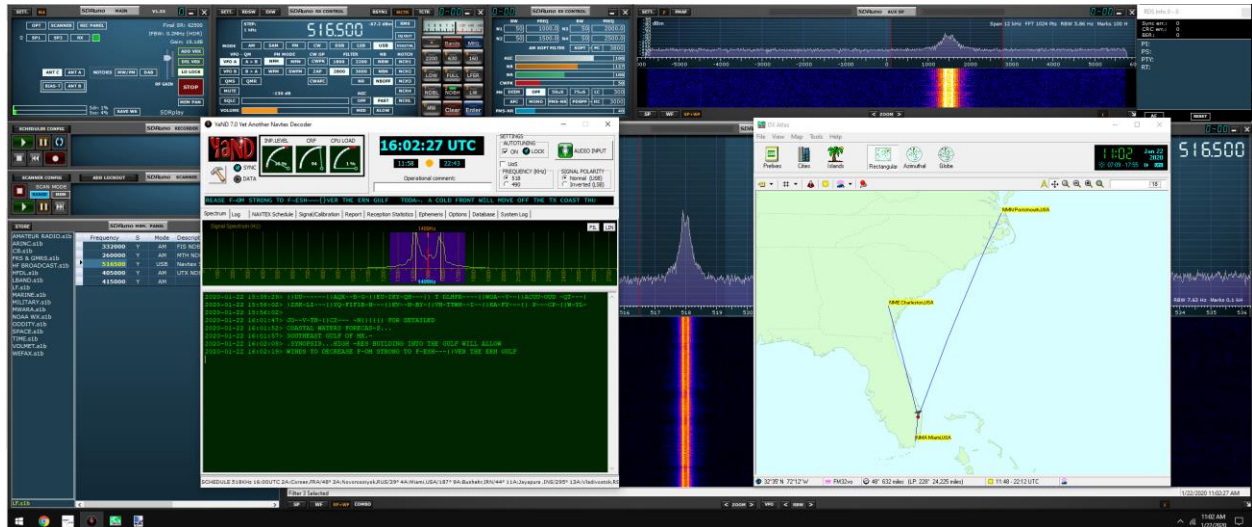


Basics to decoding NAVTEX using an RSP and SDRUno



SDR: RSPdx from SDRplay using input C. All model RSP's can tune NAVTEX transmissions. <https://www.sdrplay.com/rspdx/>



Antenna: Megaloop FX from Bonito. In an Inverted delta loop configuration pointed N/E-S/W. Any good antenna placed outdoors should be fine. It's all about the SNR, not your S-meter reading. <https://www.bonito.net/hamradio/en/mega-loop-fx/>



Software:

SDRuno v1.33

SDRuno is an advanced Software Defined Radio application platform which is optimized for use with SDRplay's range of Radio Spectrum Processing receivers.

<https://www.sdrplay.com/downloads/>

VBcable (donationware) Pack43

Transfers audio, digitally from one application (SDRuno) to another (YaND) with zero loss.

<https://www.vb-audio.com/Cable/>

VAC (paid for use) v4.62

Transfers audio, digitally from one application (SDRuno) to another (YaND) with zero loss.

<https://vac.muzychenko.net/en/>

https://www.sdrplay.com/docs/SDRuno_VAC.pdf

YaND NAVTEX decoder (free) v 7.0

Decodes NAVTEX messages.

<https://www.ndblist.info/datamodes.htm>

Dx Atlas v2.4 (paid for use).

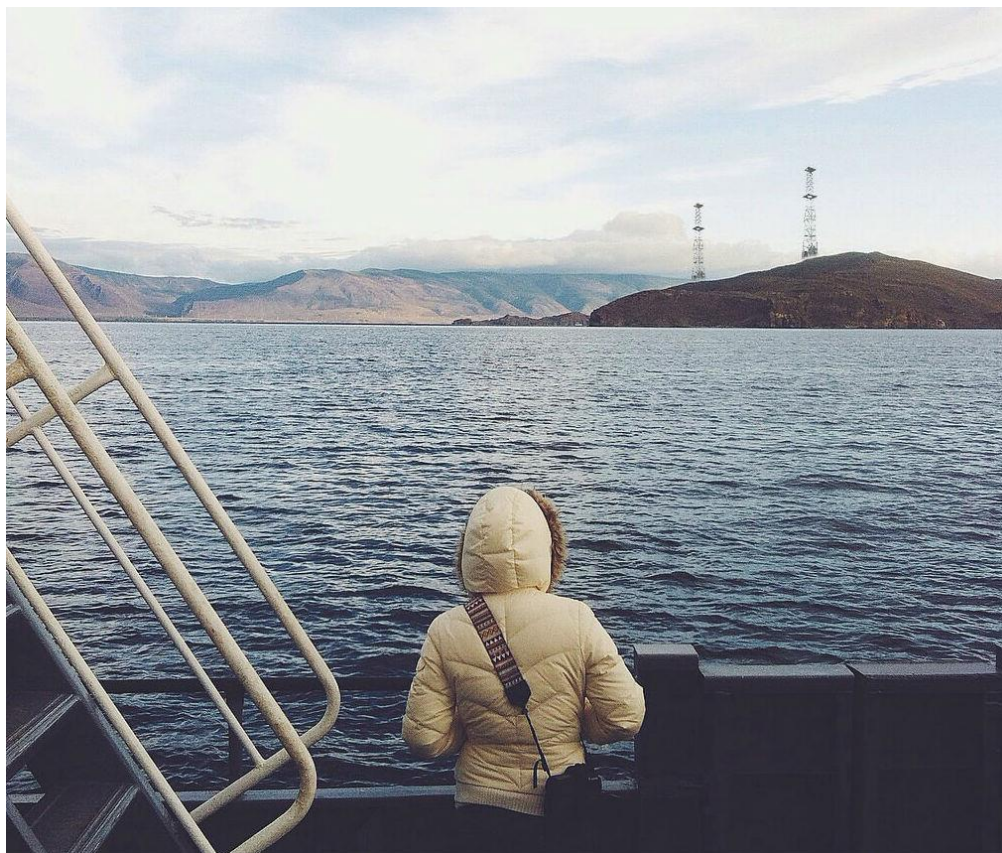
<http://www.dxatlas.com/>

Displays the stations logged in YaND on an external map.

