



**JANUARY 2019**

**Volume 8 Issue 1**

# VE3ERC-LUB

- President: Brian VA3DXK**
- Vice-President: Ted VE3TRQ**
- Secretary: Tom VE3DXQ**
- Treasurer: Paul VA3PDC**
- Trustee: John VE3JXX**
- QSL Manager: Paul VA3PDC**
- Repeater Trustee: Wes VE3ML**
- Website Admin: Ted VE3TRQ**
- Lighthouse: Al VA3TET**
- Maple Syrup Display: Al VA3TET**
- Newsletter: Bob VE3IXX**

## ERC REPEATERS

- UHF 444.700 TONE: 131.8**
- UHF 444.700 TONE: 123.0**
- VHF 147.390 + TONE: 123.0**
- EMERGENCY SIMPLEX: 147.51**
- UHF- IRLP node 2404**
- VHF- IRLP node 2403, ECHOLINK node VE3ERC-R**

**In an emergency, tune  
 Into our repeaters,  
 UHF 444.700 or  
 VHF 147.390 or  
 HF 3.755 LSB or  
 Simplex 147.510  
 For coordination and  
 assignments.**



There are times when you may need more gain than the standard J-Pole antenna. With twice the gain of a standard J-Pole antenna, the 2 meter Slim Jim antenna is a J-Pole on steroids! The Slim is an end-fed folded dipole antenna that has a gain of 6 dBi and a nice low RF take...

Thanks to Mike VE3MKX for website (More on page 8)





**MAY 2019  
BLESS YOU ALL WITH  
HEALTH AND HAPPINESS !**

**FROM  
VE3ERC  
ELMIRA RADIO CLUB**

# THE PREZ SEZ!

This club is Radio-ACTIVE

THE CLUB IS RADIO-ACTIVE



## President's Update for January 2019

**A**s I write this month's note for the Elmira Radio Club VE3ERC, the wind is howling outside my window, snow is coming down sideways, and an Alberta Clipper snowstorm is upon us. Winter is not coming – it's here! Tomorrow I will have to contend with shoveling the driveway outside but for now I hope all of us are somewhere warm and comfortable, and in a place where we can sit back and relax at our stations, perhaps chasing tropical DX, dreaming of spring, and planning this year's activities.

The New Year brings excitement for upcoming club activities and opportunity for new endeavours and challenges. Before we know it, the Elmira Maple Syrup Festival will be upon us and Spring Field Day not too far behind it. Now is the time to take out our scratch pads and pencils, ruminate on our club's and your personal ideas or goals for the year, and begin to sketch out plans.

On a personal level I will begin with a desperately needed 'tidy up' of my radio shack. Plans continue for developing simple, compact, ready-to-go, easy to maintain, field antennas to compliment my 6m Hex antenna. On my agenda are an EFHW end fed half wave HF antenna, and a lightweight aluminum folded J-pole antenna for VHF. On the technical end of things I will continue with code practice as I learn CW, and I am beginning to explore the amazing world of Arduino and small circuits by assembling a lightning detector (my radio shack is in the basement with no windows), and yes I know there are phone aps and computer programs that can do that for me but that would just be too easy – and it does not satisfy the curiosity of the tinkerer in me.

On a club level I think we should continue to do what we do best, and that is sharing our comradery and knowledge by working together in friendship as we do. A full year of ERC 'radio' lies before us and so I encourage you to key up your mic, explore new ideas and projects, volunteer and help out with club activities and initiatives, and above all have fun and enjoy the Elmira Radio Club!

On behalf of the Elmira radio Club VE3ERC I would like to wish you all a Happy New Year and I look forward to seeing you at our next meeting on Wednesday, February 27<sup>th</sup>, 2019.

**Brian VA3DXK**

# Back-of-the-Napkin Eyeball

## QSO notes and stuff

by Rich, ve3DCC

JANUARY 2019

### BOOK REVIEW: "Click Here to Kill Everybody" by Bruce Schneier

This book is worth reading because it is accessible and appropriate to these troubled times. Bruce Schneier, the author, is "one of the world's foremost security experts" (Wired) and a best-selling author of thirteen books. His first book, published in 1993, is a classic Mathematician's delight. The title is: "Applied Cryptography: Protocols, Algorithms and Source Code in C".... ah, yes! I ordered my copy and I was hooked. You may not want to read it!

