

Receiving weather forecasts offshore

Gilbert Park devises a low-cost solution to receive weatherfax information using a portable radio, an aerial and a tablet device


When offshore, the ability to receive weather forecasts when there is no phone or VHF reception is crucial as it gives you the time to avoid or prepare for a storm. There are many ways of doing this. Satellite internet access is becoming increasingly common, but the equipment and running costs remain high.

Shortwave radio is another possibility, but again the equipment costs are high, there are a limited number of sets

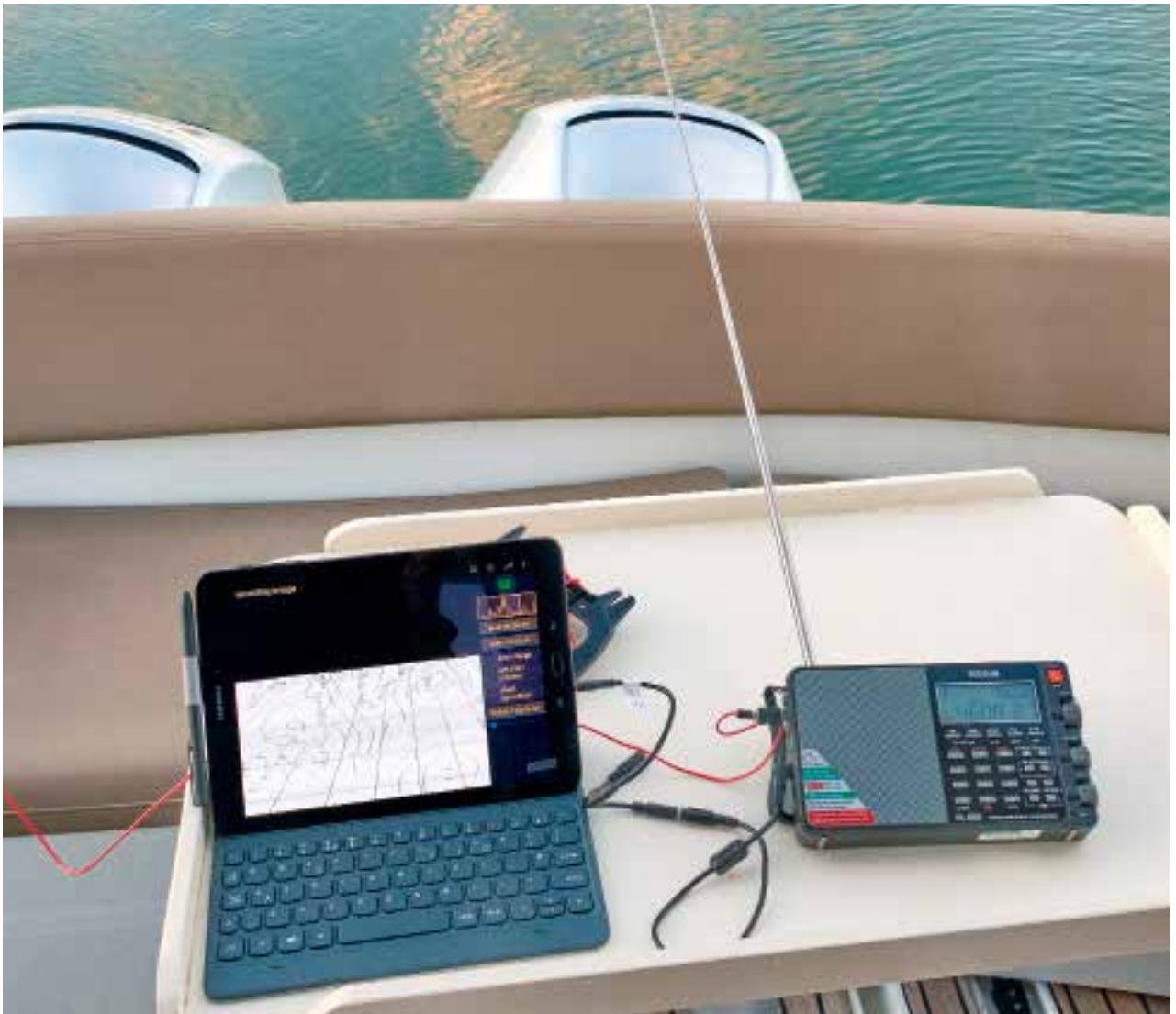
available and a license is needed to use one. On the positive side, though, sending and receiving information is free.

