-mile mission to Japan and back in 2021.

For now, F-35B Lightning jets, frigates, destroyers, submarines, Royal Fleet Auxiliary tankers, and helicopters are in the North Sea, as they test their ability to carry out operations seamlessly together

This will be supported by the RAF who will provide aircraft to support anti-submarine operations and test the air defence capability of the task group.

IN THE NEWS

Running the exercise from HMS Prince of Wales is Commodore James Blackmore, Commander of the UK Carrier Strike Group, and his battle staff, who carefully coordinate operations, ensuring the task group works as a highly effective unit.

He said: “The UK’s Carrier Strike Group is the 1* battle staff that commands the fleet embarked on HMS Prince of Wales.

“I have command of highly capable assets and personnel, which provide a powerful capability across all domains from anti-air to cyber

“This exercise is important because it will validate my team as a “Very High Readiness” force, which means we can be ready to command a fleet with a few days’ notice.

“This is all in preparation for next year’s exercise across which will see us traverse the globe to achieve.”

“Exercise Strike Warrior is an important milestone for 809 NAS, being the Squadron’s first return to sea since the Falklands conflict and an important stepping stone in developing our Initial Operational Capability.”

www.royalnavy.mod.uk/news/2024/october

IN THE NEWS

Laser Weapons For The RN

Spectacular image showing DragonFire engaging a target during high-power trials at the MoD Hebrides range.

Into the hands of operators? -Future potential

As a technology demonstrator, DragonFire is some way from becoming an operational capability, should the MoD decide to pursue development further. Many of the components are of commercial off-the-shelf (COTS) standard and would need to be replaced by much more robust military spec (MOTS) equivalents. The system is nominally rated as a 50kw-class weapon but has been deliberately designed to be scaleable up or down in power to provide a flexible basis for a variety of future weapons.

Besides the upper deck mounted beam director, a shipboard installation would require about the equivalent space below deck of a shipping container for the laser source and assorted racks for electronics. It would also need to be integrated with the ship's combat system. The electrical power requirement is often somewhat overstated but LDEW need either a battery bank, a large

IN THE NEWS

capacitor to meet the peak power demands. Post-PIP Type 45 destroyers and the Type 26 frigates will certainly have sufficient spare power generation capacity to support at least a 50kw class system. Despite delivering a large pulses of energy LDEWs do not create interference with ship's own radars and electronic warfare systems.

The DF consortium are confident that, depending on the laser power requirement, considerable reduction in weight and space requirements can be achieved. LDEW are a realistic proposition for mounting on Army fighting vehicles and possibly eventually an airborne version for GCAP/ Tempest.

Independent Royal Navy news and analysis

ENCRYPTION VIA ONE-TIME PADS

Pete McCollum

This article presents an example of how message encryption was typically done by CIA communicators using a "one-time pad" (OTP). A retired CIA old-timer kindly provided the descriptions.

A one-time pad is essentially a pad of paper on which each page has a unique set of random letters. The sender and receiver have identical pads. Each letter on the pad is used to determine a single letter of the enciphered message. Since the letters on the pad are random, there is no formula that can be determined by studying the letters. Assuming that the pad is not compromised, and each page is used only once, then the OTP system is unbreakable. The disadvantage of the OTP system is that a copy of the pad must be securely delivered to the person on each end of the communication.

The key letters on the pad, and the messages themselves, are typically written in 5-letter groups. This helped the communicators to collate and verify the length of the message, and if something was misunderstood, the receiving person could ask for a certain group to be repeated, etc.

"OTP is a very simple yet completely unbreakable symmetric cipher. To use a one time pad you need 2 copies of the "pad" which will vary in size from something around 8 x 10 inches, or approximately half that size. There are two pads issued to each user. One for encipher and one for decipher, and the key text is printed in red for encipher and black for decipher. Each page of the pad is sealed and must not be opened until actually enciphering or deciphering [if a page is not sealed, it must be assumed that the page has been compromised - Pete]. Typically the pads are set up in blocks of five letter random groups.The key text may not be reused and pages should be destroyed after each use."

To use the OTP, a method is needed for correlating a letter of plain text with the next letter of the key text (from the pad), to produce a letter of enciphered text. The method used is called a "Vigenere's Tableau", or Vigenere's square. The table has the alphabet in the left-most column, and also across the top. For each row, there is a shifted-reverse alphabet. So, the "A" row lists the alphabet backwards, beginning with Z. The "B" row begins with Y and ends with "DCBAZ", etc.

The first 3 rows of the table look like this:

ENCRYPTION VIA ONE-TIME PADS

	ABCDEFGHIJKLMNOPQRSTUVWXYZ
A	ZYXWVUTSRQPONMLKJIHGFEDCBA
B	YXWVUTSRQPONMLKJIHGFEDCBAZ
C	XWVUTSRQPONMLKJIHGFEDCBAZY

To encipher the first letter in a message, go to the row corresponding to the plain-text letter, then go to the column indicated by the first letter on your OTP. The letter at the row-column intersection is the enciphered letter. Note that the Vigenere's table itself does not contain any 'secret' information - it simply provides the mechanism for combining plain and key text into enciphered text. For example, suppose that the message is "Dead drop Alpha three AM tonight"

DEADD ROPAL PHATH REEAM TONIG HTXXX ------ (plain text)
BNJEX KQPBC LZCXV PKTUY QFHNG QWERT ----- (text from OTP)
VIQSZ YVVYM ZTXJX TLCFP QGFEN CKYLJ ----- (enciphered text)

One of the two disks that comes with the GRA-71 burst coder device has an extra reversed alphabet enscribed on it, thus allowing it to be used in place of a printed table. The red mark on the coder is aligned with the red letter on the wheel indicating the desired row of the table, then the 2nd and 3rd members of the triad are read from the white letters directly below the red mark.

New students of the OTP encryption scheme were given a card, about 3" X 6", which had the complete Vigenere's table printed on the front, and a "memory aid" on the back. The back is a set of certain 3-letter combinations ("triads") taken from the main table. The triads on the back of the card are chosen because they are relatively easy to remember. The more triads that can be memorized, the faster the radio operator can finish his job. Here is a sample from the back of the card:

MEMORIZE THESE

Five minutes daily spent in studying these combinations will pay dividends in the time saved in encoding and decoding.

AIR	FOG	SOT
BAY	HAS	SUN
CUD	HOE	TAG

An experienced radio operator would memorize the entire table, and could take a look at the plain text, and key text, identify the triad from memory, and thus encipher as he sent code. A less-experienced operator would have to write down the enciphered message before sending it. **(RNCA)**

RSGB NEWS - Club Nights & Nets

RSGB.org

Licence Revalidation on U-Tube

Ofcom Release a step-by-step video on licence revalidation

Ofcom does make note that while the requirement is to revalidate licences every 5 years, it is recommended to do this annually. Make sure you keep your details up to date and put a reminder in your diary. RSGB members can find this video at RSGB.org and search for 'licence revalidation.' On that page you will find a helpul FAQ on the topic prepared by the society.

CLUB NIGHTS & NETS

26 Oct – **BATC Convention For Amateur TV 2024 (CAT 24) Part 2 – Online**
Online Talks about ATV-related topics from 10am until 3pm.
http://batc.org.uk/live

26 Oct – **Carrickfergus ARG Rally**
Elim Pentecostal Church, North Road, Carrickfergus
Doors open at 11.30am. Refreshments available, everyone is welcome.