His latest best sellers, though, including "Data and Goliath: The Hidden Battles to Collect Your Data and Control Your World" and this one, are written for non-technical folk who want to understand the depth of the threat to each of us as the world becomes increasingly dependent on internet transmission of data. In the last few months, we have seen a crisis develop around the issue of Huawei, a Chinese company, accessing the next generation G5 communications systems in the Five Eyes- those Allies (Australia, New Zealand, the UK, Canada and the United States) who collaborate on intelligence gathering and sharing. Last year, the world discovered that ALL computers are subject to compromise via two "viruses", Spectre and Meltdown. In fact, each of these trap doors are within the architecture and programming of the CPU chip that is the brain of all computers. In a related fashion, allowing Huawei to provide the infrastructure for national communication systems, could allow all data to be read and accessed by foreign governments. The data hacks of respected companies like EQUIFAX, and even the abuse of data by FACEBOOK and others suggests that there is as much to be concerned about from accepted service providers. As an aside, my mother often said that "if it's free, think about it". My colleagues prefer to point out that if it is free, you are not a client, you are the product. These are very frightening scenarios.

Schneier's newest book covers a lot of ground but it is non-technical. It is divided into two parts:

Part 1: The Trends, describes, in a chilling fashion, recent data breaches that have occurred. It also looks at the issue of artificial intelligence in, for example, self-driving cars, the hacking of home convenience devices and, even, the "Security Arms Race". He suggests that the coming "Internet of Things" (IoT) that allows your refrigerator and home thermostat to "talk" to your personal communications devices opens up serious avenues for abuse. He states that "A vulnerability in Samsung smart refrigerators left users' Gmail accounts open to attack. The Gyroscope on your iPhone, put there to detect motion and orientation, is sensitive enough to pick up acoustic vibrations and, therefore, can eavesdrop on conversations. The antivirus software sold by Kaspersky accidentally (or purposely) steals US government secrets." (page 29). Even your virtual assistants are hackable.

Part 2: The Solutions, addresses the issues of "trusted, resilient and peaceful INTERNET+".

Since the author is a trusted consultant to governments and security agencies, one might conclude that this is a hint of future policy. He states that "the Internet+ is a free-wheeling integrated system of computers, algorithms and networks" (page 146). While he suggests that a single and new government agency be tasked with monitoring and regulating the system, it becomes clear that the need for enforceable norms is the key.

Schneier coins the term: Internet+ as "more than the internet, more than the Internet of Things. It's really the Internet + Things + Us or, for short, the Internet+". (page 7)

This seems a bit conservative. I wonder if we need to look at the entire system as if it is a water delivery system, where EVERY part of the system needs structural integrity, so..... You heard it here first, why not call for an INFRA-net that requires security protocols and encryption from source to destination. Every part of the infrastructure must be secure. A tiny crack in any dam can create a deluge--So too, in the world of data transmission. Quantum computers may be the only way to meet the speed required to secure every part of this very complex system. Anything less is unacceptable, but how long can we wait? What do you think? READ THE BOOK!

### References:

Click Here To Kill Everybody by Bruce Schneier, ISBN 9 7803 9360 8885 published 2018  
Schneier.com

To access his website, monthly email newsletter and blog go to

<https://schneier.com/ch2ke.html> and find links relating to the book.

**WANTED:** Ham Tech support

PS: Many hands make light work!

We need folks to help with the final planning for Ham tech Sept 21, 2019.

The framework and template are ready, but we need people to handle and assist on any of these tasks:

**Chair:** to coordinate the team and execute the plan, book the hall and lunch, introduce/thank speakers

**Comptroller:** to accept and deposit cheques, arrange speaker honorarium, arrange bill payment, report to the club at completion

**Booklet:** adjust the current booklet to reflect new speakers, date etc.

**Poster and publicity:** assist Bob ve3ixx with poster distribution, publicity to area clubs, RAC, FLEA MARKET, email to past attendees etc.

Prizes and sponsors: follow up donors

**A/V:** assist Frank with AV setup  
Speakers: follow up and book 5 speakers.. some are already scouted





Thanks to Tony VE3DWI for sending along the following article.

Date 11.01.2019 Author Lewis Sanders IV

## Magnetic north pole is changing faster than forecast

Scientists were set to release a new World Magnetic Model after accelerating changes in earth's magnetic field, but the US government shutdown has stopped them for now. Navigation as we know it could be in jeopardy.

