The BEACON

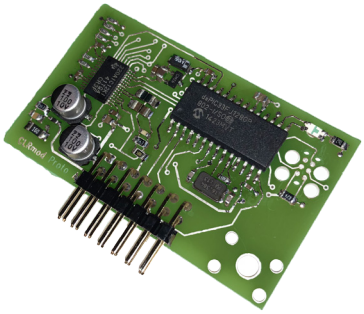
West Mountain RADIO
Quarterly Newsletter

Quarter 2 - 2019

NEW PRODUCTS!

See Page 6 for More Information

CLRmodule: DIY DSP Filtering!



CLRstereo: Filter Two Stations at Once!

COMING SOON!

N8XJK Battery Booster

Shortwave Utility Monitoring
by: Sholto Fisher K7TMG

What are Utility Stations?

Utility Station (Ute) monitoring has been and continues to be a popular and integral part of Shortwave Listening (SWL). The term Utility Station refers to any transmitting station that is not an Amateur or Broadcast station; so it is a very broad catch-all term which covers Government, Military, Commercial, and Private transmissions.

As Shortwave Radio has given way to the internet and telecommunication satellites, the volume of utility traffic has naturally decreased but you can still find plenty to monitor on the Shortwave bands even in 2019. *(Monitoring Government and Military transmissions may or may not be legal in your country, so if in doubt, consult your national telecommunications body guidelines)*

This article is going to concentrate on monitoring the various Maritime "digital data" stations you will typically encounter on Shortwave. The transmissions you can monitor include weather reports (SYNOP), navigational warnings, FAX images, positional/situational reports, and general information relevant to mariners. They are transmitted in a variety of digital modes so learning how to successfully monitor them will increase your knowledge and ability in recognizing common modes heard on Shortwave.

Where Can I Hear these Stations?

The maritime Shortwave bands are generally harmonically related in a similar fashion to the Amateur bands. A useful "rule of thumb" frequency guide to remember is 2.1 MHz, 4.2 MHz, 6.3 MHz, 8.4 MHz, 12.6 MHz, 16.8 MHz, and 22.1MHz. These make good places on the radio dial from which to explore.

There are also published lists of various Maritime stations you can consult such as William Hepburn's excellent Telex Broadcast list, which gives very detailed information useful in identifying and selecting stations to monitor.

The 8 MHz Maritime band is often a very good place to start as it is available to most areas day and night. For this reason it is probably the most active band for transmissions.

Most Telex broadcasts will be in SITOR-B mode. This is more or less identical to our Amateur digital mode AMTOR-B (remember B for broadcast). It was also widely known simply as FEC when it was a common mode heard on the Amateur bands, and it is common to hear it described as NAVTEX.
SITOR-B is a synchronous data stream with a symbol speed of 100 Baud. It uses Forward Error Correction (FEC) with each character repeated to help overcome the fading typically encountered on Shortwave.

WE WANT TO HEAR FROM **YOU**!

If you would like to submit an article for consideration in future newsletters please contact marketing@westmountainradio.com

Shortwave Utility Monitoring
by: Sholto Fisher K7TMG

(Continued from previous page)

With a fair signal and good decoding equipment, it is often possible to get 100% accuracy of received text over a considerable length of time!