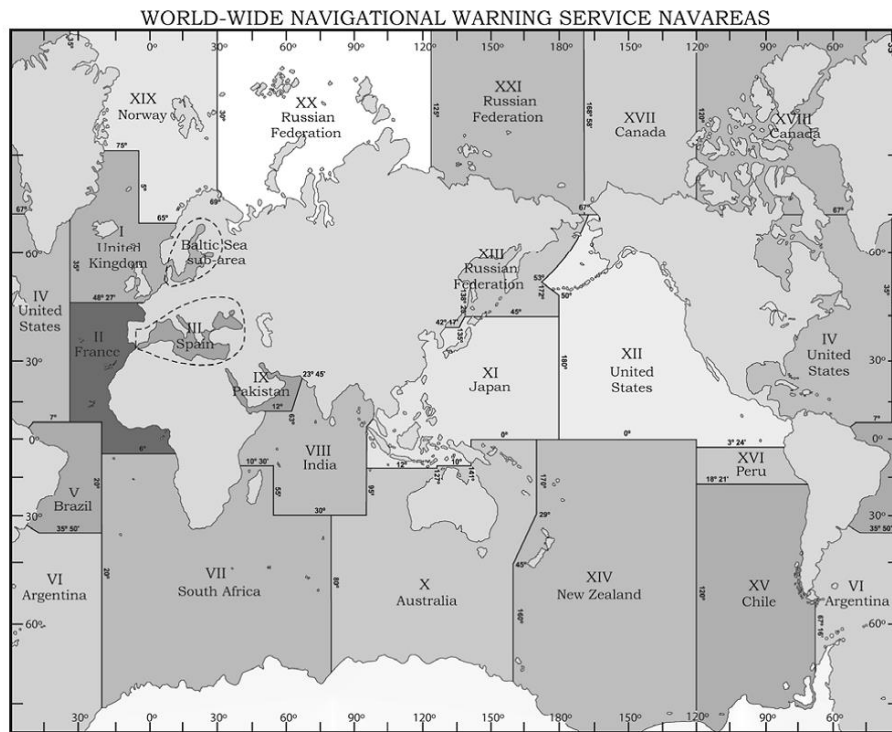
Introduction:

(some text was taken from various websites)

This document is not the definitive guide to NAVTEX, this is only a collection of information that I have found scattered throughout the internet and re-compiled into this document.



NAVTEX is an international automated service for delivery of navigational and meteorological warnings and forecasts, as well as urgent maritime safety information (MSI) to ships on 490 kHz, 518 kHz and 4209.5 kHz, *This PDF is for Navarea stations using 518 kHz.*

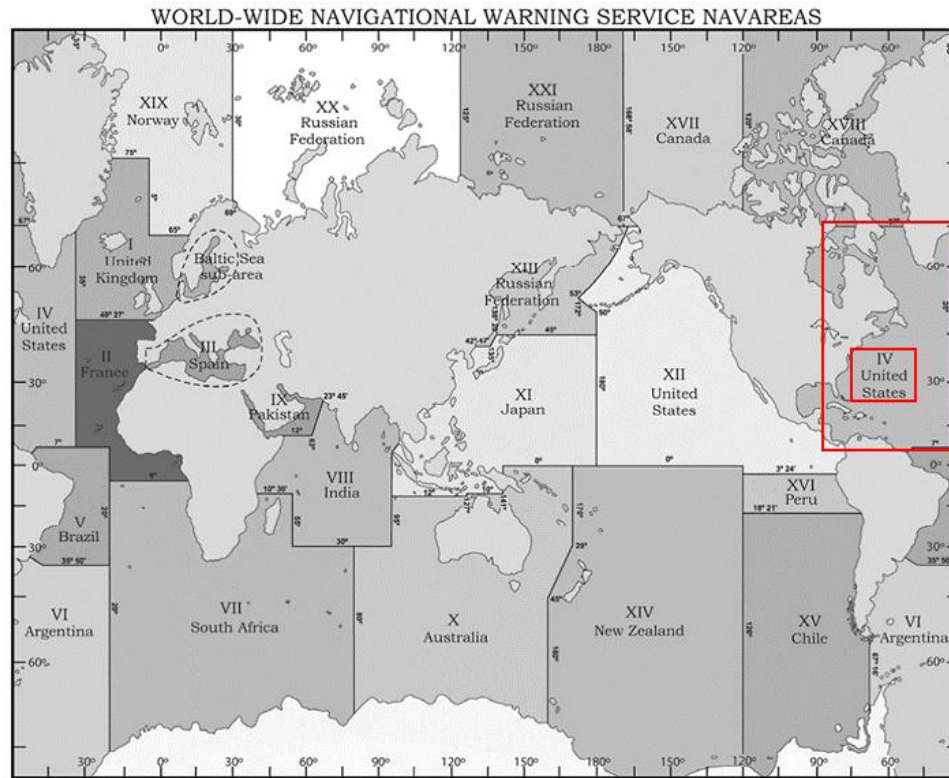


The world is divided into 21 different Navareas (shown above). NAVTEX stations are positioned around the globe within a defined Navarea (shown below).

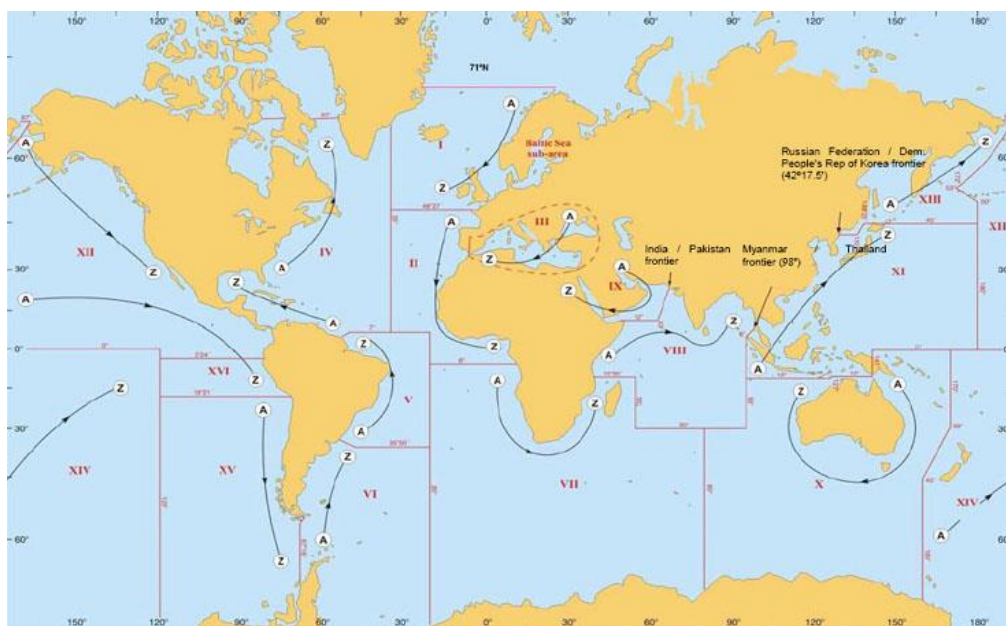
- I United Kingdom
- II France
- III Spain
- IV United States of America (East)
- V Brazil
- VI Argentina
- VII South Africa
- VIII India
- IX Pakistan
- X Australia
- XI Japan
- XII United States of America (West)
- XIII Russia
- XIV New Zealand
- XV Chile
- XVI Peru
- XVII Canada
- XVIII Canada
- XIX Norway
- XX Russian Federation
- XXI Russian Federation

My monitoring location and Navarea:

I live in Florida, that places my location in Navarea 4, United States of America (East)



Within Navarea 4, I have other stations assigned to that Navarea (listed below).