I am planning a trip that will take me offshore for four days when I do the practical for my RYA Ocean Yachtmaster. Hiring a satellite phone was one option but to hire one with a charger, receive it

and pay for the data then send it back would cost at least £100-200. I already have a satellite tracker (SPOT X) that will let me stay in touch with my shore contacts as it can send and receive SMS messages inexpensively. I started looking at other alternatives.

It took me almost a year (it was a )

BELOW My offshore weather receiving station – a Tecsun PL-880 radio with a Samsung S3 Android tablet, connected from the line output socket of the radio to the headphone/microphone input to the tablet. The red wire is 20m of insulated copper wire running up to the mast to act as an aerial. It's all battery driven, portable, rechargeable and free to use





Satellite tracker/messengers are popular in many forms of watersports

great lockdown project) to develop a system that I feel is reliable enough to use safely for this trip. It uses freely available data from Navtex (Navigational Text Messages), synoptic weather charts from Fleet Weather in Northwood and Deutscher Wetterdienst (DWD, the German Weather Service) as well as Radioteletype (RTTY) Weather forecasts also from DWD (in English and German).

There are three parts to the system: the receiver, the aerial and the software transcription of the information received.

1. The receiver

The receiver is a portable radio that has short wave bands along with the ability to receive upper side band (USB). There is usually a button labelled SSB (single side band) to select this. Some shortwave (SW) radios do not allow USB reception and will not work well, if at all.

A SW radio wave has a carrier frequency and also a band of frequencies higher or lower than the carrier frequency. The frequencies above and below the carrier wave are generated by the voice or data transmitted and their height is the signal (amplitude modulation – AM). As the upper and lower frequencies (band) are mirror images of each other, only one is needed. Similarly, the carrier frequency is unnecessary. When the SSB mode is used the radio will add back in the

carrier wave. Losing these frequencies reduces the amount of power needed to transmit messages and reduces overcrowding in the bandwidth.

I bought a Tecsun PL880 that was reduced to £180. Among other features it has a USB and LSB as well as a huge number of memory slots, a fixed level audio output and an aerial socket – and it works well.

Having read some reviews I also bought a Lowe HF150 battery operated receiver for £90 and it works brilliantly. It lacks the value after the decimal point when tuning, but this is not a great loss as you can fine tune by ear or using the app (see later). I have also tried a NASA Target HF3, but didn't find it as sensitive as the Tecsun, but still very usable. Neither the Lowe nor the NASA receiver are still in production,

24 hours or until SPOT is powered off.

- The check in function allows you to tell others you're well and let them know your location

- It can alert the GEOS Emergency Centre in a life threatening emergency. The Centre can then alert the local Emergency services wherever you are. You will be kept informed of developments by text message. Importantly, it is not part of the Global Maritime Distress and Safety System (GMDSS) so an emergency position-indicating radio beacon (EPIRB) or other device should be on board.

Satellite tracking

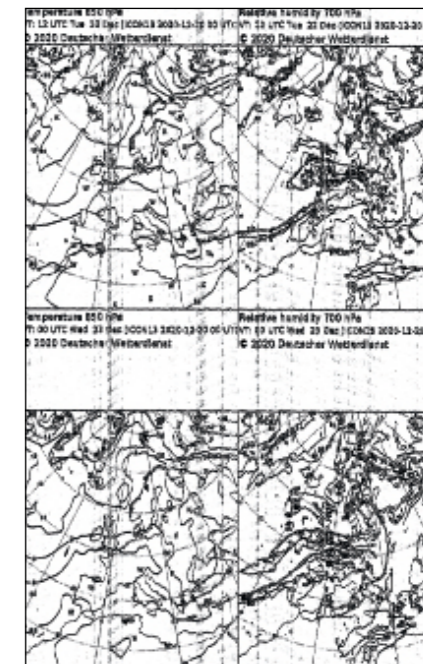
SPOT uses the commercial SPOT satellite network to transmit your location and status. Among the current tracking/messenger devices to use it is the Globalstar SPOT Gen4, which costs around £115.

Popular with outdoor enthusiasts, it has four functions:

- It can send messages to family and friends in the event of a non-life threatening emergency.
- SPOTcastingSM allows others to follow your progress in real time, sending a position every 10 minutes for



LEFT NAVTEX will work from 200-400 miles offshore and besides weather information gives a lot of other information such as navigational hazards, subfacts and gunfacts. Even cruising inshore it provides a whole host of information that is very useful and supplements the Maritime Safety Information broadcasts. Notice the waterfall for tuning. RIGHT A two day weather forecast received on Weather Fax from DWD



other thing that made a big difference was switching off various electrical items, such as the fridge on the boat and a phone charger that caused significant interference. I haven't tried it underway yet, only at anchor, at various sites in the UK, but alternators and the like can also cause interference.