8 MHz											
8.416.5	0030 / 1000 / 1400 / 1900 0300 1530 2100 Z		L2C	ARG	BUENOS AIRES	EE/SS	1000	-34 27 24	58 37 24		
	0530 / / 1300 / 1830 2300 Z		L2X	ARG	COMODORO RIVADAVIA	EE/SS	1000	-45 51 00	-67 25 00		
	0330 / / 1530 / Z		VFF	CAN	IQALUIT		5000	63 43 07	-68 33 00	JUN 15 - DEC 25	
	0250 / 0850 / 1350 / 2250 2350 Z		XSG	CHN	SHANGHAI	EE/CC	5000	31 06 00	121 32 00	PLANNED	
	/ / 1430 / Z		SUZ	EGY	SERAPEUM		-	30 28 00	32 22 00		
	/ 0930 / / 2130 Z		SVO-4	GRC	ATHINAI (OLYMPIA)	GR/EE	10000	37 36 00	21 29 10	PLANNED	
	0130 / 0730 / 1330 / 2030 Z	O	NMO	HWA	HONOLULU		-	21 26 17	-158 08 49		
	0000 / 1130 / / Z		PKX	INS	JAKARTA		1000	-6 07 06	106 51 48		
	0530 / / 1230 / / Z		EQI	IRN	ABBAS		-	27 12 00	57 17 00		
	/ 0630 / / 1830		LGI	NOR	HAMMERFEST		2000	70 43 01	23 47 54	NEW	
	/ 1100 / / 2300 Z										
	/ / 1600 / Z		OBC	PRU	CALLAO		1000	-12 03 00	-77 07 00	PLANNED	
	/ / / 2100 Z		OBF-4	PRU	MOLLENDO		1000	-17 01 00	-72 01 00	PLANNED	
	0200 / / / Z		OBY-2	PRU	PAITA		1000	-5 05 00	-81 07 00	PLANNED	
	/ 1100 / / / Z		UFL	RUS	VLADIVOSTOK		-	43 22 30	131 53 40		
			LGS	SJM	SVALBARD		2000	78 13 00	15 35 00	DECOMMISSIONED	
	0140 / / 1630 / / Z	F	NMF	USA	BOSTON		-	41 38 30	-70 33 00		
	0015 / / 1730 / / Z	C	NMC	USA	POINT REYES		-	37 55 29	-122 43 55		
	TO BE DETERMINED		SUH	EGY	ALEXANDRIA			31 11 53	29 51 46	PLANNED	
			IAR	ITA	ROME			41 36 44	12 28 36	PLANNED	
8.417.5	0500 / 0700 / 1200 / 2300 1600 Z		XSV	CHN	TIANJIN	CC/EE	7000	38 54 00	117 44 00		
8.424	/ 0930 / / 2130 Z		SVO-4	GRC	ATHINAI (OLYMPIA)	GR/EE	10000	37 36 00	21 29 10		
8.425.5	0250 / 0850 / 1350 / 2350 Z		XSG	CHN	SHANGHAI	CC/EE	5000	31 06 00	121 32 00		
8.431	/ 0800 / / 2000 Z		TAH	TUR	ISTANBUL		10000	40 59 00	28 49 00		
8.431.5	1915 Z		UAT	RUS	MOSKVA		-	55 39 00	37 38 00	AUG-MAR	
8.433	/ / / 1800 Z		KSM	USA	POINT REYES		5000	37 54 50	-122 43 22	SAT , SITOR / RTTY 45/170R	
8.438.3	/ / 1700 / 2130 Z		KSM	USA	POINT REYES		5000	37 54 50	-122 43 22	SAT , CW	
8.451	0000 / 0700 / / / Z		UFH	RUS	PETROPAVLOVSK		5000	53 14 57	158 25 18		
8.454	/ 1000 / 1620 / / Z		UIW	RUS	KALININGRAD		5000	54 42 00	20 30 00		
8.473			WLO	USA	MOBILE		20000	30 22 35	-88 12 20	DECOMMISSIONED	
8.580	0230 / 0600 / 1430 / 1845 0400 2130 Z		PWZ-33	BRA	RIO DE JANEIRO	PP/EE	-	-22 56 00	-43 20 00	PACTOR	
8.595	/ 1100 / / 2300 Z		UFL	RUS	VLADIVOSTOK		5000	43 22 30	131 53 40		
8.643	/ 0900 / / / Z		UFL	RUS	VLADIVOSTOK	RR	5000	43 22 30	131 53 40		

Figure 1: An extract of William's list for the 8MHz Maritime band.

From William's list you can also see RTTY 45/170, CW (Morse Code) and Pactor listed as modes used.

How Can I Decode these Stations?

There are a number of software programs available to decode these transmissions. Some are free and some commercial.

A well regarded program specific to Maritime monitoring is the SeaTTY package available from Sergei Podstrigailo. It is capable of decoding SITOR B (Navtex), RTTY, FAX, GMDSS DSC (HF & VHF) and SAME transmissions (used in the US for certain Weather alerts). Pactor decoding in SeaTTY is not currently supported but Sergei is working on an update to include that feature.

Pactor and CW decoding is currently available in F6CTE's software MultiPSK. All modern decoding software uses your computer sound card as a capture device. Simply hook up receiver audio to your mic or line-in jack on the pc and you are ready to decode.