Scientists had planned to roll out a new update of the World Magnetic Model (WMM) on January 15 due to increased fluctuations in earth's magnetic field. However, due to the U.S. government shutdown, this has been delayed.

Although the magnetic north pole — unlike the geographic North Pole — is constantly in motion, the magnetic field is changing faster than scientists had previously forecast, according to a report published by scientific journal *Nature* this week.

The World Magnetic Model is updated every five years to account for shifts to the field and the last one took place in 2015. However, in 2016, part of the magnetic field "temporarily accelerated deep under northern South America and the eastern Pacific Ocean," according to *Nature*.

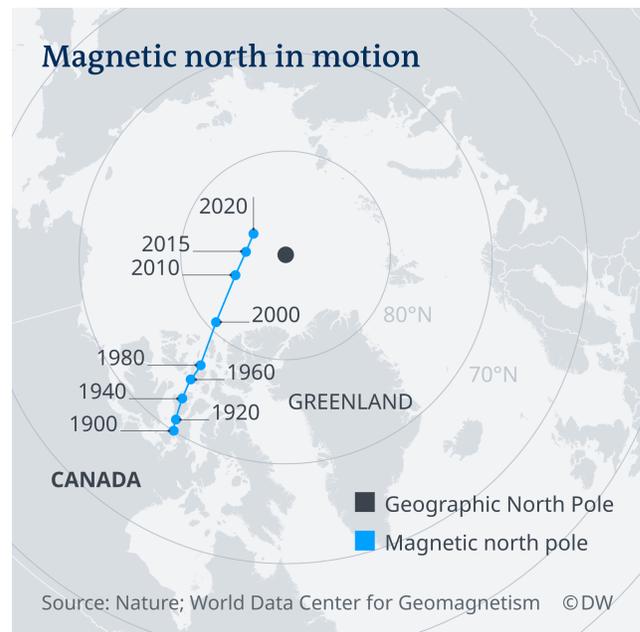
By 2018, scientists at US National Oceanic and Atmospheric Administration and the British Geological Survey realized they needed to release an updated WMM because it had become "so inaccurate that it was about to exceed the acceptable limit for navigational errors." The wandering pole is driven by unpredictable changes in liquid iron inside the Earth.

Due to the US government shutdown, scientists have been unable to release the updated WMM. Instead, they have pushed back the date to January 30, hoping that the government will be running by then. But it's unclear if that will be the case.

**'Your orientation':** While location can be tracked using GPS technology, WMM provides orientation for aircraft, naval vessels and even smartphones. "Your orientation, the direction you are facing, comes from the magnetic field," said James Friederich, a scientist at the US National Geo-Spatial Intelligence Agency, in 2014 ahead of the last WMM update.

"Our war fighters use magnetics to orient their maps. Your smartphone camera and various apps can use the magnetic field to help determine the direction you are facing. All of these examples need the WMM to provide your proper orientation."

But scientists are still in the dark concerning the acceleration of changes in the magnetic field. The shifts are fueled by changes in currents — like those of the ocean — of molten iron in the earth's core. But why they're accelerating now remains a mystery.



# VE3ERC Elmira Radio Club Inc.

*Minutes from Jan 23 , 2019*

## 1. Call to Order & Welcome

The meeting was open at 7:30 pm by our Club president Brian VA3DXK .

**2. Roll Call:** VE3DXQ Tom, VA3PDC Paul, VE3DCC Rich, VE3QB Bruce, VE3DWI Tony, VE3IXX Bob, VA3DXK Brian, VE3DWI Tony, VE3KCY Ken, VA3TET Al , VA3FJM Frank, VE3JXX John, VE3TRQ Ted

**3. Adopt Agenda :** Agenda was approved.

**4. Secretary's Report:** Tom VE3DXQ asked if there were any errors or omissions from the Nov 28th 2018 minutes. None were mentioned. Tom made a motion to have the November minutes accepted. This was seconded by Tony VE3DWI.

**5. Treasurer's Report:** Paul VA3PDC showed us the 2108 years end balance, and current balance on the flat screen TV. Brian VA3DXK and John VE3JXX have done an audit and accepted it. Paul VA3PDC asked for a motion to accept the audit. Al VA3TET made the motion to accept the audit this was seconded by Bob VE3IXX. Paul also asked for a motion to send in our tax return. Tom VE3DXQ made the motion and this was seconded by Al VA3TET.