A	518 kHz	Miami	United States	25°37.40'N	080°23.37'W	240 NM
B	518 kHz	Bermuda	Bermuda (UK)	32°21.07'N	064°39.48'W	280 NM
C	518 kHz	Santa Marta	Colombia	11°03.34'N	074°13.10'W	300 NM
C	518 kHz	Moisie	Canada	50°11.76'N	066°06.70'W	300 NM
E	518 kHz	Charleston	United States	32°50.67'N	079°57.00'W	200 NM
F	518 kHz	Boston	United States	41°42.82'N	070°30.27'W	200 NM
G	518 kHz	New Orleans	United States	29°53.08'N	089°56.74'W	200 NM
H	518 kHz	Ferndale	Canada	44°56.22'N	081°14.00'W	300 NM
H	518 kHz	Curaçao	Curaçao	12°10.31'N	068°51.82'W	400 NM
M	518 kHz	Simiutaq	Greenland	60°41.20'N	046°35.00'W	300 NM
N	518 kHz	Portsmouth (CAMSLANT)	United States	36°43.72'N	076°00.60'W	280 NM
O	518 kHz	Robin Hood Bay	Canada	47°36.65'N	052°40.18'W	300 NM
P	518 kHz	Pass Lake	Canada	48°33.80'N	088°39.37'W	300 NM
Q	518 kHz	Port Caledonia	Canada	46°11.16'N	059°53.64'W	300 NM
R	518 kHz	Isabella	Puerto Rico (USA)	18°28.00'N	067°04.32'W	200 NM
T	518 kHz	Iqaluit	Canada	63°43.79'N	068°32.73'W	300 NM
U	518 kHz	Chebogue	Canada	43°44.67'N	066°07.29'W	300 NM
W	518 kHz	Kook Island (Nuuk)	Greenland	64°04.12'N	052°00.51'W	400 NM
X	518 kHz	Cartwright	Canada	53°42.50'N	057°01.28'W	300 NM

I can monitor station A, Miami but I have other distant NAVTEX stations that I want to decode transmissions from (shown above).

You can find your Navarea by visiting

<https://www.icselectronics.co.uk/support/info/navtexdb>

Click on the map within the webpage.

Each station within a defined Navarea has a fixed 10-minute transmission time slot, starting with station A (Miami) at 0000 UTC. The time slots are repeated at 4-hour intervals. Within each time slot, a mix of navigation warnings, weather forecasts, ice information and other content may be sent.

Using the link below you can see what station is transmitting or going to transmit within a defined timeslot for a specific Navarea.

https://en.m.wikipedia.org/wiki/List_of_Navtex_stations

The most important things to know are your Navarea and what Navstations are within that Navarea.

Types of NAVTEX messages:

A NAVTEX transmission can consist of the following types of messages:

A	Navigational Warning
B	Meteorological Warning
C	Ice report
D	Search and Rescue Information/ piracy and armed robbery
E	Meteorological forecast
F	Pilot messages
G	AIS messages (formerly Decca messages)
H	Loran C messages
I	Omega messages
J	Satnav messages (GPS or GLONASS)
K	Other electronic navigational aid system messages
L	Navigational warnings (additional)
M to U	Reserve
V	Notice to fisherman
W to Y	Reserve
Z	No messages on hand

NAVTEX message format:

NAVTEX message appear in the following format:

ZCZC B1 B2 B3 B4 MAIN MESSAGE NNNN

ZCZC: It is the start code. It indicates the beginning of the message.

B1: This character represents the Station ID.

B2: This character is called the Subject Indicator. It is used to represent the type of message. (A to Z). The characters B1 and B2 are used by the NAVTEX receivers to reject messages from stations of concerning subjects of no interest to the officer.

B3 and B4: B3 and B4 is a 2 digit serial number for each message.

The characters B3 and B4 are used by receivers to keep already received message from being repeated.

NNNN: This indicates the end of message.

Below is an example of a message I received in West Palm Beach, Florida from transmitting station A located in Miami, Florida.

ZCZC AA46
CCGDSEVEN BNM 028-20
SC-CHARLESTON ENTR-CHARLESTON HBR
1. CHARLESTON HBR CHNL LB 15 (LLNR 2405) TEMP RELO FOR DREDGE OPS
TO 32-42-43.886N/ 079-47-38.924W.
2. CHARLESTON HBR CHNL LB 16 (LLNR 2410) TEMP RELO FOR DREDGE OPS
TO 32-42-57.862N/ 079-47-28.490W
3. CANCEL AT TIME//300400Z JAN 20.
2020-01-23 16:17:38> NNNN

Every NAVTEX message has information within the message header.