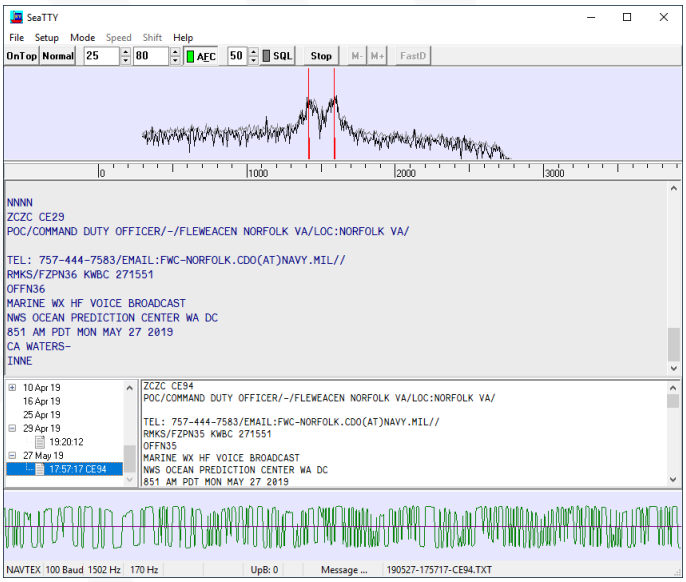


Figure 2: SeaTTY Decoding a SITOR-B (NAVTEX) Transmission

NAVTEX messages are numbered and SeaTTY will organize them into a list by received time and date.

The station DWD (Hamburg) broadcasts RTTY SYNOP data 24/7. These are weather reports coded in WMO format and can be automatically displayed by the free NavTMsgs companion software for SeaTTY. There is also a SYNOP decoder in MultiPSK.

Shortwave Utility Monitoring
by: Sholto Fisher K7TMG

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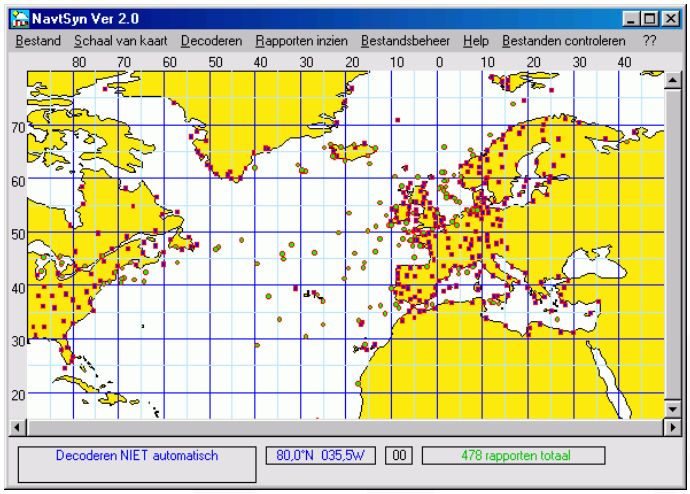

Figure 3: NavtMsgs Displaying SYNOP Stations Received by SeaTTY

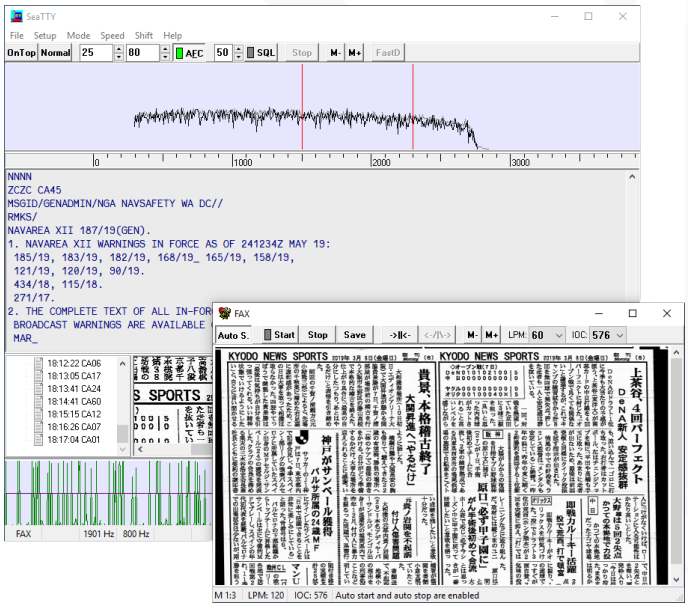

Figure 4: SeaTTY Receiving a Kyodo FAX Image

Kyodo News (Japan) is the only commercial press transmission left on shortwave radio. There are still plenty of Maritime weather FAX stations operating around the world and in the resources section you can find a complete schedule.