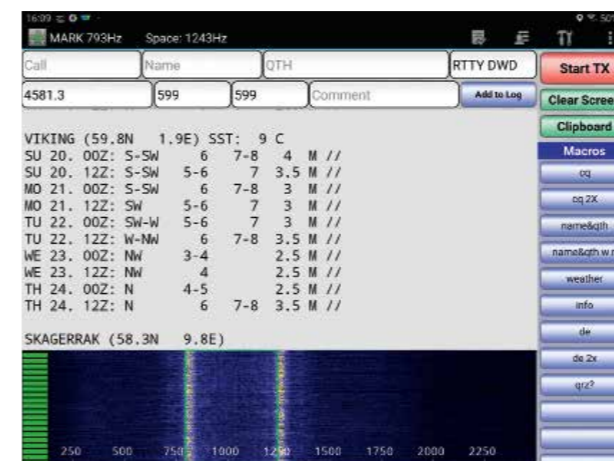
3. Data display

Once you have the signal the next part is to get the data to display, in my case on an Android tablet. You don't actually need to physically connect the receiver to the tablet – the audio signal from the receiver can be picked up by the microphone in the tablet. There are clear disadvantages to this, such as interference and having to listen to the noise. It's better to connect using a cable. The output from the radio is usually a two or three pole jack plug while the input to a tablet is a four pole jack plug. Plugging a double ended three pole connecting lead into the tablet doesn't work (I tried it) you have to use a four pole jack splitter lead that has separate sockets for a microphone and headset.

Software

Once into the tablet the data has to be translated. For this I used three software packages from Wolphi Solutions on Google Play Store:

- **Droid Navtex** (£8.99) enables you to receive both International and national Navtex broadcasts and stores them in a searchable database. It's very easy to use and the only problem I've found with it is that the auto-rotate feature on my tablet doesn't work. It has an alarm clock function which, when paired with that feature on my Tecsun, lets me receive broadcasts when I am asleep without leaving the equipment fully on flattening the batteries. There is no print function



LEFT This is an example of the type of weather forecast from DWD sent using Radioteletext (RTTY). Notice at the bottom there is a waterfall display of the tuning – it makes fine tuning into the signal straightforward

but can be sourced from various internet sites selling used equipment. If you just want to receive RTTY information then NASA used to make an inexpensive receiver. This has now been discontinued, but still appears on various websites.

You only need one or other of the Tecsun, Lowe or NASA receivers.

2. The aerial

The next part is the aerial. The Tecsun comes with a built-in telescopic aerial. This works surprisingly well and enables nearly all of the weather stations to be received on one frequency or another. I did find the problem with this was interference that meant poor quality images and data was received.

My next ploy was to buy an 'active' aerial that amplifies the signal. This was an improvement, but not a great one.

After that I went for the simple solution – a 20m length of insulated wire strung outside initially along guttering and later up the mast. This was connected into a socket on the side of the Tecsun with a 2-pin 3.5mm jack plug, connecting the aerial to the centre and another wire to the earthing connection of the plug. The earth connection made a vast improvement. At home it was a crocodile clip onto a radiator (so long as you have copper, not plastic, piping) – in the boat just a wire over the side works.

To try and reduce interference at home I used a coaxial cable from the receiver to the aerial outside. I sought advice about this from various experts and they suggested I also added a 9:1 Balun. The theory about this device is complex and I found it made little or no difference compared to earthing the receiver. The

with the app, but there is a search function available for all the data (by station or type). If you do want to print it out then a screen shot would solve the problem. When I make my trip I will be able (I hope) to receive the French, Spanish, Italian and Maltese stations all broadcasting in English at various times during my voyage.

■ **HF Weather Fax** (£8.99) allows me to receive weather faxes as synoptic charts from Northwood and DWD. These include the Mediterranean, North Atlantic and give forecast charts for up to 48hr. Using this piece of software does involve a learning curve. The software can be configured to synchronise with a start signal and save the chart in the pictures file, from where it can be printed. There are also adjusters for slant correction and if the start column is in the wrong place. Finally, there is the black and white slider that lets you have white on black or vice versa as well as adjusting the contrast. There is no switching on or off facility. The fax is saved as a picture so can be viewed or printed easily.