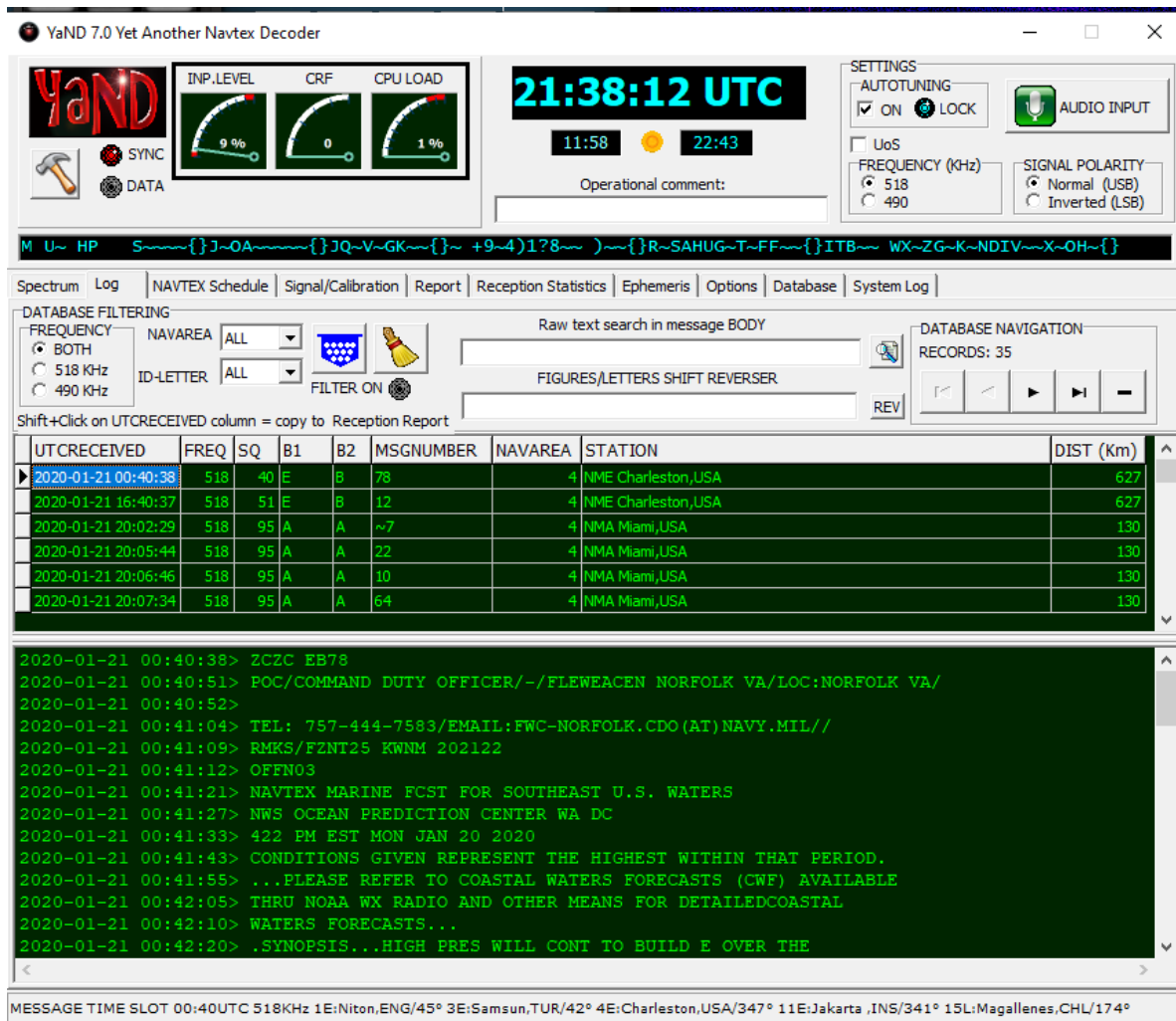
In the above message:

ZCZC: Indicates the beginning of the message.
The letter "A" indicates a broadcast from the NAVTEX station, Miami radio.
The 2nd "A" indicates Navigational warning category message.
'46' indicates the navigational warning message priority sequence.
NNNN: Indicates the end of message.

Online Resources:

<http://www.sjofartsverket.se/pages/105078/NAVTEX%20Manual%202018.pdf>
<https://www.icselectronics.co.uk/support/info/navtexdb>

YaND, Yet another NAVTEX Decoder:



YaND 7.0 Yet Another Navtex Decoder

INP. LEVEL: 9 % CRF: 0 CPU LOAD: 1 %

21:38:12 UTC

11:58 22:43

Operational comment:

SETTINGS: AUTOTUNING: ON LOCK AUDIO INPUT

UoS: FREQUENCY (kHz): 518 490 SIGNAL POLARITY: Normal (USB) Inverted (LSB)

M U~ HP S~~~~({}J~OA~~~~({}JQ~V~GK~~~~({}~ +9~4)1?8~)~({}R~SAHUG~T~FF~({}ITB~ WX~ZG~K~NDIV~X~OH~({}

Spectrum Log NAVTEX Schedule Signal/Calibration Report Reception Statistics Ephemeris Options Database System Log

DATABASE FILTERING: FREQUENCY: BOTH 518 KHz 490 KHz NAVAREA: ALL ID-LETTER: ALL FILTER ON: [Icon]

Raw text search in message BODY: [Text Box] FIGURES/LETTERS SHIFT REVERSER: [Text Box] DATABASE NAVIGATION: RECORDS: 35 [Buttons]

Shift+Click on UTCRECEIVED column = copy to Reception Report

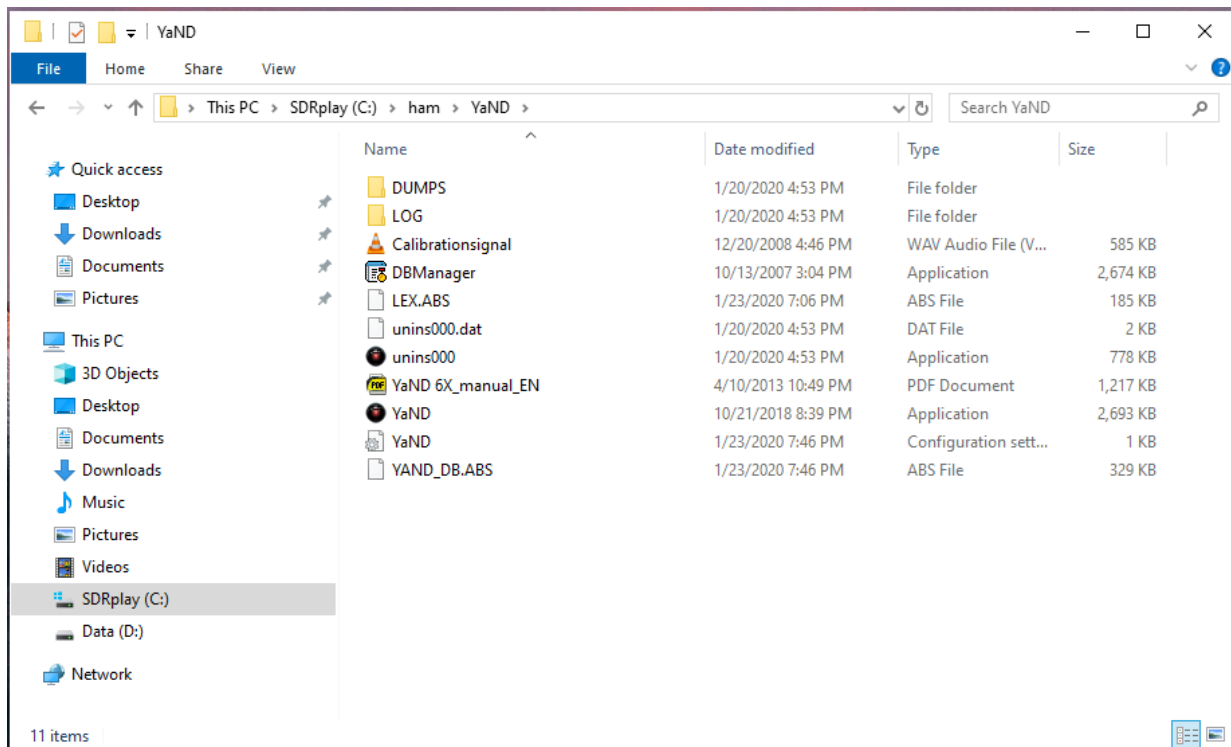
UTCRECEIVED	FREQ	SQ	B1	B2	MSGNUMBER	NAVAREA	STATION	DIST (Km)
2020-01-21 00:40:38	518	40	E	B	78	4	NME Charleston,USA	627
2020-01-21 16:40:37	518	51	E	B	12	4	NME Charleston,USA	627
2020-01-21 20:02:29	518	95	A	A	~7	4	NMA Miami,USA	130
2020-01-21 20:05:44	518	95	A	A	22	4	NMA Miami,USA	130
2020-01-21 20:06:46	518	95	A	A	10	4	NMA Miami,USA	130
2020-01-21 20:07:34	518	95	A	A	64	4	NMA Miami,USA	130