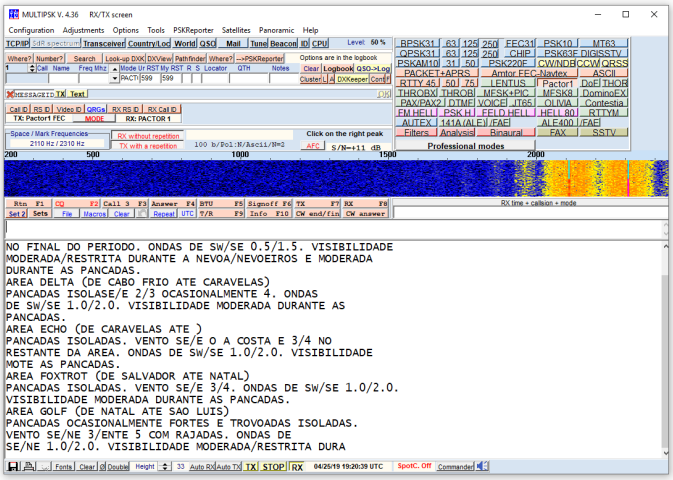

Figure 5: MultiPSK Decoding a Pactor Transmission

Station PWZ in Rio de Janeiro uses Pactor mode to broadcast its weather and navigational warning information.

Digital Selective Calling (DSC)
In the GMDSS (Global Maritime Distress & Safety System) the use of digital selective calling is employed. These transmissions take the form of brief data bursts which contain a variety of information such as safety, test messages and distress. Both SeaTTY and MultiPSK are capable of decoding these. You will see DSC messages from ship or shore stations.

Shortwave Utility Monitoring
by: Sholto Fisher K7TMG

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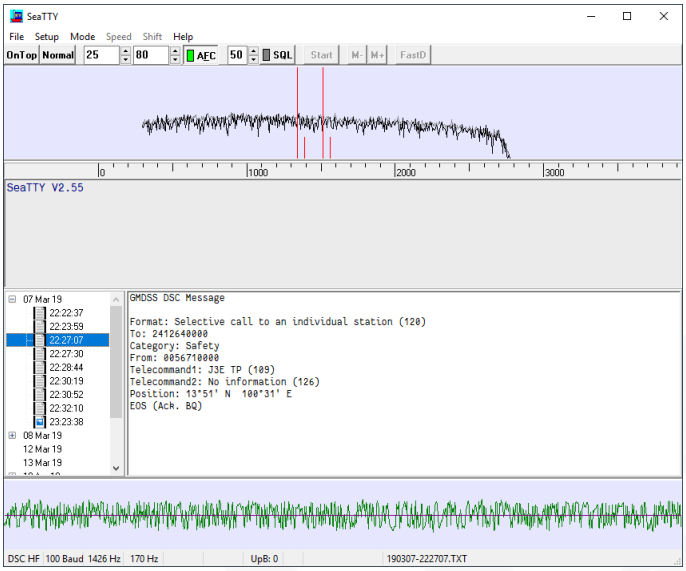


Figure 6: SeaTTY in DSC (HF) Mode

Help! I Can't Hear Anything!

If you do not have a very good receiving antenna or location, one trick you can employ is to use an online SDR radio instead. Hook up an audio patch cable from your speaker output jack to the mic or line-in jack on your computer and you can decode in exactly the same way!

I hope this article has given you a brief feeling of what is out there to monitor and some ideas for how to do that.