26 Oct – **Essex CW Boot Camp**
Meet your CW friends face to face for a day of CW activities, tea, coffee and cakes! For more information visit essexcw.uk

27 Oct – **British Vintage Wireless Society (BVWS)**
Swapmeet, Golborne. BVWS members only.

27 Oct – **Galashiels Rally**
11am at the Volunteer Hall, St Johns Street, Galashiels, TD1 3JX.
There will be refreshments, traders and bring and buy. Admission fee: £3.
Contact rallyqueries@galaradioclub.co.uk for more information or visit us at www.galaradioclub.co.uk

3 Nov – **Holsworthy Radio Rally**
Holsworthy Leisure Centre, Well Park, Western Road, Holsworthy, Devon, EX22 6DH. There will be traders, bring and buy, and catering. The venue has disabled access and free parking. Open to Traders from 8am. Doors open at 10am, entry £3 per person.
Traders online booking: https://forms.gle/8h8aNNJZHHcGQSKw8
Web: https://www.qsl.net/m0omc/holsrally24.htm
Enquiries to Chris Bolton, M0KNF: boltonbicycles@gmail.com

9 Nov – **Twelfth 2024 Scottish Microwave Round Table GMRT**
Museum of Communication, Burntisland, Fife. Lunch will be provided and an optional dinner will be held in the evening at a local hotel. Online booking is now open via the GMRT website: gmroundta ble.org.uk
For more information email Colin, GM4HWO via gm4hwo@gmail.com

Club Nights & Nets

RSGB

23 Nov **–Rochdale & District Amateur Radio Winter Rally**
St. Vincent de Paul's Hall, Norden, Rochdale, OL12 7QR. Doors open at 10am with entry still only £3. Usual Traders and caterers. Plenty of free parking.Contact Martin Shore (Treasurer and Rally Organiser) on 07587709006, or email: rally.radars@hotmail.com

24 Nov – **Bishop Auckland Radio Amateur Club Annual Rally**
Spennymoor Leisure Centre, Co Durham, DL166DB. The usual traders, catering, ample parking and disabled facilities will be available. For more information, and downloadable forms for traders, please visit barac.org.uk

1 Dec **– Wiltshire Radio Winter Rally**
Opens 9am, closes 1pm. Kington Langley Village Hall, Kington Lang-ley, SN15 5NJ. Just off Junction 17 of the M4. Admission £3, indoor tables £10. Car boot: car-size pitch £10, van size pitch £15. H/C refreshments available on site. Contact: Chairman@Chippenhamradio.club

8 Dec – **British Vintage Wireless Society (BVWS)**
Swapmeet and auction, Royal Wootton Bassett. BVWS members only.

8 Dec – **Mid-Devon Amateur Radio & Electronics Fair 2024**
Winkleigh Sports & Recreation Centre from 9am to 1pm. Entry £3 per person, no charge for partners and under 16s. Easy access from the A3124, free parking, free Wi-Fi, hot food and refreshments available. A chance to pick up hard-to-find electronic components, two-way radio and computer hardware. Traders £5 per 6 foot frontage (tables supplied), pre-booking in advance rec ommended. Mains electricity available on request. Traders – please pre-book ASAP, contact Phil G6DLJ 07990 563147 or email: wrg2024@hotmail.com
Winkleigh Sports & Recreation Centre, Mid-Devon EX19 8HZ
What3Words ///focal.fountain.laminated

10 Aug 2025 – **Flight Refuelling ARS Hamfest**

26 Jan 2025 – **Lincoln Short Wave Club Winter Radio Rally**
The Festival Hall, Caistor Road, Market Rasen, LN8 3HT.
Doors open at 10am. Admission £3. Tables £10 Indoor event, ample free car parking. Hot refreshments including our famous bacon butties.
To book contact: Steve Burke, M5ZZZ, m5zzz@outlook.com, 07777699069

SERVICE VETERANS EVENTS

The *AFVBC* (Armed Forces & Veterans Breakfast Club) is a vital community where veterans come together to share stories, find support, and enjoy the banter. **https://afvbc.com**

MY RADIO LICENCES - Register

NAME: _____ **RNARS Member:** _____ **RSGB Member:** _____

LICENCE	DATE	C-SIGN	Licence No.	Remarks
Foundation				Amateur UK
Intermediate				Amateur UK
Full				Class 1, CEPT-T/R 61-01, International

Notices of Variation:

Date	Licence	Reason	Licence No.	Type	Remarks
	Foundation	Change in regs		Amateur	
	Intermediate	do		Amateur	
	Full	do		Amateur	Class 1, CEPT-T/R 61-01, Int

EMERGENCY COMMUNICATIONS

RSGB

Emergency communications

The provision of emergency communications is one of the fastest growing areas of amateur radio around the world.

Amateur radio is so useful to emergency communications because it does not depend on any infrastructure.

Although mobile phones and the internet have wireless capability, they are still dependent on fixed masts and cabling which can be severely disrupted by a natural or man-made disaster; so while very useful in an emergency, mobiles and the internet cannot be relied upon completely.

When the phone lines are down and the electricity is off, it is still possible to communicate worldwide with amateur radio using only battery power.

This versatility has saved many lives over decades of amateur radio emergency service. Amateur radio still gets through when everything else has failed.

RAYNET

RAYNET was formed in 1953 following the East Coast floods, when radio amateurs provided emergency communications, and was administered by the RSGB.

Radio Amateurs who are willing to provide communications during emergencies are organised in autonomous local RAYNET Groups and are also members of the national organisation, RAYNET-UK.

There are over 100 RAYNET Groups around the country. These Groups practice and improve their skills by taking part in exercises or by providing communications for community events.

RAYNET-UK is a registered charity, affiliated to the RSGB and there is regular liaison between the two, promoting a coordinated approach to emergency communications.

RAYNET-UK provides the special support which Groups need, such as specific insurance and photo ID. RAYNET-UK also liaises with the emergency services, government and other organisations at a national level. Only groups in RAYNET-UK are able to use the title RAYNET.

Many RAYNET groups are affiliated to the RSGB as Clubs.
FIND OUT MORE: Visit the **RAYNET-UK website**

Emergency Frequencies - RAYNET-UK

All frequencies below are listed in the **2012 UK bandplan** as being used by emergency communications groups.

Groups should remember that the UK band plan is advisory and RAYNET groups do not have a "right" to use any frequency. Having said that, most other amateurs will, when asked in a *polite manner*, move frequency.

80 metres

3.663 National co-ordination during emergencies
Weekly News (Every Sunday, 08:30 local time)

40 metres

7.110 National co-ordination during emergencies

6 metres

51.650 FM
51.750 FM
51.770 FM
51.790 FM

4 metres

70.350 FM
70.375 FM
70.400 FM

70.350 is listed for digital mode use as well as emergency communications.

2 metres

70 centimetres

433.700 FM
433.725 FM
433.750 FM
433.775 FM

433.700 is listed as IARU Region 1 packet as well as emergency communications.

438.400 FM, Voice repeater
430.800

Base TX on 438, mobiles TX on 430 (-7.6MHz repeater shift. This has been chosen so that usage is compatible with most modern radios which have a wide negative shift available as standard).

This is a 7.6MHz split repeater pair in the 70cm "wide" repeater section. Further information about this portion of the band can be found on the RSGB's Repeater Management Committee website.

432.775 FM, Voice repeater
434.375

Base TX on 432, mobiles TX on 434 (standard +1.6MHz repeater shift)

Emergency Frequencies - RAYNET-UK

Every public service has its own culture of communications language with their own protocols to follow, with their own specialised phrases and acronyms which they will use to pass on vital information as rapidly as possible without taking up valuable time on air. As a messenger service the naval dictum holds true; *'a messenger must not add to or subtract anything from a message.'* You may not understand it -you don't have to. You have to take it on trust that the recipient of the message or someone else listening in will know what is being sent. For all you know the 'client service' is asking for tea and stickies. The golden rule in emergencies is; if you cannot do anything to help stay out of it.

Queen had to tell Boris Johnson about F-35B crash

An excerpt from Boris Johnson's upcoming memoir reveals that the Queen personally informed him of a crash involving an RAF F-35 fighter jet.

During one of their regular audiences, Johnson writes that the Queen was the one to tell him that the jet had fallen into the sea while operating from Royal Navy aircraft carrier HMS Queen Elizabeth.
In a surprising twist, Johnson notes that the Queen was often very well-briefed, sometimes even before he was.
"Sometimes she even seemed to know things before I had been briefed," he writes. He recalls how she informed him of the incident, saying, "It was she who broke it to me that a very expensive RAF F-35 fighter plane had blown a gasket and dropped off its aircraft carrier and into the drink because someone had left a plastic tray over the air intake." Johnson adds, "Doubly embarrassing to hear it from the Queen."