2020-01-21 00:40:38> ZCZC EB78
 2020-01-21 00:40:51> POC/COMMAND DUTY OFFICER/-/FLEWEACEN NORFOLK VA/LOC:NORFOLK VA/
 2020-01-21 00:40:52>
 2020-01-21 00:41:04> TEL: 757-444-7583/EMAIL:FWC-NORFOLK.CDO(AT)NAVY.MIL//
 2020-01-21 00:41:09> RMKS/FZNT25 KWNM 202122
 2020-01-21 00:41:12> OFFN03
 2020-01-21 00:41:21> NAVTEX MARINE FCST FOR SOUTHEAST U.S. WATERS
 2020-01-21 00:41:27> NWS OCEAN PREDICTION CENTER WA DC
 2020-01-21 00:41:33> 422 PM EST MON JAN 20 2020
 2020-01-21 00:41:43> CONDITIONS GIVEN REPRESENT THE HIGHEST WITHIN THAT PERIOD.
 2020-01-21 00:41:55> ...PLEASE REFER TO COASTAL WATERS FORECASTS (CWF) AVAILABLE
 2020-01-21 00:42:05> THRU NOAA WX RADIO AND OTHER MEANS FOR DETAILED COASTAL
 2020-01-21 00:42:10> WATERS FORECASTS...
 2020-01-21 00:42:20> .SYNOPSIS...HIGH PRES WILL CONT TO BUILD E OVER THE

MESSAGE TIME SLOT 00:40UTC 518KHz 1E:Niton,ENG/45° 3E:Samsun,TUR/42° 4E:Charleston,USA/347° 11E:Jakarta ,INS/341° 15L:Magallenes,CHL/174°

I have tried every Windows NAVTEX decoder and personally find YaND to be the best. YaND is free and available from <https://www.ndblist.info/datamodes.htm>

Note: do not install YaND into the default directory of c:\program files\. I recommend installing YaND into a root subfolder ie: c:\ham\yand



I highly recommend reading the YaND manual. It's very easy to follow.

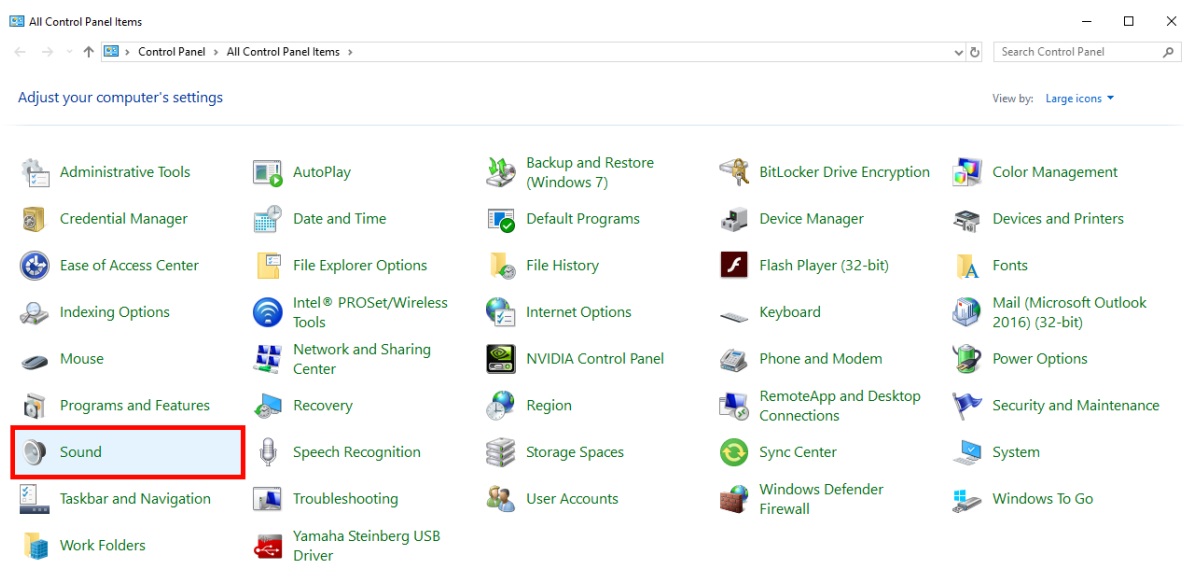
<https://www.ndblist.info/datamodes/YaNDmanual.pdf>

Virtual audio cable:

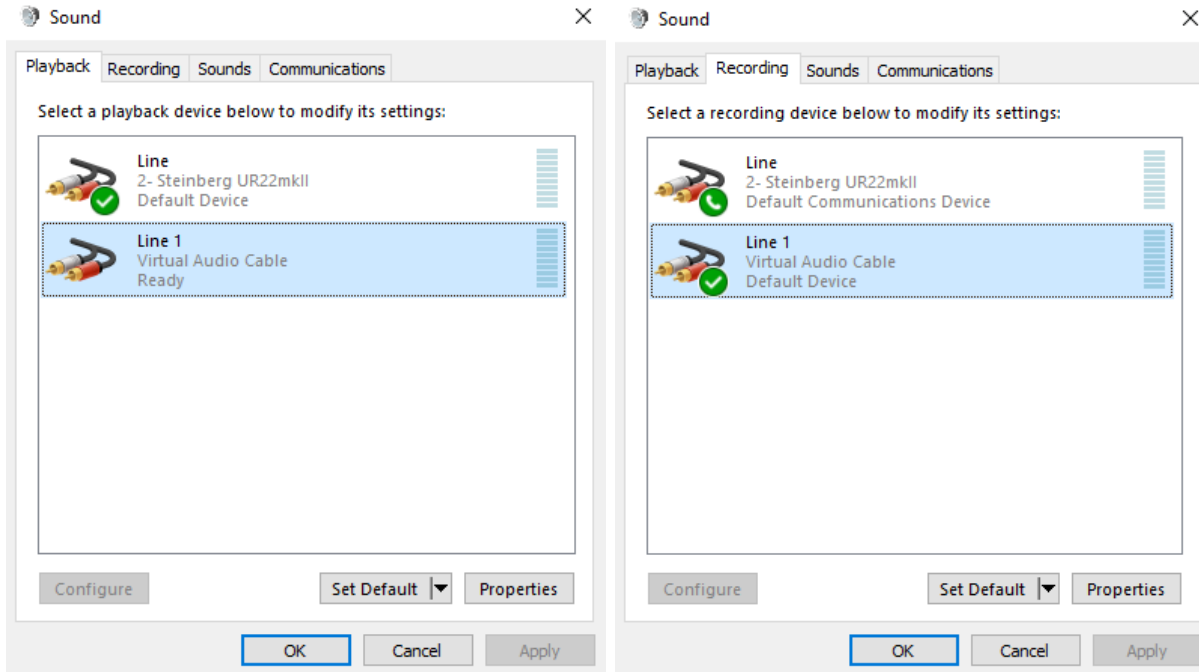
A virtual audio cable allows you to pipe the audio from one application (SDRuno) into another application (a decoder like YaND) digitally. I will assume SDRuno is already installed with your device attached and functioning properly.

You can now download a virtual audio cable package. If you already have a virtual audio cable package installed, you can skip to the next section. If you don't have a virtual audio cable application installed, you only need to choose one and install only one of the two that are available.

Close any running apps, install the virtual audio cable and reboot your computer. When your computer boots to your desktop, your computer will now have a virtual audio cable pair installed on the system.



You can verify the installation by going to your Control Panel and double clicking the Sound icon. VB-Cable and Virtual Audio Cable will only install a single virtual audio cable pair, one is for the input (Recording) and one is for the output (Playback). A single pair is all that is needed (shown below).



SDRuno VAC setup:



SDRuno needs its Output assigned to the Virtual Audio Cable. The output can be changed via the RX CONTROL panel, clicking the SETT. button on the top left and clicking the OUT tab.

Additional notes:

Do not enable the medium wave notch filter within the RSP when monitoring NAVTEX.

If using an RSPdx, place the DX in HDR mode by clicking the NDBH band button shown in the RX CONTROL panel of SDRuno.

I recommend running the RSP in LOW-IF mode, this is selected via the MAIN panel. This reduces the need to track separation between the Tuned frequency and LO (local oscillator) <https://youtu.be/Fsns4P3JxrM>

LOW-IF mode also minimizes the LO being placed outside of the desired preselect filter of the device in use, Remember the preselect filter is automatically enabled based on the LO frequency <https://youtu.be/w-vkiVp7Q4E>

I also recommend leaving the IF AGC enabled and placing the RF GAIN as high as possible without causing an ADC OVERLOAD warning within the MAIN panel. If an ADC OVERLOAD warning appears, back the RF GAIN down.

https://www.sdrplay.com/wp-content/uploads/2018/06/Gain_and_AGC_in_SDRuno.pdf

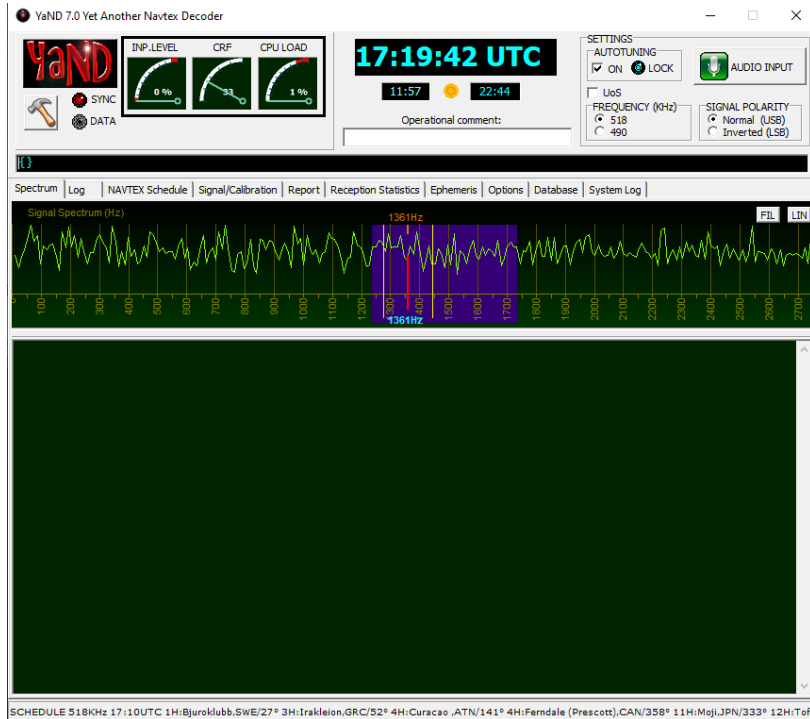
NAVTEX stations transmit on a set schedule and in UTC time. The link below lists station transmission times.