73,

Sholto Fisher, K7TMG

Resources

1. Shortwave Utility Station Monitoring by KC2HMZ
https://www.qsl.net/kc2fng/swute.html

2. Worldwide HF Radio-Telex Broadcasts
http://www.dxinfocentre.com/maritimesafetyinfo.htm

3. Worldwide Marine Radiofacsimile Broadcast Schedules
https://www.nws.noaa.gov/os/marine/rfax.pdf

4. SeaTTY Digital Maritime Decoder
http://www.dxsoft.com/en/products/seatty/

5. SYNOP Companion Program for SeaTTY (English, French, & Dutch)
http://home.kpn.nl/da2dr1/navtmsgs/Navt_GB.htm

6. F6CTE's MultiPSK Software Decoder
http://f6cte.free.fr/index_anglais.htm

7. DWD Hamburg Radio Teletype (RTTY) Weather Forecasts
https://weather.mailasail.com/Franks-Weather/Radio-Teletype-Weather-Broadcasts

8. DWD Schedule
http://www.ominous-valve.com/dwdschedule.pdf

9. GMDSS Digital Selective Calling
https://www.sigidwiki.com/wiki/GMDSS_Digital_Selective_Calling

10. Worldwide online SDR radios
https://sdr.hu/

New Product Spotlight: CLRstereo & CLRmodule!

by Craig Dominski, KC9VFA

Our family of Clearspeech® products is expanding! Introducing the CLRstereo and CLRmodule.

CLRstereo is perfect for those who use either an advanced radio (with two independent audio outputs), or two separate radios simultaneously. This would happen typically when contesting as an SO2R station (single operator two radio). You can also use it in non contesting situations as a way to listen to two different radios at the same time e.g. casual monitoring of two different frequencies/ bands! CLRstereo allows for flexible audio switching so you can listen to Main, Sub or both simultaneously! This unit features independent volume, tone and filtering for both channels. The CLRstereo unit can be used with stereo headphones or connected to amplified stereo speakers such as our COMspkr. Of course, this product has our patented Clearspeech® technology so you can experience independent DSP noise reduction for Main and Sub RX or two separate radios! Our powerful CLRspeech® algorithm gives clarity and depth for difficult HF reception!

CLRmodule is ideal for those with their own speaker 'shells' who wish to upgrade to Clearspeech® technology!
There are many applications for this DSP noise reduction unit!

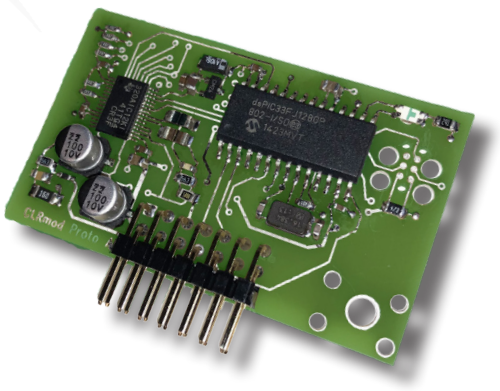
Hobbyists can now add to:

- An existing radio that does not have a factory DSP
- A new "homebrew" shortwave receiver or QRP rig
- A powered speaker
- A matching external speaker for a radio *(also requires a small audio power amplifier)*

Manufacturers can:

- Easily incorporate an audio noise reduction DSP into a new product
- Reduce development time by utilizing a complete DSP solution from West Mountain Radio

INTERESTED IN MICROCONTROLLERS?
Check out this page for more info:
www.westmountainradio.com/pic_resources



Hedy Lamarr
by Laura Schneider

Hollywood Star or Radio Scientist?
Why not both?

A big name in MGM's "Golden Age", Hedy Lamarr starred in many films as an actress (Ecstasy, Samson and Delilah), but also contributed to one of the most crucial scientific developments of our time. Along with many other clever solutions, she co-invented an early technique for spread spectrum communications. This was crucial to the many wireless communications of our present day. According to Melanie Phillips (2018), Hedy referred to her project as the "secret communications system" and began developing it around World War II . Her "SCS" was originally designed to help ships fire torpedoes. These are powerful but difficult to control weapons, and they could often go off course and damage the wrong target. There was a desperate need for a system that could reliably control these torpedoes. She found her answer in radio systems.

At first, radio contact was used between the torpedo and the ship that it was sent from. This allowed for a great deal of control. However, if the opposing forces figured out what frequency the torpedo and the ship were communicating on, they could just block that frequency. Control would be lost, and the torpedo would go off course. Hedy and a composer called George Antheil solved this issue and created a system that allows the two vessels to communicate by jumping between different radio frequencies. Due to the ever-changing frequencies the connection became impossible to intercept, and the problem was solved!