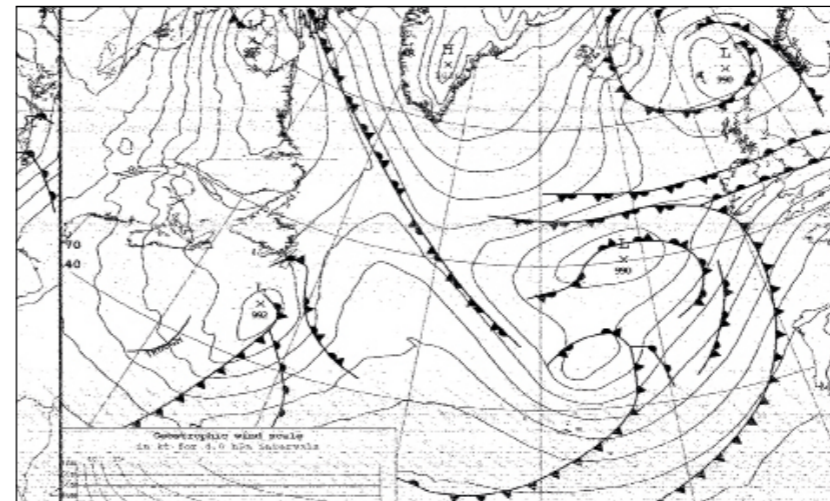
■ **DroidRTTY** (£4.99) allows a text weather forecast to be received from DWD for up to five days in advance. As well as the Mediterranean it gives forecasts for many other areas. As with DroidNavtex there is no print function, but a screenshot solves this problem.

Tuning in

Tuning in the radio for the transmission needs a bit of care. Firstly, the best reception is usually found 1-1.5kHz below the stated frequency. You can tune using



The Lowe HF150 (top) and NASA Target HF3 (above) receivers. Neither are in production any more but can still be found second-hand on various websites



Area of service: Offinbach (Main) - Hamburg/Prinsberg (Broadcast for shipping)

| Call sign | Frequency | Class of emission | TIME | Power |
|-----------|-------------|-------------------|---------------------|-------|
| DW13 | 3855.0 kHz | H1C | ALL BROADCAST TIMES | 20 kW |
| DW13 | 3882.5 kHz | (White + 425 Hz) | ALL BROADCAST TIMES | 20 kW |
| DW15 | 13882.5 kHz | (Black - 425 Hz) | ALL BROADCAST TIMES | 20 kW |

Time UTC Contents of Transmission

- 0430 Surface Analysis 00UTC North Atlantic, Europe
- 0512 36HR-forecast MSL pressure
- 0525 MSL pressure analysis 00UTC, arrows showing movement of pressure systems, sign.
- 0546 Information of tropical storms, North Atlantic (during season only)
- 0559 12HR, 24HR 500 hPa H+T, MSL pressure
- 0612 12HR, 24HR 850 hPa H+T, 700 hPa U
- 0625 36HR, 48HR 500 hPa H+T, MSL pressure
- 0638 36HR, 48HR 850 hPa H+T, 700 hPa U
- 0651 60HR, 72HR 500 hPa H+T, MSL pressure
- 0704 60HR, 72HR 850 hPa H+T, 700 hPa U
- 0717 36HR-forecast MSL pressure
- 0730 48HR-forecast MSL pressure
- 0743 60HR-forecast MSL pressure
- 0804 84HR-forecast MSL pressure
- 0817 108HR-forecast MSL pressure
- 0830 24HR-forecast wind and swell
- 0842 48HR-forecast wind and swell
- 0854 72HR-forecast wind and swell
- 0906 96HR-forecast wind and swell

ABOVE A synoptic chart from Northwood. Note the line (sometimes slanting) a little way in from the left. This can be adjusted easily in the Weather Fax software so the whole chart is shown properly

LEFT Northwood and DWD show many different types of forecast at different times of the day. This schedule from DWD – received on Weather Fax – shows both the type and time of forecast and frequencies in use