<https://www.dxinfocentre.com/navtex.htm>

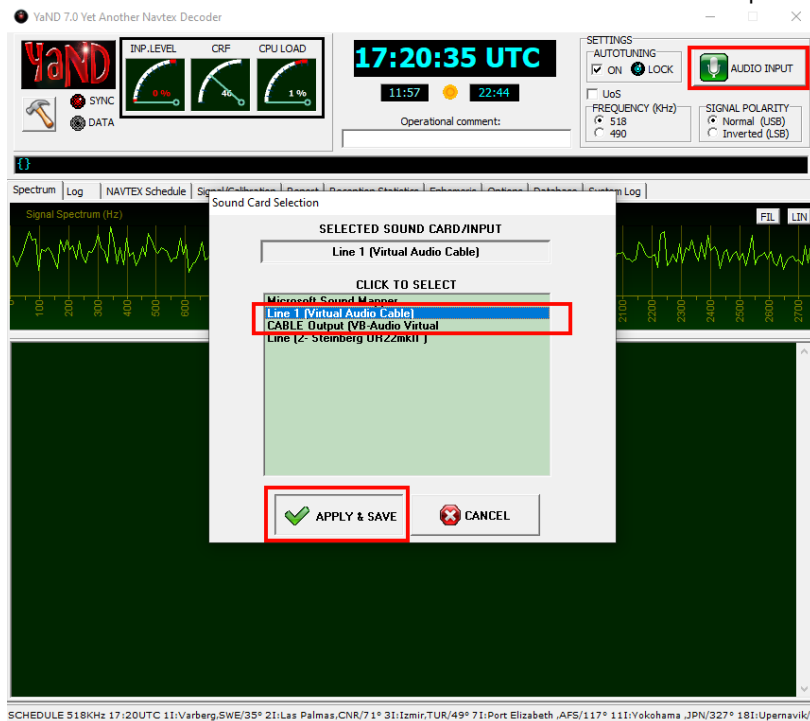
<https://www.timeanddate.com/worldclock/timezone/utc>

The first NAVTEX decode.

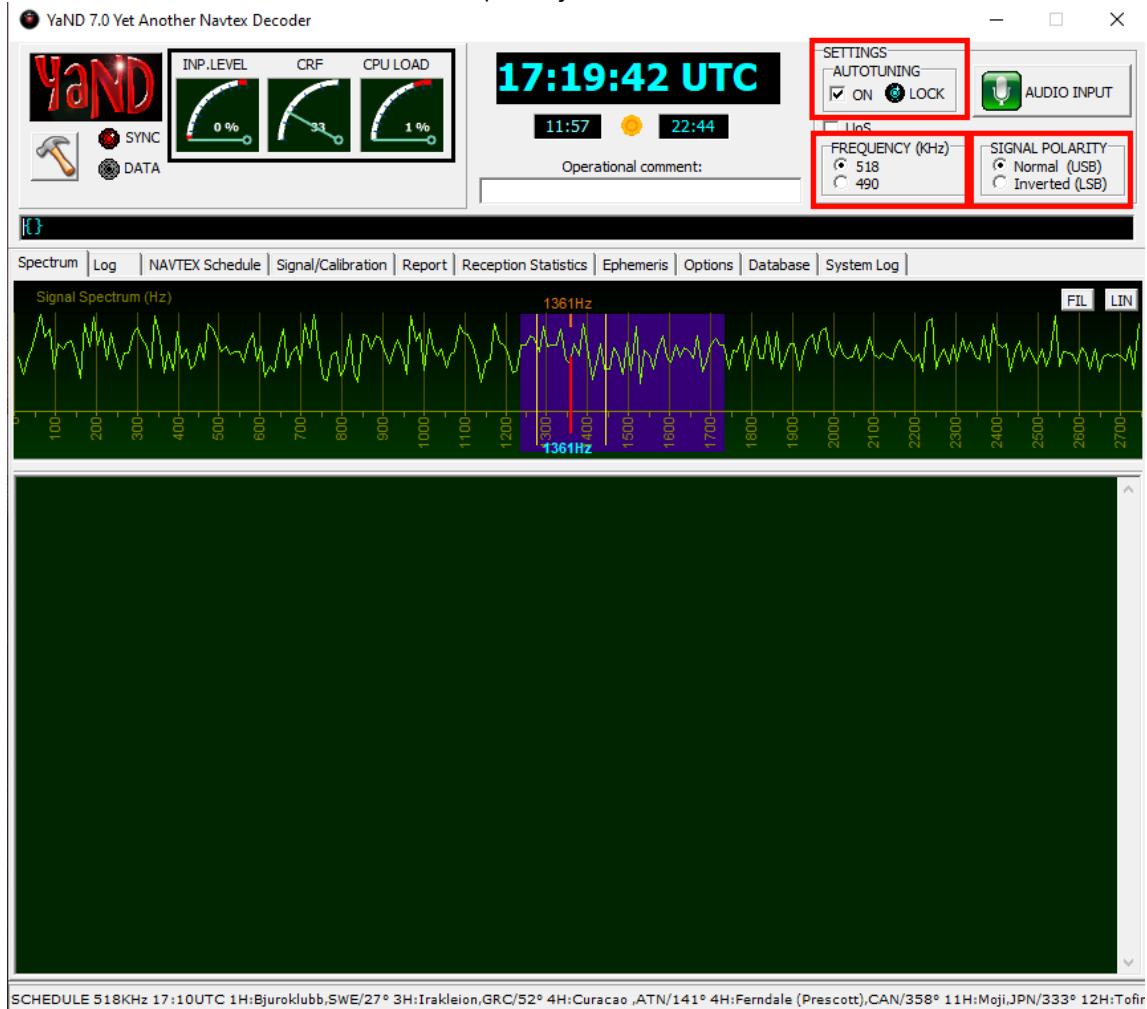
1: Launch YaND.



2: Select the Virtual Audio Cable or VB Cable as the input within YaND.



3: Set AUTOTUNNING to ON, Frequency to 518 and SIGNAL POLARITY to normal.



4: Launch SDRuno and click PLAY, select Virtual Audio Cable or VB Cable as the Output in SDRuno (shown on page 11),

5: Tune to 516.500 kHz, USB and select a filter width of 2.8k



Another setting is tune to 518.000 kHz, CW and select a filter width of 500Hz

6: Run the RSP at Max Gain but reduce the RF GAIN (MAIN panel) to avoid an ADC OVERLOAD warning.

7: Check the transmission schedule for the transmission times, Start with a Navstation close to your location. When a transmission appears, YaND will lock onto the signal and begin decoding automatically.