At first, her idea was laughed at, and people told her to "go back to being an actress." However, everyone came around as they realized just how invaluable her invention truly was. Hedy proves that anyone can be an inventor, if you have the drive and passion to make it work! Her system allowed for the much-needed security during World War II, but over time it became the foundation of military communications, cellphones and bluetooth! Our wireless lives are all thanks to Hedy Lamarr and the power of the radio!

Article adapted from https://www.womenshistory.org/education-resources/biographies/hedy-lamarr

Radio Sloyd and the Rebirth of Collegiate Amateur Radio

by David Kazdan, AD8Y

"Sloyd" is a 19th century Swedish word that translates roughly to "manual dexterity" or "craft." It refers primarily to wordworking as an educational tool. The officers of the Case Amateur Radio Club of Case Western Reserve University in Cleveland, Ohio have created "Radio Sloyd." In this university classroom curriculum, amateur radio is used broadly in the teaching research and critical thinking. This certainly could be extended to the teaching of science, technology, math, language arts, history, social and political science, and other university-level areas. Our class has been successful in guiding four years of students through library research and paper writing, with focus on communications regulation and censorship issues. It has produced award-winning papers, an IEEE conference presentation, and a teaching award for its faculty advisor. It has certainly put the amateur radio club on the university's map. We hope that it can become a model for university amateur radio clubs' interactions with their schools.

Collegiate amateur radio has had varying fortunes. Columbia University and Massachusetts Institute of Technology had the nation's first college clubs and stations. By the middle of the last century, about two hundred schools had ham clubs and they were part of the technical teaching landscape. Just as school music departments had bands and orchestras, physics and electrical engineering departments had a lab with antenna cables running out the window to rooftop antennas. Students, faculty, and staff visited off hours to maintain the equipment and use it for contests, DXing, traffic handling, and sometimes research—all the activities the Amateur Radio Service is meant for. Sputnik was tracked by school stations, and much radio and antenna research was published out of the facilities.

Then the internet happened.

This photo is of Case Amateur Radio Club president Rachel Boedicker AC8XY and member Kellen McGee KE8HHV, operating the station for our October special event. The event commemorates the Michelson-Morley experiment on the Case campus in 1887, the demonstration that radio waves do not require a "luminiferous aether" for their transmission. Our program included physics graduate students holding question-and-answer sessions on the air about modern physics.

Radio Sloyd and the Rebirth of Collegiate Amateur Radio

by David Kazdan, AD8Y

(Continued from previous page)

By the early 1990s, many of the technically-minded students who might have investigated radio engineering and amateur radio headed for computer programming and the internet. It is hard to blame them; computer networking and communications was quite obviously the "next big thing" of the era. To students, amateur radio suddenly looked quite old-fashioned. University amateur radio stations went unused. The floor space was valuable and was repurposed; equipment budgets were reduced, often to zero. Universities were becoming liability sensitive at the same time, and roof access for antenna work was taken away from radio club members.

The Case club was never dismantled. The station is in a blockhouse on the roof of an 8-story engineering building and although it was nearly disused for ten years, it did remain available. Some maintenance and station improvement performed by alumni members. The station's two towers stayed in place, decaying in Cleveland winters but putting out a signal when activated. A new group of students discovered W8EDU in 2010 and reactivated its undergraduate club charter. They gave license exams and station tours, had operating activities including hidden-transmitter hunts, and enjoyed having a meeting place.

In fall of 2015, the electrical engineering department chairman told the faculty advisor that the station was under pressure from university administration for closure, primarily because university attorneys wanted students off the roof and certainly not climbing towers. He said he could support the station's continued existence if the facility had involvement in university curriculum and in research. He could not support it solely as a student club only—the club would have to get off the roof. Members talked about it. We proposed a course to the CWRU general education program that involved amateur radio education.