The crash in question occurred in November 2021, when an RAF F-35B Lightning II jet operating from HMS Queen Elizabeth crashed into the Mediterranean Sea shortly after takeoff. The aircraft was part of the UK's cutting-edge fleet, designed for stealth operations and equipped with advanced technology. Fortunately, the pilot was able to eject safely and was rescued shortly after the incident.

UKDJ - George Allison, Sept. 29, 2024

Russian Army Tactical Communications

Sergio Miller

From the beginnings of the war, a lack of coordination and disjointedness in Russian Army operations has surprised. What happened to the vaunted operational level of command? Why have we not witnessed regimental or brigade-level operations? Why is YouTube sagging with videos of platoon actions, but rarely a company and still less a battalion action? The reason, to use the phrase, was hidden in plain sight. It lies in the Russian Army's tactical communications system.

Following the withdrawal from Kherson, an angry 2nd Army Corps serviceman, Andrei Morozov, with a history of activism, published seven lengthy articles on kenigtiger.livejournal.com. The series is entitled '*Why the RF Armed Forces are losing, retreating and will continue to do so*'. Morozov was one of the co-authors of the Report of the Coordination Centre for Assistance to Novorossia following the results of 2014-2018, which sought to highlight equipment and corruption problems in the separatist enclaves in the Donbass. He is pro-Russian but does not hide the many problems besetting the 'special military operation'.

The articles allege the Russian Army's tactical radio systems are unfit for modern military operations. He attributes the problems of tactical radio communications as the main factor in the failure of the armed forces of the Russian Federation. This article explores his writing and Russian Army tactical communication problems.

The signs were there from the beginning

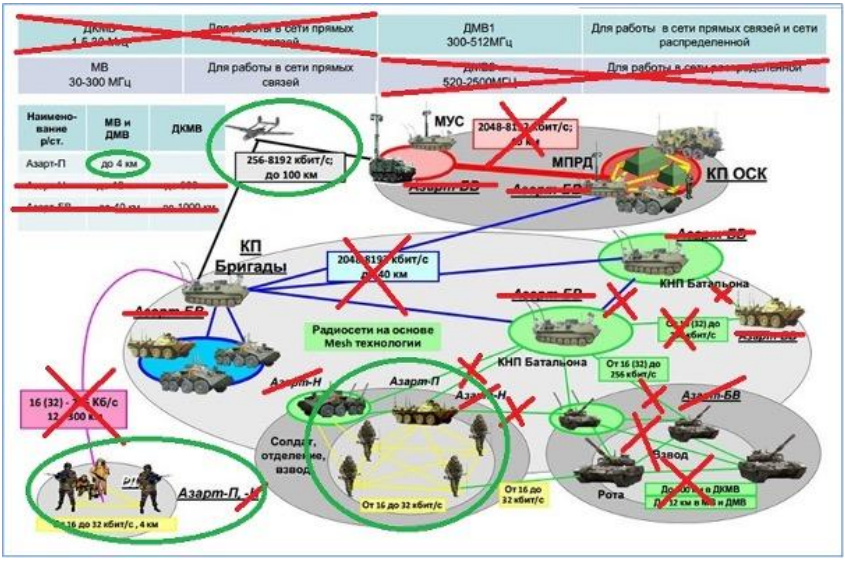
In his bitter 184-page e-autobiography 'ZOV' posted on Telegram, Russian paratrooper Pavel Filatyev describes how within the first 24 hours of the invasion, his unit (56th Guards Air Assault Regiment) broke up. Companies lost

contact with each other, the commanding officer 'disappeared', and he and fellow paratroopers were unclear what they were supposed to be doing (or why). There were fratricidal incidents and units got lost. Lack of situational awareness and outright confusion was a consistent theme of Filatyev's account of the war.

Morozov chiefly describes the limitations of the main Russian Army's tactical radio system R-168 'Aqueduct' in his seven articles. This digital communications system was developed in the 1990s and fielded from the noughties onwards. It was designed to provide robust communications from soldier to division-level. He also describes the more modern R-187P Azart radios, subject of RUSI reporting as early as March. *The Economist* also published an article on this subject in the same month. The problems identified by Morozov are summarised in the sections below.

The four kilometre tactical communications range limit

The main problem Morozov highlights is a four kilometre range limit to tactical communications. He explains: 'The Armed Forces of the Russian Federation do not have a normal communication and control system. The war began and the army went to war with communication 2.5-3 [km], in the best case, if from a mast or an elevation – 4 km.' He elaborates: 'There are no PPRC [repeater] radio stations on armoured vehicles and command and staff vehicles. There is no entire HF segment at all.' To make his point, Morozov displays an Angstrem NPO promotional image and has crossed out what does not, in reality, exist in deployed units. His version claims only platoon or company-level 4 kilometre range radios are actually fielded, with the possibility of UAV repeater



stations (but there are issues, not least UAVs are shot down).
Morozov alleges only a very short range VHF capability is actually fielded in the Azart family of radios Source: https://kenigtiger.livejournal.com/2196138.html

In the seventh article Morozov describes how Luhansk militiamen resorted to buying Chinese recreational kites and creating improvised 'flying repeaters'. These were used in the fighting around Lysychansk.

Mixed radio systems = insecure, analogue communications

A second constraint is mixed radio systems from different generations. The Russian Army and Donbass militias have been fighting with three generations of radio systems: the Soviet R-123 and R-173; the R-168 Aqueduct; and the R-187 Azart (in limited numbers). A fourth may be added: the Andromeda-D reportedly fielded with airborne forces and which was supposed to be integrated with the new ESU TZ (Unified Tactical Control System). The latter was described in a lengthy article in *Voennoye Obozreniye* (Military Review) three months before the war.

The consequence is that all participants on a net must communicate at the lowest common technological denominator. This is, as Morozov explains, 'in FChS mode' which is 'the 'Fixed Frequency Simplex communication mode.'' The reality is analogue, insecure communications not advertised digital, secure communications. He adds sarcastically, 'The passage of waves at the "low band' is good, the enemy hears armoured vehicles perfectly, takes measures in advance. By the time it approaches the attacked sector of the front, there is already a 'meeting committee' with RPGs, NLAWs and Javelins.'

Sanctions

Angstrem NPO—the manufacturer of the R-187 Azart radios—is subject to sanctions. Morozov asserts as many as 25 components are sanctioned, of which five 'cannot be obtained at all now.' This raises unavoidable questions on the sustainability of a radio system intended as the future of Russian Army communications, never mind sustaining the system in a war.

Corruption

The procurement of the R-187 Azart communications system was subject to epic Russian corruption involving General-Colonel Khalil Arslanov, Deputy Chief of the General Staff and Chief of Communication Troops from December 2013 to October 2019. It is alleged he was involved in fraud of a public procurement programme to the tune of 6.7 billion roubles. This massive fraud was made possible by buying at inflated rather than market prices and stuffing the radio systems with '90% of the work… done in China from imported kits.' This saga has been extensively reported by Russian newspapers such as *Kommersant* ('The Businessman').
The upshot has been unreliable radios with components and batteries no longer readily obtainable.

Morozov concludes:
'*And, I repeat once again, in general, the establishment of communication does not mean at all that we will immediately begin to win. No. The rest of the problems will not go away, moreover, if, while we are establishing communication, no one is fighting with them, then after at least some normalization of management, the situation will not immediately get better. It will simply stop rapidly deteriorating. The rate of decline will stop. Improvements in the situation will still have to be achieved…'*
The Russian Army has a tactical communications problem.