PREPROGRAMMED RADIO STATIONS

| Number | Name | Item | Published frequency kHz | Working frequency(s) kHz | Band/baud |
|--------|----------------------|------------------------|-------------------------|--------------------------|-----------|
| 1 | BBC Radio 4 | BBC Radio 4 | 198 | 198 | |
| 2 | Navtex local | Navtex native language | 490 | 489.06 | USB |
| 3 | Navtex International | Navtex English | 518.00 | 516.5 | USB |
| 4 | DWD | WeFax | 3855 | 3853 | USB |
| 5 | DWD | WeFax | 13882.5 | | |
| 6 | DWD | WeFax | 7880 | 7878.14 | USB/50 |
| 7 | DWD Prog 1 | RTTY | 4583 | 4581.3 | USB/50 |
| 8 | DWD Prog 1 | RTTY | 7646 | 7644.15 | USB/50 |
| 9 | DWD Prog 1 | RTTY | 10100.8 | 10099.5 | USB/50 |
| 10 | DWD Prog 2 | RTTY | 147.3 | | USB/50 |
| 11 | DWD Prog 2 | RTTY | 11039 | | USB/50 |
| 12 | DWD Prog 2 | RTTY | 14467.3 | | USB/50 |
| 13 | Northwood | WeFax | 2618.5 | | USB |
| 14 | Northwood | WeFax | 4610 | 4608.2 | USB |
| 15 | Northwood | WeFax | 8040 | | USB |
| 16 | Northwood | WeFax | 11086.5 | | USB |

1. Where there's no working frequency I have not been able to receive it in the Solent – but it may be able to be heard elsewhere
 2. Separation frequencies ±42.5Hz at this 147.3kHz, ±225Hz for all the others

'Being secure in the knowledge gales are not expected gives me something to smile about'

sound or, better still, all of the apps have a display of the signal strength as a waterfall or analogue display.

Once you have found the best frequency you should save it to the memory of the receiver and make a note of it. In the table (left) I have listed the frequencies that are published and work for my 'rig'. They may be different for your set up. Those frequencies that don't have a working frequency I haven't been able to receive.

What are the alternatives?

There are alternatives to my simple, inexpensive solution. You could buy a Navtex receiver and aerial. Simple to install, you can even get a Bluetooth version (that works well) for about £130 so you don't need to fit another instrument at the helm. If you are not going far offshore this may be all you need (the range is about 250-400 miles).

A further alternative is to buy a

shortwave receiver, for £25-30 from ebay and link it up to your laptop. I did buy one of these but haven't used it as I decided that a tablet (that I would have out anyway) and radio was my preferred way of going, rather than a receiver and a laptop, which I would find cumbersome on a small boat.

There are also other apps for tablets but the Wolphi ones have the highest ratings and I know from personal experience the developer is only too happy to help with any problems.

I see there has been enthusiasm for learning new and honing old skills during the Covid Pandemic. For me, aside from celestial navigation (see PBO June 2021), it's deciphering synoptic charts in the areas I am interested in on a daily basis.

Dreaming of sunny days in my boat, secure in the knowledge that gales are not expected, gives me something to smile about.

Satellite phones

Satellite phones can download accurate weather forecasts, call anyone in the world and send back videos and images from mid-ocean, all from a tiny device. But choosing one is not straightforward.

Some, such as the Thuraya SatSleeve Plus, transform your own phone into a satellite device, while Iridium Go works with up to five smartphones using an app. Others, such as the Iridium 9575 Extreme, Inmarsat iSatPhone or Thuraya's XT Pro are ruggedised handsets.

A lower cost option is Garmin's InReach Mini which, while not strictly a sat phone, is a low-cost messenger like the SPOT, which allows two-way text messaging.

As with everyday smartphones, the cost of sat phones and calling plans varies hugely; the phones themselves range from around £500-£2,000+ but you'll also need a SIM card and data plan.

At the time of going to press, a pre-paid SIM card for an Iridium Satellite Phone Global, for instance, costs £427 for 200 minutes/180 days.

It's worth spending some time researching the best options for your type of sailing. MailASail have a useful guide to choosing your usage on their website, mailasail.com.

Questions to ask

What will you be using the phone for, primarily? Weather forecasts? Voice calling? SMS? Emergencies only? These will have a bearing on the type of device and the type of contract/pre-pay deal you end up with.

Do you need it to have an SOS function, or are you happy with a separate EPIRB?

Do you need waterproofing? Some of the latest sat phones can be submerged for a short while, but some older models must be kept dry – an important consideration.

How important is battery life? If you'll be mainly using the phone on board with ready access to charging, you may not be as concerned as if you were planning to use the phone in an open boat.

Satellite phones with internal GPS can offer significant peace of mind to family and friends ashore, but this comes with a cost, both financial and to battery life.



Garmin InReach Mini



Thuraya SatSleeve