Image Source: https://thedaily.case.edu/

Radio Sloyd and the Rebirth of Collegiate Amateur Radio

by David Kazdan, AD8Y

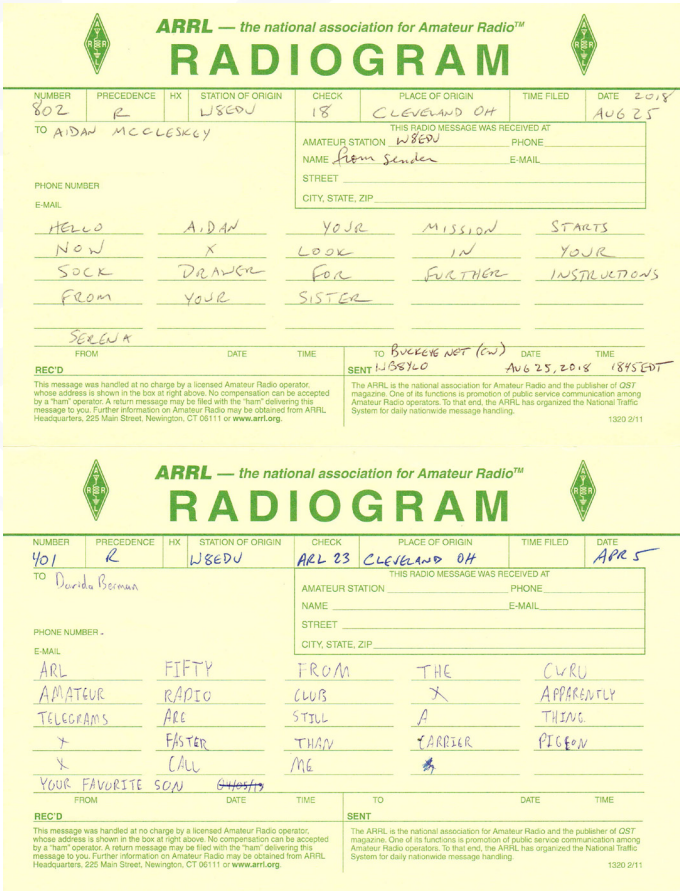
(Continued from previous page)

We were told that the course needed academic research and writing content. We huddled again, and developed Radio Sloyd. Among university courses that teach amateur radio and have license examination as part of coursework, this one is nearly unique in being part of nontechnical curriculum.

Our course, Shrinking the World: Ham Radio and Distance Communication, discusses the ways humans have communicated over long distances from ancient times to modern. From the first class, emphasis is on the ways that communication has altered human history, has had economic importance, and has been controlled in ways good and nefarious. We discuss smoke signals and the semaphore towers of Europe (with a nod to The Count of Monte Cristo), postal systems and landline telegraphy, newspaper distribution, radio, satellite communication, the internet. Students learn some rudimentary cryptography (not for amateur band use!). Our in-depth discussion of communications regulation is FCC Section 97, the amateur radio service. The mid-term exam is the Technician test and all students are expected to qualify for that license.

We have reading and writing assignments as would any collegiate critical-thinking and research course. Students sample historical communications systems beginning with postal letter writing on stationery and with interesting stamps, a new experience for many of them. The next reading/writing assignment involves studying electric telegraphy and telegrams. We bring this to life by having students write amateur radio radiograms within the rules of amateur radio communications and third party treaties. We create an ad-hoc traffic net to get radiograms out of the classroom, and students are invited to watch the process of their messages being placed in the National Traffic System for dispatch—some in CW. They are asked to report when they receive a radiogram or other notification in response, and radiograms received at the club station for students are presented with some ceremony in class. The local and state level nets know we do this and are fully cooperative with the volume of traffic generated.

Amateur radio contesting is presented as an example of constrained speech, and all students are expected to make contacts in the School Club Roundup.



ARRL — the national association for Amateur Radio™

RADIOGRAM

NUMBER 802 | PRECEDENCE R | HX | STATION OF ORIGIN W8EDU | CHECK 18 | PLACE OF ORIGIN CLEVELAND OH | TIME FILED | DATE AUG 25

TO AIDAN MCCLESKEY

THIS RADIO MESSAGE WAS RECEIVED AT
AMATEUR STATION W8EDU PHONE
NAME from Sender E-MAIL
STREET
CITY, STATE, ZIP

PHONE NUMBER
E-MAIL

HELLO AIDAN YOUR MISSION STARTS
NOW X LOOK IN YOUR
SOCK DRAWER FOR FURTHER INSTRUCTIONS
FROM YOUR SISTER
SERENA

FROM DATE TIME | TO BUCKEYE NET (CW) DATE AUG 25, 2018 TIME 1845 EDT | SENT W8SYLO

REC'D

This message was handled at no charge by a licensed Amateur Radio operator, whose address is shown in the box at right above. No compensation can be accepted by a "ham" operator. A return message may be filed with the "ham" delivering this message to you. Further information on Amateur Radio may be obtained from ARRL Headquarters, 225 Main Street, Newington, CT 06111 or www.arrl.org.