The Wavell Room December 19, 2022

Amateur radio: more freedom to innovate - OfCom

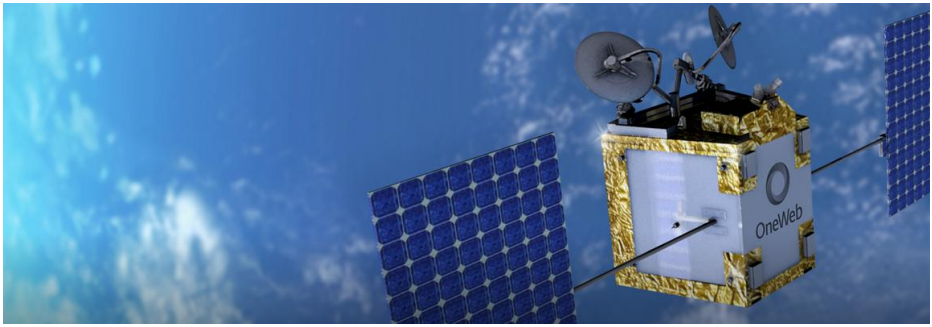
From today, (21st February 2024) amateur radio enthusiasts will enjoy greater operating freedoms under amateur radio licensing changes announced by Ofcom.
Last year, we set out how we planned to change amateur radio licences and policies, so they better meet the needs of current and future needs of the hobby. We received over 1,400 responses, and we would like to thank everyone who provided their input as part of this process. Following this, we published our General Notice of Proposals to vary all amateur radio licences in line with the proposed new terms and conditions.
The changes we are making to the licences include:

- **Updating the overall licensing framework**
- **Streamlining and modernising call sign assignment.**
- **Adjusting technical parameters**.
- **Providing clearer updated rules**.

Whilst the new rules apply from today, we will need to reissue all the licences and aim to complete this process by autumn 2024... We will contact licensees by email or post depending on their preferred method of communication. In the meantime, licensees can access the Amateur Radio General Licence Conditions Booklet from our website or contact us to request it in an alternative format. https://www.ofcom.org

Military Welfare through LEO Satellites

by Charlie Clarke October 11, 2023



***In today's fast-paced and interconnected world, maintaining seamless communication is critical for the success of military operations. Low Earth Orbit Satellites can help*.**

ABSTRACT

Military welfare, which encompasses the physical, mental, and emotional well-being of soldiers, sailors, and aviators, both on and off the battlefield has emerged as a top priority for modern armed forces. To achieve this, reliable and efficient communication plays a pivotal role, ensuring that those on the frontline remain connected – not only to operational HQs but also to their families, support systems including finances and vital resources for personal and professional development. In challenging and often hazardous environments, communication with peers becomes crucial in maintaining a strong and motivated fighting force. This new generation of military personnel have grown up in a connected world with social media and gaming at their fingertips – always on and always connected. This increased level of connectivity directly impacts the well-being of military personnel and their overall morale. Initiatives encompass a range of aspects, from health and safety to emotional support, but few are as pervasive and impactful as communication connectivity.

A Paradigm Shift with Modern-day Communication Technology from Space

Traditionally, military communications heavily relied on geostationary satellites for effective, long-range communications. Now with the advancements of low-Earth-orbit (LEO) connectivity, this has brought about a paradigm shift in military communications. Orbiting at lower altitudes LEO satellites offer low latency, providing troops with near-instantaneous connectivity. This advantage is a game-changer for those in the field, at sea or even in the air, allowing them to make video calls, access critical data, and engage in seamless communication with minimal delay.

UKDJ

THE JASON CODE

Machine Generated Messaging

Alberto Di Bene I2PHD

QRZ.com

Introduction To Version 0.99

First of all, why the name Jason ? Well, you all know the program Argo... Argo was the name of the mythological ship that brought the Argonauts in Colchis, searching for the Golden Fleece. The coxswain of the ship Argo was the Greek hero Jason. So this program, which loosely relies on the technology of Argo, has been named Jason. And, if you don't like mythology, you can always read Jason as an acronym: ***J**ust **A**nother **S**hip-**O**wner **N**ame* :-)

The JASON Coding Scheme

The coding scheme of Jason is based on the ideas about IFK (Incremental Frequency Keying) initially proposed by Steve Olney, VK2ZTO.

Basically, the information is coded in the absolute value of the difference between two frequencies sent sequentially. This has the advantage of not needing a precise initial tuning. A tuning error of a few Hertz is perfectly acceptable.

Another characteristic is that, since the frequencies are sent one at a time, you don't need a linear amplifier. A class-D Mosfet TX will do nicely. The frequency deltas can assume one of 16 different values. After sending one tone, the next one is shifted by the appropriate amount, up or down depending on the setting of the USB/LSB switch. With 16 deltas we need 17 slots (tones), and any overflow causes a wraparound.

With 16 possible deltas, each baud (a baud is a change in the signal transmitted, in this case a change in frequency) encodes 4 bits (called a nibble), which are not enough for a reasonable alphabet. So we need two nibbles for our alphabet.

But now a problem arises: how can we get character synchronization? In other words, which is the high-order and which is the low-order nibble? I solved the problem in the simplest way, which may be not the optimal one. I used the high order bit of each nibble to encode this info. So the high-order nibble is of the form '1xxx'b, while '0xxx'b is the low-order one. Here xxx stands for the actual information transmitted, so now there are 6 bits available to encode our alphabet, enough for 64 symbols. I decided that my alphabet would be that that in ASCII code goes from x'20' (the blank) to x'5f'. This allows the transmission of all the letters (upper case only...), the ten digits, and practically all the punctuation symbols normally used.

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JASON Signals

Ok, this explains the encoding. What about the signalling? For this version of Jason (but it may change in future versions), I chose the following parameters for the standard speed setting:

- The default Rx and Tx centre frequency is 800 Hz.
- Each one of the 17 slots is separated from the adjacent by 3 FFT bins, so to guarantee some orthogonality.
- Each FFT bin is roughly 84 millihertz for the standard ***Normal*** speed setting, so the slots are at a distance of roughly 252 millihertz, for a total band occupancy of 4.038 Hz for the standard ***Normal*** speed setting
- Each baud (each tone sent) lasts for roughly 11.89 seconds for the standard ***Normal*** speed setting (the inverse of the FFT bin width)The throughput hence is about 2.5 characters per minute for the standard ***Normal*** speed setting, hardly a speed champion, but it compares favourably with QRSS.

The following table summarises the parameters for the various speed and turbo on/off settings.

Speed	Tone Duration(S)	Tone Spacing(Hz)	Bandwidth (Hz)	Characters/Minute (Turbo Off)	Characters/Minute (Turbo On)
Slow	95.2	0.03	0.5	0.3	0.6
Normal	11.9	0.25	4.0	2.5	5.0
Fast	1. 5	2.0	32	20	40

Options

The ***Options*** menu allows settings for a number of parameters.

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• **Select Audio Input…:** Displays a Volume Control Dialog for your Soundcard Device. Here you can select the audio source input.

• **Read from Wav file…:** Displays an open file dialog to allow audio data to be read from a .WAV file (NOTE: Must have a sampling rate of 11025Hz).

• **Read from JAS file…:** Displays an open file dialog to allow data to be read from a .JAS file. A JAS file contains the down-sampled I and Q components of the audio input.

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• **Jas Recording Setup:** Displays a save file dialog allowing the specification of the .JAS filename and save location.

• **Wav Recording Setup:** Displays a save file dialog allowing the specification of the .WAV filename and save location.

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• **Center Frequencies…:** Displays a dialog that allows setting of the audio TX and RX frequencies (can be set independently) in the range of 50Hz – 5000Hz (the upper limit is set by the fixed 11025Hz sampling rate – Nyquist). Should initially be set to the default of 800Hz to allow easy netting.

• **Speed ->:** Displays a sub-menu to allow selection of three different speeds as shown in the table above (Slow/Normal/Fast). This setting must be the same at each end of the communication path.

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• **Tx Port ->:** displays a sub-menu allowing the selection of the three output options as outlined in the ***Interfacing JASON*** section below.

• **Tx Shift Mult. Factor…:** In the case where the output audio is fed to a frequency multiplying circuit (e.g., PLL) you need to enter the frequency multiplying factor here to allow JASON to reduce the frequency shift deltas to ensure that the correct shifts are present at the multiplied frequency.

• **Turbo Mode:** An ON/OFF selection to enable/disable the TURBO mode. Selecting Turbo mode causes the tone time to be half as long while still maintaining the same tone shifts. This should only be done when the S/N is good. This setting must be the same at each end of the communication path.

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• **Tx LSB / Tx USB:** Selection must match the correct sideband setting for the Tx at your end.