<http://dxinfocentre.com/navtex.htm>

<https://www.icselectronics.co.uk/support/info/navtexdb>

8: The decoded message log, YaND will store all logged NAVTEX messages under the LOG tab (shown below)

YaND 7.0 Yet Another Navtex Decoder

YAND INP.LEVEL CRF CPU LOAD

17:54:20 UTC

11:57 22:44

Operational comment:

SETTINGS

AUTOTUNING ON LOCK

AUDIO INPUT

UoS

FREQUENCY (kHz) 518 490

SIGNAL POLARITY Normal (USB) Inverted (LSB)

Log NAVTEX Schedule Signal/Calibration Report Reception Statistics Ephemeris Options Database System Log

DATABASE FILTERING

FREQUENCY BOTH 518 KHz 490 KHz

NAVAREA ALL

ID-LETTER ALL

Raw text search in message BODY

FIGURES/LETTERS SHIFT REVERSER

DATABASE NAVIGATION RECORDS: 31

Shift+Click on UTCRECEIVED column = copy to Reception Report

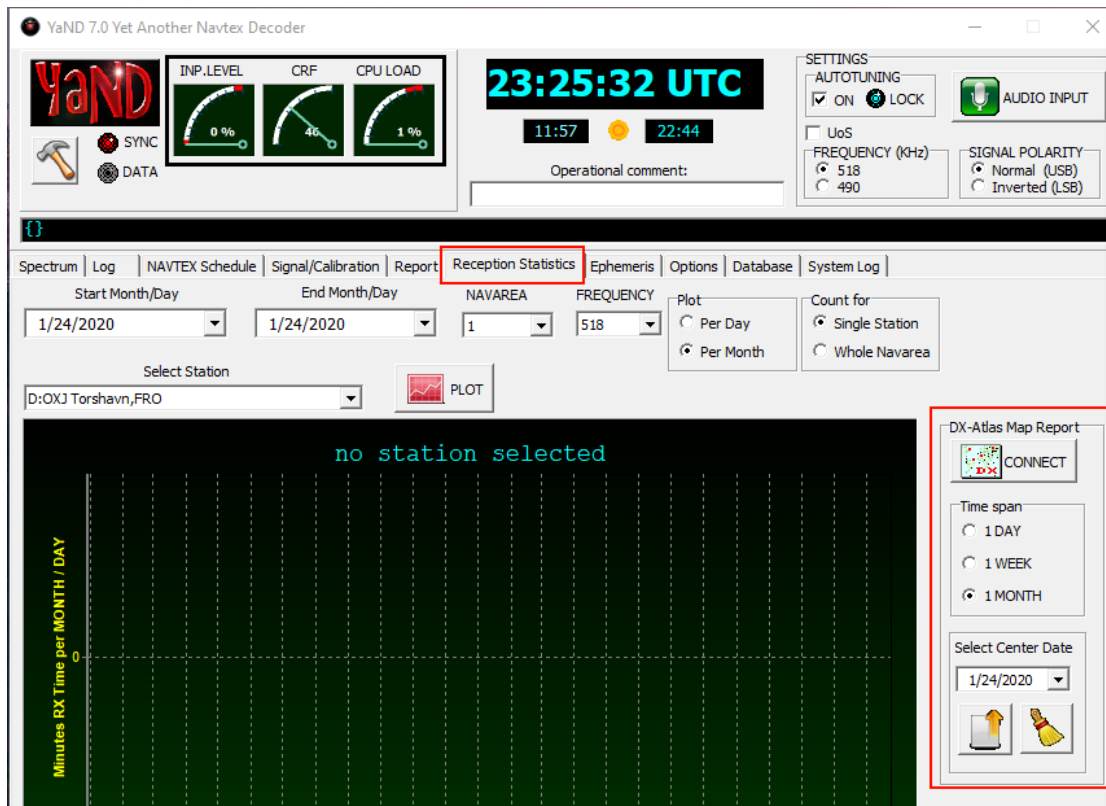
UTCRECEIVED	FREQ	SQ	B1	B2	MSGNUMBER	NAVAREA	STATION	DIST (Km)
2020-01-21 00:40:38	518	40	E	B	78	4	NME Charleston,USA	627
2020-01-21 16:40:37	518	51	E	B	12	4	NME Charleston,USA	627
2020-01-21 20:02:29	518	95	A	A	~7	4	NMA Miami,USA	130
2020-01-21 20:05:44	518	95	A	A	22	4	NMA Miami,USA	130
2020-01-21 20:06:46	518	95	A	A	10	4	NMA Miami,USA	130
2020-01-21 20:07:34	518	95	A	A	64	4	NMA Miami,USA	130
2020-01-21 20:08:23	518	89	A	A	50	4	NMA Miami,USA	130
2020-01-21 20:40:36	518	17	E	A	44	4	NME Charleston,USA	627

```

2020-01-21 00:40:38> 2020-01-21 00:40:51> POC/COMMAND DUTY OFFICER/-/FLEWEACEN NORFOLK VA/LOC:NORFOLK VA/
2020-01-21 00:40:52>
2020-01-21 00:41:04> TEL: 757-444-7583/EMAIL:FWC-NORFOLK.CDO(AT)NAVY.MIL//
2020-01-21 00:41:09> RMKS/F2NT25 KWNM 202122
2020-01-21 00:41:12> OFFN03
2020-01-21 00:41:21> NAVTEX MARINE FCST FOR SOUTHEAST U.S. WATERS
2020-01-21 00:41:27> NWS OCEAN PREDICTION CENTER WA DC
2020-01-21 00:41:33> 422 PM EST MON JAN 20 2020
2020-01-21 00:41:43> CONDITIONS GIVEN REPRESENT THE HIGHEST WITHIN THAT PERIOD.
2020-01-21 00:41:55> ...PLEASE REFER TO COASTAL WATERS FORECASTS (CWF) AVAILABLE
2020-01-21 00:42:05> THRU NOAA WX RADIO AND OTHER MEANS FOR DETAILED COASTAL
2020-01-21 00:42:10> WATERS FORECASTS...
2020-01-21 00:42:20> .SYNOPSIS...HIGH PRES WILL CONT TO BUILD E OVER THE
  
```

SCHEDULE 518KHz 17:50UTC 1L:Rogaland,NOR/35° 3L:Limnos,GRC/48° 11L:Hong Kong ,CHN/343° 20L:Arkhangelsk,RUS/22°

9: DX Atlas integration, select the Reception Statistics tab in YaND. Click CONNECT, select a Time span and a Center Date. Click the send-to Dx Atlas button.



10: YaND calibration, YaND should only need to be calibrated one time. Calibration is carried out by clicking the Signal/Calibration button. I strongly suggest using a very strong NAVTEX transmission to calibrate YaND. Remember to reboot YaND after calibration.

11: Enjoy yourself... Try picking up bordering DX Navareas or post your NAVTEX station logs online and of course read the NAVTEX warning messages, they can be very interesting.

I hope this primer helped spark some interest in NAVTEX as well as guide you into decoding NAVTEX messages from possibly around the world.

It's important to remember that when trying to decode NAVTEX from outside of your Navarea receiving these signals is dependent on antenna location and propagation, you might hear a NAVTEX transmission from a Navarea outside of your own. The strongest signal will always be decoded.

If you have any questions or comments, I can be found at the following watering holes online.

<https://www.facebook.com/groups/sdrplay/>

<https://www.facebook.com/groups/sdruno/>

<https://www.facebook.com/groups/SDRUnoHFListeningDC30/>

Warmest of 73,
Mike-KD2KOG

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