The ARRL is the national association for Amateur Radio and the publisher of QST magazine. One of its functions is promotion of public service communication among Amateur Radio operators. To that end, the ARRL has organized the National Traffic System for daily nationwide message handling.

1320 2/11

ARRL — the national association for Amateur Radio™

RADIOGRAM

NUMBER 401 | PRECEDENCE R | HX | STATION OF ORIGIN W8EDU | CHECK ARL 23 | PLACE OF ORIGIN CLEVELAND OH | TIME FILED | DATE APR 5

TO Dorida Berman

THIS RADIO MESSAGE WAS RECEIVED AT
AMATEUR STATION PHONE
NAME E-MAIL
STREET
CITY, STATE, ZIP

PHONE NUMBER
E-MAIL

ARL FIFTY FROM THE CURL
AMATEUR RADIO CLUB X APPARENTLY
TELEGRAMS ARE STIL A THING
X FASTER THAN CARRIER PIGEON
X CALL ME
YOUR FAVORITE SON ~~CHUCK~~

FROM DATE TIME | TO DATE TIME | SENT

REC'D

This message was handled at no charge by a licensed Amateur Radio operator, whose address is shown in the box at right above. No compensation can be accepted by a "ham" operator. A return message may be filed with the "ham" delivering this message to you. Further information on Amateur Radio may be obtained from ARRL Headquarters, 225 Main Street, Newington, CT 06111 or www.arrl.org.

The ARRL is the national association for Amateur Radio and the publisher of QST magazine. One of its functions is promotion of public service communication among Amateur Radio operators. To that end, the ARRL has organized the National Traffic System for daily nationwide message handling.

1320 2/11

These radiograms were class assignment submissions by students in the Radio Sloyd class

Radio Sloyd and the Rebirth of Collegiate Amateur Radio

by David Kazdan, AD8Y

(Continued from previous page)

Club members volunteer their time to act as control operator for the contest, and we usually do well in Collegiate category. We always do lose to our arch nemesis, Russell Elementary School. Their callsign is KM4RE, and they are in Smyrna, Georgia. After licenses are gained, we distribute inexpensive HTs and have on-air communications exercises. We hold demonstration traffic nets and emergency nets, and we have an on-campus contest. Students who want more technical radio content may join us in building tape-measure Yagis for the foxhunts, operating and maintaining the station with us, and planning engineering senior projects that use the station.

The Case Amateur Radio Club (CARC) has been used as a curricular lab now in courses on mixer circuits, RADAR, communications theory, and acoustics. We have won the School Club Roundup several times, had good showings in November Sweepstakes, and supervised about fifteen senior electrical engineering projects. The student club has become a well established part of the university's academic ecosystem.

It has been a wonderful experience! Let us know if you would like to schedule a contact and obtain the coveted W8EDU QSL card, or if your collegiate club would like to compare notes on operating, class involvement, and research projects.
CUL!

73,

DE David, AD8Y and the officers of the Case Amateur Radio Club

Check out the CARC Website at:
https://www.w8edu.wordpress.com

About the Author:
David was first licensed as WN8HKS in 1970 at age 11; then WB8QYM as Amateur Extra at age 16, and is currently licensed as AD8Y. He graduated from MIT in 1981 with bachelor degrees in Electrical Engineering and Computer Science, and Humanities (music). He was an active member of the MIT Radio Society W1MX; he received his MD from the University of Cincinnati in 1985, and his Biomedical Engineering PhD from Case Western Reserve University in 1992. He enjoys CW, traffic handling, contesting, and coaching beginners in the practices of amateur radio.

Club faculty advisor David Kazdan, AD8Y copying the CW Field Day bulletin from W1AW

Bulletin Board

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