• **Rx LSB / Rx USB:** Selection must match the correct sideband setting for the Rx at your end.

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• **Native Decoder:** Selects original decoder.

• KK7KA Decoder: Selects KK7KA decoder. Not selectable (greyed out) in v0.99 as decoder has not been upgraded by KK7KA to accommodate speed settings other than Normal.

==========

• **Show Frequency Peaks:** Enables/disables a real-time readout of the detected peak frequency between the yellow lines on receive.

THE JASON CODE

• **Jimi Hendrix Mode:** Amplitude clipper intended to be used in the presence of impulsive noise. For those not atune to Mr. Hendrix – he was famous for a guitar sound produced by heavy clipping.

==========

• **Capture Trigger…:** Displays a dialog that allows entry of a piece of text that will trigger the beginning of text capture. Useful for leaving the receiver running waiting for a signal to begin (or rise out of the noise). The received screen text is saved in a file called “Jason.log” in the directory where Jason.exe is located.

• **Beacon Text from File:** Type different beacon messages into separate text files (.txt) and select a message from this open file dialog.

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Capture Range

The program has a capture range of 1.5 times the bandwidth (my arbitrary choice), i.e. slightly more than 6 Hz for the standard ***Normal*** speed setting. The capture range can be easily positioned with the mouse. To do this, left-click on the approximate center of the white lines that represent the received signal. The capture window (the two yellow lines)will then positioned so that its center will coincide with the frequency you have clicked on. Be warned that any signal that falls, even slightly, outside the capture window will be i nored by the decoding algorithm.

Frequency Stability Requirements

Using the standard ***Normal*** speed setting as an example, it is evident that the combination of the Tx and Rx drifts must be such that, in each 11.89 sec. interval, the frequency must stay in one single FFT bin, i.e. 84 millihertz. Actually, a drift from -1 to +1 bin is tolerated, and accounted for, by the program. But let's remain on the conservative side. If we translate this into short term stability, where short term means a period of 10 minutes, we compute that our oscillator must not drift, in each 10-minute interval, more than 0.084 * 600 / 11.89 = 4.24 Hz (roughly). This means, at 136kHz, a stability of 31 ppm is required, which doesn't look like a difficult figure to achieve.

Interfacing JASON

How does Jason interface with the radio? For reception, it's quite easy. Just bring the Rx audio into the sound card,just as you do now with Argo and Spectran. Keep the audio level low. Jason works best when the level bar on the left side of the panel is below 50 %.

You will see in the waterfall window two yellow lines. Tuning must be done so that to ensure that the white lines of the received signal are always inside the

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two yellow lines. The program discards all that falls outside. Fine-tuning is possible with the mouse. Click on a signal line on the waterfall window, and its frequency will be brought at the center of the yellow lines (the receiving window). The Rx center frequency can also be adjusted with a menu choice. For transmission, I have envisaged three different modes, to make interfacing the easiest possible.

1. **Parallel Port Output** : via the Options menu, you can choose between LPT1 or LPT2. The code (ranging from 0 to 16) for the tone to be sent is output, with the ***Strobe*** pin pulsed high for 100ms. The Tx condition is indicated by the ***SelectInput*** pin being high.

2. **Serial Port Output** : via the Options menu, you can choose between COM1, COM2 or COM3. The serial format is 9600 - 8N1. The code (ranging from 0 to 16) for the tone to be sent is output. The Tx condition is indicated by the RTS being active. Via the Option menu, you can also choose the ZL1BPU format, which is what is needed by Murray's AVR Atmel board (http://www.qsl.net/zl1bpu/MICRO/EXCITER) Basically, an ASCII 'T' is sent at the beginning of transmission and an 'X' at the end. Moreover, the tones to be sent are identified by the three character sequence 'A00', 'A01'...'A09', 'A0A', A0B'....'A0F', 'A10' . No CR/LF used.

3. **Audio Output** : selectable via the Options menu. If you choose this method, a note is generated using the sound card, with a software implementation of a DDS, with a very long sine table (262144 entries), which ensures low distortion. The default center frequency generated is 800 Hz, but can be selected via the ***Options*** menu in the range 50Hz to 5000Hz.

When using audio output, there is the possibility to specify a shift multiplier factor (default = 1), which can be handy when generating the RF using a PLL process that involves divisions. The output is in stereo with left and right channels outputting the audio in quadrature (I and Q) allowing feeding to a phasing-type SSB transmitter set-up. To maximise sideband rejection of a phasing-type SSB transmitter a dialog for adjusting the relative amplitude and phase of the two stereo channels (I and Q) is available in the ***Options | Tx Port*** menu.

With these interfacing possibilities, it should be easy to hook-up a Tx to Jason, both if you have the capability to up-convert the audio tone to the working frequency, or if you use a DDS board, either with a parallel or serial interface. If you use a DDS board, you will need the following table to set up the frequency to generate for the standard speed setting, depending on the code output from Jason. Add the value in the table to the nominal value of the carrier generated by the DDS.

THE JASON CODE

Tone #	Frequency (Hz)
0	797.981
1	798.234
2	798.486
3	798.738
4	798.991
5	799.243
6	799.496
7	799.748
8	800.000
9	800.252
10	800.505
11	800.757
12	801.009
13	801.262
14	801.514
15	801.766
16	802.019

Tone # - Frequency Table

These are also the default frequencies for the standard ***Normal*** speed setting generated when using the audio output, provided that your sound card has an exact sampling rate.

The encoding is taken care of by Jason; the DDS board task is only to generate the appropriate frequency, according to the code received via the serial or parallel port.

Frequency Accuracy for Using Audio Output Interface

A common method for interfacing is using a soundcard that is normally installed in a PC as standard. It is useful to analyse the frequency accuracy and stability requirements for JASON. JASON assumes an exact 11025Hz sample rate. The initial frequency accuracy determines the ability to place the desired signal in the input frequency range of JASON. The table below outlines requirements for different speeds

	Bin Width (Hz)	Display Range (Hz)	Capture Range (Hz)	Reqrd Capture Window Accuracy (Hz)	Required Display Window Accuracy (Hz)
Slow	0.0105	2.69	0.76	±0.1	±1
Normal	0.0841	21.5	6.06	±1	±9
Fast	0.673	172.3	48.45	±8	±70

Audio Frequency Accuracy Table

The final frequency accuracy is the sum of the receiver frequency error and the soundcard error. Sampling frequency accuracies of soundcard are usually much poorer in terms of ppm than modern receivers. Typically soundcards sampling frequencies are derived from a standard ±100ppm crystal oscillator while receivers are typically ±5ppm. Working in favour of the soundcard is that it is dealing with audio frequencies; therefore 100ppm @ 800Hz = 0.08Hz error. For 5ppm accuracy receiver working at 134kHz the error is about 0.7Hz. So worse error is 0.78Hz (say 0.8Hz). Short-term drift of both the soundcard and receiver will be much less than the initial accuracy error. Therefore with this combination it is possible to start JASON in the ***Fast*** mode without having to manually adjust the signal to be within the capture window (assuming both ends of the communication path are using gear of the same specifications).

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If the operators are prepared to manually adjust the capture window then the signal need only be within the display window requiring 8 times less initial accuracy and so the ***Normal*** mode is also possible without further calibration for the equipment accuracy described above.

Important Disclaimer: Older soundcards usually had ±100ppm accuracy for the standard sampling rates of 44100, 22050, 11025 samples/second. However, the newer soundcards that have 96kHz and 48kHz sampling rates will likely have ±100ppm for these two rates, but the standard rates of 44100, 22050, 11025 might not have the same accuracy. For example a newer model external soundcard might be off by about 64ppm for the 48kHz and 96kHz sampling rates, while the sampling rates for 44100, 22050 and 11025 might be off by many ppm!!! Because of this it is probably necessary to calibrate the soundcard if it is one of the newer cards.

Methods for calibrating soundcards can be found on the Internet. As JASON has no provision to enter the real sampling rate (it assumes exactly 11025Hz) you can compensate by changing the ***Rx*** centre frequency. For example, if you find your soundcard sampling frequency is high by 100ppm (i.e. 11026.103Hz), you should enter a ***Rx*** centre frequency 100ppm low (e.g., 799.92001Hz for a nominal 800Hz). Of course, this does not account for any receiver errors.

WAV and JAS Recording

Incoming signal data can be saved for reading back at a later date. Two formats are available – WAV and JAS. The WAV format is Mono, 11025Hz sample rate, 16-bits per sample. The JAS format brings out the internal down converted and down sampled I/Q data (much lower effective sampling rate) that is normally fed to the internal JASON complex FFT algorithm before decoding.

Starting and stopping WAV and JAS recording is done via the 'W' and 'J' buttons respectively that appear just to the right of the ***Options*** and ***About*** buttons when JASON is in Rx mode. Note that if you haven't setup the filenames for saving to, you will be presented with a file save dialog when you first click these buttons. So if you want to suddenly capture some interesting signals make sure you have setup the filenames beforehand (See WAV and JAS recording setup in the ***Options*** menu).

After recording a WAV or JAS file you can feed it back later to JASON via the WAV and JAS reading modes in the ***Options*** menu.

The purpose of recording to a JAS file is that, compared to a WAV file, the size of a JAS file at ***Slow, Normal*** and ***Fast*** speeds is 0.4%, 3% and 25% respectively of a WAV file for the same record time. Handy for recording over

THE JASON CODE

night sessions without filling up your hard drive!!! Of course there is a catch. The JAS file only records the signal passing into the internal complex FFT and decoder – therefore you cannot change the centre frequency or speed if you discover that the signal is outside the capture range or at the wrong speed when you play the JAS file back later. So if you see a nice signal but some of it or all of it falls outside the capture and/or if it is the wrong speed then too bad. Any changes you make are ignored during playback. In comparison the WAV file records the whole audio signal and when played back allows adjustment of centre frequency and speed. So if you see a nice signal that is wholly or partly outside the capture window and/or the wrong speed, you can make changes via the ***Options*** menu and run the WAV again. The playback of the WAV file is just like a speeded up version of real-time operation (so you have to be quick if you want to click in the display window to centre the signal unless the file is long :-).

JASON Beaconing

For weak signal work it is useful to be able to repeat a message continuously to allow other stations to wait for propagation conditions to be suitable for reception. This can be done by typing in the text message to be repeated in the typing input window enclosed in curly braces like this { *text to beacon* }. For example { I2PHD IN JASON MODE }. Alternatively, a text file can be created containing the beacon text (say in Notepad) and the file selected from the

I do hope this notes are sufficient to make you understand how Jason works, and how to interface it with a Tx for LF work.

Should you have any questions, feel free to contact me at dibene@usa.net.

Enjoy, Alberto I2PHD

THE SDR 3000

David Firth M0SLL

The MOONRAKER SDR 3000 Receiver

As an independent observer of things I sometimes take a risk at buying early versions of new products because they represent something different, if not that much more attractive. For example, when the Sony ICF-735 first appeared in a shop window one Saturday morning in Reading I snapped it up. It was a bargain at just £60, and I must admit to being away from all things radio for some time. The last time I handled a full HF band receiver was at sea in the comfortable surroundings of an H class, and it took two people to man-handle it into the EMR! Thankfully, the days of the B-40 are long gone. The Sony represented a major paradigm shift in design because it easily rested in the palm of my hand and it could be carried inside the breast pocket of my jacket, and blow me down -if it was not only a full HF band receiver, but could handle SSB as well, weighing in at a few ounces. The fillip was that it included the VHF broadcast band as a bonus It piqued my interest!

I've witnessed several paradigm shifts in electronic design over the last 6 or so decades, and here I must admit to a level of conservatism over the latest craze for 'soft' engineering projects such as DMR and SDR because of the many difficulties associated with such things when it comes to the tricky prospect of getting them to work. If the first paradigm shift in radios was from *'cat's whiskers*' to thermionic valves, the latest certainly is the advent of the SDR, or software defined radio. The memory stick or 'thumb stick' of old that became the ubiquitous USB memory of the computing world which provided the impetus to develop the SDR in which computer circuits and much better software evolved magically into an almost perfectly formed micro-miniaturisation of a totally new DSP based radio-tech.

Cat's whisker's came first!

THE SDR 3000

A type of radio the size of a human thumb

The problems we encountered with those early versions were the lack of supporting literature on how to initialise them on a PC, and if one was successful, how on earth did you operate it? Not forgetting the clones! But things have changed for the better these days. No more tricky bootstrap loaders, or difficult initialisation processes, or indeed third or fourth party operating systems. *DSP=Digital Signal Processing.*

Instead, what they used to label as 'turnkey solutions' in the computing world now have started to appear on the market. What this means is that you just use the on/off switch and the gadget works fine -no fiddling... just like it used to be in those good old days. Well, alright then, you can't make toast on the output valves like you could on a Marconi NT-204!, but you have a versatile receiver that exists in the tiny offering of cyberspace inside the case. What's more, it comes with a tidy 4.3 inch LCD screen. That is why the special offer of the SDR 3000 attracted me. Is that a paradigm -or is it a 'paradigi' shift?

What's In The Box?

Delivery was within 24 hours, and inside the padded envelope I found a small but sturdy cardboard box containing the radio, a telescopic aerial, a double ended stylus for the touch-screen, a USB C-lead, and a small operating leaflet.

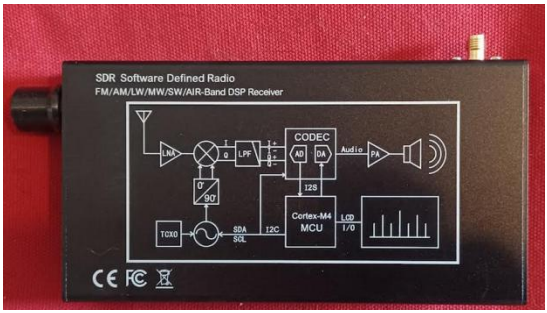
First Impressions

It looks good and because I am an inveterate techie it made me sigh a little when I saw the small leaflet which passed for a user manual. However, the item itself is in a neat metal case painted matt black, sporting two sockets at each end, a power on/off switch, and a rotary control knob which acts as the only control for performing several functions. The telescopic aerial is fitted with a screw-in SMA connector that fits into a socket at the top left while at the left side is an earphone socket for a 3.5mm jack plug. On the right hand side you can plainly see the rotary control knob with the remaining items underneath it; A USB 5v output socket, On/OFF switch and green LED indicator, and a Type C Charging input socket used to charge the internal batteries.

THE SDR 3000

Safety Note

Before switching on the power take note that the standard USB socket is a 5V output socket for charging or powering other devices, it is not for connecting to anything else like a PC or a Laptop for audio output to these devices. The instruction manual, such as it is, does not explain this. I have seen this before on my Eton G2 Reporter broadcast receiver, so I took the time to check this out by phoning Moonraker. One other point to look out for is that Moonraker has experienced manufacturing issues in the supply chain. If you find that the control knob does not appear to be functional it is because there was a batch from the supplier where the retaining nut underneath the knob was not quite properly secured to the case. just pull off the knob and give the nut a gentle tighten up with either a socket or a small pair of pliers. I found Moonraker to be helpful on this, and I have to say they are finishing-off their current batch in-house.



One last thing, check that the batteries are fully charged by switching on the unit and by checking the battery indicator icon on the LCD screen. If necessary, fully charge the batteries before use.

Switching On

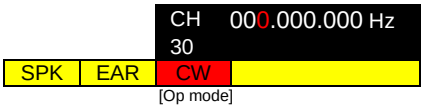
The receiver bursts into life in both colour and in sound, so while the screen is bright and clear, the volume may be a little bit too loud. The factory setting for the volume is 35, so this may be your first attempt at using the control knob. The rotary control is used for tuning and for setting up functional parameters. The knob works by just turning it or by pressing it (gently) inwards and then by turning it in either direction while keeping it pushed inwards. Look closely at the channel number under the letters CH. If the number is coloured red then it has been left in memory channel select mode by the factory, so turning the knob will change memory locations. If this is not the case my suggestion here is to study the screen from left to right from the top. Look at the frequency numbers on the topline. If any of these numbers is coloured red the unit is in frequency

THE SDR 3000

tuning mode. Below the multi -coloured function line is a line of numbers. For example, on the far left you will see two yellow boxes; SPK and EAR. Almost self-explanatory as speaker and earphone. The numbers below are the settings, so if under the SPK box you see 35 then this is the volume setting for the speaker, and so on. Before attempting to change any settings look carefully at both the frequency and the control settings to see if any of the numbers in any single box is coloured red. If that is the case then you are in the 'function setting' mode. For example, to change the SPK volume turn the knob while pushing it in until the speaker number setting turns red. Now release the knob to leave it resting on the SPK figure. To adjust the volume simply turn the control knob left or right to get your preferred volume. You can adjust any of the functional settings in the same way, but there are some exceptions such date and time which can be set up independently. I have found that best practice dictates that once you have finished adjusting functional settings, move the control knob again by pressing it in and turning it until the memory channel CH turns red. There are several frequencies that are already saved in memory channels...

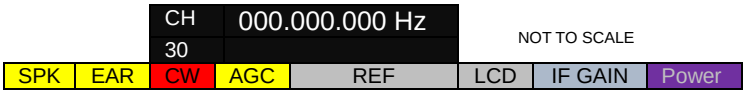
You may notice a little quirky behaviour while attempting to set up in function mode. Observing the numbers turning red. That is because there are two function levels.

1. **Quick access** to a small number of functions, 5 in all. Just push in the control knob and immediately let go. Repeat to step through the following 5 functions on each press of the knob:



NOT TO SCALE

2. **Full access** to all functions including graphical scale changes. Press and hold the knob pressed in while turning it to access the other functions.



NOT TO SCALE

The apparent quirkiness appears when rolling through the functions where the numbers stop changing colour to red. Nothing is wrong here. It is the scaling of the grid in the display that is changing which you might have missed. Watch the scales closely on the vertical and horizontal axes and see them change to red, etc. However, some of the scaling options are red in colour.

THE SDR 3000

Waterfall Screen

Underneath the tuning indicator where signals can be monitored is a waterfall screen which can be set up to view the signals as you would expect them to be seen on more expensive machines like the IC-7300, etc. Use the full access to all functions of the rotary control knob as described above. I played around with the scaling, IF gain and the Ref settings until I found what I wanted to see.

Tuning

The important bit for radios -setting up and tuning. Assuming you have several favourite frequencies in mind, and you have managed to set up the mode of transmission you want to receive, tuning can be achieved in two ways:

1. Tuning by using the control knob
2. Tuning by using the number pad

Using the function knob entails the quick access method by repeatedly pushing it in and letting it go until one of the numbers on the frequency counter display turns red. Now you have to choose which particular unit you want to adjust when tuning. To change the step size in tuning push in the function knob and hold it in while turning it. The numbers start changing as you go back and forth with the knob. Choosing larger units makes for easier tuning. When you are happy with the step size whether it be KHz or something else just let go of the knob, and start tuning around your selected frequency by rotating the knob. You will see the numbers going up or down accordingly.

Using the number pad, I think, is a little easier. It is less fiddly. All you have to do is use the soft end of the stylus to tap the frequency display. A black and white number pad appears with other function controls such as K, M and G which refer to units; Kilo, Mega and Giga. There are three others; a decimal point and an arrow button that gets you back to the SDR screen. The x1 button will get you Hertz without the unit indicator. For a strong signal try entering 10.1M which wil put you on 10.1MHz where you should find a strong RTTY signal from the Deutsche weather service. The more you experiment the easier it becomes. You may need a better aerial. On the right of the frequency display appears a small green label telling the user what band the receiver is working in. There are no instructions on how to save into memory the name of the station on a particular frequency.

THE SDR 3000

Antenna

The supplied telescopic antenna is good enough for experimenting with, and is useful for listening VHF broadcast band signals. The impedance of the internal interface is 50Ω so for serious listening an appropriate aerial for your favourite working bands will improve signal reception. The same in general applies to those SWLs out there as much as to those who are licenced to transmit. I gathered a few VHF broadcast channels before turning to HF. Surprisingly, the aerial worked well on the WX channels either fax or RTTY, and on VHF 88MHz-108MHz broadcast frequencies.

Overall Impression

If you are an SWL or keen to listen-in on a casual basis this is a handy piece of kit to have, and it can be used quite conveniently if you travel a lot. Its small footprint makes it ideal to slip into a pocket or into a small gap inside a rucksack or travel bag. It is a bit noisy without a decent aerial, but as others have found you can use it to successfully track down annoying sources of local QRM.

It is not without some minor issues, and I have a list of only one query about how it should function when setting up a different scale for viewing signals. The main drawback is that it does not come with an appropriate user manual. What you get is a tiny, flimsy folded document where the printing is so small it is actually unreadable -even with reading glasses. Which leaves user operation to much guesswork. Design-wise the SDR-3000 could have benefitted from clarity in its design objectives. Namely, that the 5V USB charging outlet could have been used as an audio signal lead to a PC so that Morse, RTTY or other digital modes can be decoded by appropriate amateur radio programs. Realistically, if you are looking to keep yourself occupied in your spare time this is quite a handy device to take with you, and take a decent antenna along with you to improve signal strength for better reception.

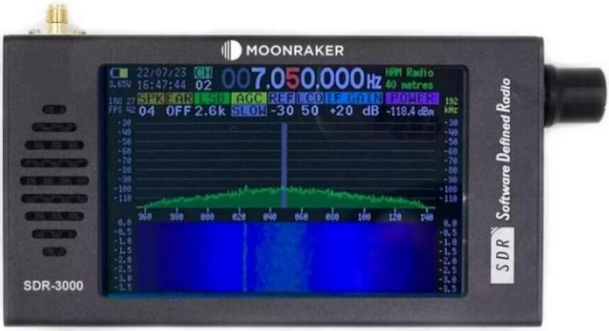
RSGB Special Offer

If you are an RSGB Member there is a special offer of £99.95 instead of the normal price of £129.95 -a saving of £30. So if you like tinkering with an SDR that comes with its own touch screen, without the faff of initialising hardware and software this might be the right gadget for both SWLs and radio amateurs.

Any issues contact Moonraker direct they are very helpful.

THE SDR 3000

The SDR-3000 Features (as advertised)

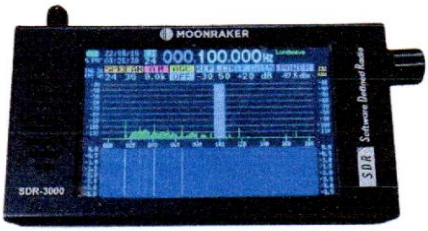


- Display technology: 4.3 inch IPS 800x480 resolution DC dimming bright LCD
- Control method: resistive touch screen+rotary encoder
- Frequency range: 100kHz – 149MHz
- Working modes: CW, AM, SSB single sideband (LSB/USB), WFM, FM broadcast stereo (requires headphones)
- Step frequency: 1Hz/10Hz/100Hz/1kHz/10kHz/100kHz/1MHz/10MHz
- Spectrum bandwidth: 192kHz, 128kHz, 64kHz, FFT real-time spectrum display
- Antenna interface: SMA, impedance 50 Ω, maximum input power -20dBm
- Reference crystal oscillator: TCXO 26MHz ± 0.5ppm
- Audio interface: supports regular 3.5mm headphones or CTIA (American standard) interface headphones
- Speaker power: maximum 3W, 4 Ω multimedia speaker
- Charging port: USB Type-C, 5.0V/2A

Just a reminder that you will need a male SMA connector with an appropriate connector at the other end in order to connect to a decent antenna.

THE SDR 3000

SDR 3000 Full Spec.



The SDR-3000 is a DSP digital demodulation radio based on the SDR software defined radio architecture. Featuring a 192kHz wide spectro- gram and waterfall display capability with 16 bit sampling for a highly dynamic receiver with CW, AM, SSB and FM demodulation. The whole unit is housed in a full aluminium CNC casing with a 4.3" 800x480 resolution high brightness IPS LCD display, while maintaining a small and compact body

Features

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- Audio interface: supports regular 3.5mm headphones or CTIA (American standard) interface headphones
- Speaker power: maximum 3W, 4 Ω multimedia speaker
- Charging port: USB Type-C, 5.0V/2A
- Current consumption: approximately 250mA @ 5V
- Battery capacity: 5000mAh/3.7V, 18.5Wh
- Usage time: approximately 10-12 hours, depending on machine volume and brightness settings
- Channel saving: 99 channels can be preset, including station name, frequency, and demodulation method
- Body size: 140 x 74 x 22mm (length x width x height) (without protrusions)
- Body weight: approximately 315g (main engine only)
- Packaging weight: 415 grams Packaging size: 19 * 10.5 * 4.5cm
- Receiver parameters
- RF preamplifier gain: fixed 20dB
- Circuit type: Zero intermediate frequency ZIF
- Sideband suppression: ≥ 50dB

As always, caveat emptor **David M0SLL**

Amateur Radio Q Codes

QRG	**Your exact frequency (or that of _____) is _____kHz.**
	Will you tell me my exact frequency (or that of _____)?
QRL	**I am busy (or I am busy with _____). Are you busy?**
	Usually used to see if a frequency is busy.
QRM	**Your transmission is being interfered with _____**
	(1. Nil; 2. Slightly; 3. Moderately; 4. Severely; 5. Extremely.)
	Is my transmission being interfered with?
QRN	**I am troubled by static _____. (1 to 5 as under QRM.)**
	Are you troubled by static?
QRO	**Increase power. Shall I increase power?**
QRP	**Decrease power. Shall I decrease power?**
QRQ	**Send faster (_____wpm). Shall I send faster?**
QRS	**Send more slowly (_____wpm). Shall I send more slowly?**
QRT	**Stop sending. Shall I stop sending?**
QRU	**I have nothing for you. Have you anything for me?**
QRV	**I am ready. Are you ready?**
QRX	**I will call you again at _____hours (on _____kHz).**
	When will you call me again? (Minutes)
QRZ	**You are being called by _____ (on _____kHz).**
	Who is calling me?
QSB	**Your signals are fading. Are my signals fading?**
QSK	**I can hear you between signals; break in on my transmission.**
	Can you hear me between your signals; can I break in?
QSL	**I am acknowledging receipt.**
	Can you acknowledge receipt (of a message or transmission)?
QSO	**I can communicate with _____ direct (or relay through _____).**
	Can you communicate with _____ direct or by relay?
QSP	**I will relay to _____. Will you relay to _____?**
QST	**General call preceding a message addressed to all amateurs**
QSX	**I am listening to _____ on _____kHz.**
	Will you listen to _____on _____kHz?
QSY	**Change to transmission on another frequency (or on _____kHz).**
	Shall I change to transmission on another frequency (or on _____kHz)?
QTC	**I have _____messages for you (or for _____).**
	How many messages have you to send?
QTH	**My location is _____. What is your location?**
	QTR The time is _____. What is the correct time?

RNARS NETS

Contact: *Change:02/2024*

UK	UTC	Frequency	Net	Control
Daily	**0001-0400**	**145.725**	**Midnight Nutters**	**M0WRU**
Sun	0800	3.667	SSB net (news: 0830)	Glenn G0GBI
	1030	7.085/3.748	RNARS North SSB net	Robin MM6CXJ
	1100	7.020	RNARS CW net	G4TNI
Mon-Sat	1030-1330	7.085/3.748	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: 20:00)	G0GBI
	1930	145.400 (S16)	RNARS Cornish Net (Falmouth / Lizard)	G4WKW
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	G0GBI
	1700	DMR	TG 23527	M0LIH
	1900	3.748	Wednesday Net	G0GBI
Thurs	1900	3.542	Scottish CW Net	???
	2000	145.575	RNARS Scottish 2m Net	GM0KTJ/P
	2100 GMT	1.835	RNARS Top Band CW	G4KJD/G0CHV
Fri	1600	10.118	RNARS 30m CW Net	SM3AHM
Sat	0800	3.748	G0DLH Memorial Net	G0VIX
DX nets	**GMT**	**Frequency**	**Net**	**Control**
Sun	0800	7.015/3.555	MARAC CW	PC4E
	14:30	21.410	RNARS DX	W1USN / GM7ESM
	1800	Echolink	RX DX	Connect to K8BBT
	19:00	EQSO	VE net when condx bad	VA3ICC
Mon	09:30	3.615	VK SSB	Suspended UFN
Wed		7.020	VKCW	"
		10.118	VK CW	"
		3.62	ZL SSB	ZL1BSA
	0930	7.020	VK CW net	Suspended UFN
	0945	7.090	VK SSB net	"
Thur	13:30	Zoom		Details fm Henry M0ZAE
	14:30	21.410	RNARS DX	W1USN / GM7ESM
Sat	0400	7.090	VK SSB	Suspended UFN
	1330	7.020	VK CW	Suspended UFN
	1400	7.090	VK SSB	Suspended UFN
	14:30	21.410	RNARS DX	W1USN/ GM7ESM

RNARS SCENE OF ACTIVITY									
VHF	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

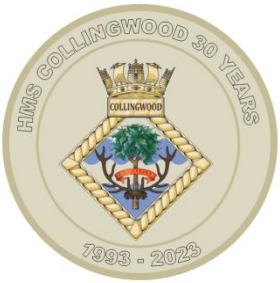
COMMODITIES PAGES

Neil Archer M7BXZ

Order Form is at the back

RNARS 30th Anniversary Challenge Coin - 1993 to 2023

Marking the 30th anniversary of the HQ Shack at HMS Collingwood. **Comes with a stylish clear protective case**



STAR BUY

RNARS detail on one side, HMS Collingwood detail on the reverse

RNARS Mug

or +with your own callsign

Great New Cap

Cap personalised with name or callsign

RNARS Anniversary Lanyard

Contact Neil M7BXZ (neila5@btinternet.com) for prices and postage costs

COMMODITIES ORDER FORM

Neil Archer M7BXZ

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 availability before ordering 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 enquire for postage rates.

If the delivery address is different to the address above include the delivery address with your order:

_____

_____

Allow fourteen days for delivery. These prices are correct when going to press, and are subject to change. Email your order to Neil M7BXZ (neila5@btinternet.com) or post to: **Commodities, RNARS, Bldg.512, HMS Collingwood, Newgate Lane, Fareham PO14 1AS**

RAFARS & RSARS NETS

RAFARS	Time	Freq	Control
Daily	1100 A 1830 A	3.71 3.71	GØSYF G3HWQ
Monday	1900 A	3.7	G3PSG
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	?
1st Monday of the month	1000 A	3.71	?
RSARS Nets	**Time**	**Freq**	**Control**
Monday - Friday	1000 A	7.17	GW3KJW
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	

How To Contact The RNARS

Membership Secretary
Edwin 2E0LLD
Building 512, HMS Collingwood
Newgate Lane
Fareham, Hants, PO14 1AS

RNARS Gen. Secretary
Martin Longbottom, M0EHL
Building 512, HMS Collingwood
Newgate Lane
Fareham, Hants, PO14 1AS

www.facebook.com/groups/RNARS/

The RNARS HQ Shack (Tues 14:00Z)
44+01329-71727(answer phone)
+44 (0)1

Skype: RNARS.HQ.SHACK

Echolink: G3BZU

Website: http://www.rnars.org.uk/

Twitter: https://twitter.com/rnarshq

By Radio: DMR/Fusion:
TG23527 -UK Military & Veterans

HF HQ Net:
Tuesday Net: 16:00 UTC ±QRM

Members Only Forum: *forum.rnars.uk Contact the RNARS Secretary for detail*

Affiliated to the RSGB

Membership of the RNARS is open to those who have served or who are serving in the:

- **Royal Navy**
- **Royal Marines**
- **Women's Royal Naval Service**
- **Royal Naval Reserve**
- **Royal Naval Auxiliary Service**
- **Sea Cadet Corps**
- **Merchant Navy**
- **The Nautical Training Corps**
- **The Royal Fleet Auxiliary**