**6. President's Report :** Brian VA3DXK asked if anyone had any thing special to report since our last meeting in November. He said he spent time over the Christmas Holidays with family down in Windsor. He said he tried his hand at painting as they had a couple of days of art for fun.

He reminded those present about Annual membership dues due in March. \$40.00 per RAC member and \$50.00 for non-RAC members. He said that 2/3 of the club members belong to RAC.

Brian said that next month he will have a spread sheet showing the Club membership roster, and the committee and managers and members of the committees. Al VA3TET mentioned that we could use an updated phone list of club members Bob VE3IXX made a motion that we create an up to date phone list and distribute to ERC members. Seconded by Paul...carried.

## 7. Committee Reports

Safety Officer: Tom VE3DXQ Tom mentioned he still has cones and vests in his garage.

**8. Unfinished Business:** Feed Mill Repeater Committee & Cabinets (Brian VA3DXK, Ted VE3TRQ Al VA3TET John VE3JXX Jim VE3JMU Paul VE3PVB). Brian opened the floor to discussion on this to see if we are keeping things as is or move the repeater at the feed mill to ground level in the new cabinets. Ted VE3TRQ said what we need to do is get the VHF repeater working up there so we can have better coverage. John VE3JXX expressed his concerns about interfering with repeaters south of the border. Al VA3TET said that since we changed our PL tone to 123 this has not been a problem. Al mentioned the repeater counsel WYNSORC <https://wnysorc.net/> and some of the issues with them in the past. Tony VE3DWI mentioned a lot of the problems were caused by special conditions such as inversions. John VE3JXX mentioned also that there are power considerations such as back up power. The fire hall now has a natural gas fired generator. Tony VE3DWI said we need to do a fact finding mission at the feed mill before proceeding. Things such as where to put cabinets so they are not in the way of traffic, away from dust and where power can be brought to them. Bruce VE3QB stated that the VHF repeater at the fire hall should be checked out to make sure it is 100%. Tony VE3DWI said it would take about a week to take a look at it at his place. Bruce VE3QB said that we should put the feed mill on the back burner until spring. There was also some discussion of possibly of having the VHF repeater up in Alma.

Ham Tech Committee: Brian said we need to figure out where we are going with this this year and if it goes a head to strike up a committee. Rich VE3DCC said we will need a person to chair the committee, someone to look after the finances, people who can do the booklet, post-

ers, find prizes, contact area clubs and previous attendees, line up A/V and confirm speakers. Visits to area clubs need to occur in April and May. As previously indicated, both Al and I are unable to play an active part this year. Frank VA3FJM volunteered to look after the A/V. Bob VE3IXX volunteered to do the posters. Brian VA3DXK said we do have a pool of possible speakers. It was decided that we will put an ad in the newsletter to get volunteers for the remaining positions. Brian VE3DXK advised that we will revisit this next month as the turn out at tonight's meeting was low.

**9. New Business:** Brian said that winter field day is this coming weekend Jan 26, 27, 2019. He asked if anyone present would be involved in it. Ken VE3KCY said he would be going.

Scouts- Brian VE3DXK said this has been on the Agenda for a couple of months now. Scouter Mathew leader of the Elmira 1<sup>st</sup> cub pack has been in touch with Brian VE3DXK, Rich VE3DCC and Paul VA3PDC trying to get something going. He was interested something where by they could earn a badge having to do with radio or communications. Frank VA3FJM one thing they might want to do is learn the phonetic alphabet. Brian said he would talk to scouter Matt about our Ideas and get back to the club next month.

Elmira Maple Syrup Festival- The festival is on April 6,th 2019. Last year Judd VE3WXU and Joyce VA3WXU were involved in setting this up but are no longer available. Rich VE3DCC said the Maple syrup festival is glad to have us there and it increases our visibility in the community. Ted VE3TRQ said he can bring his flex radio which has HDMI out put. Rich VE3DCC said Brian can contact Doug Maclean . He is the one in charge of the Toy Festival. The charge for the table is minimal. Paul VA3PDC made a motion that we sanction the Maple Syrup Festival event . This was seconded by Al VA3TET. Carried.

Rich VE3DCC spoke briefly about contacting the ISS. International Space Station. Frank spoke about antenna he is designing that is inflatable. He called it a Christmas tree antenna.

**10. Presentation.** The presentation-(Elimira Fire station protocol & Amateur Radio) was postponed until next month due to small turn out and time was running late.

**11. Adjournment :** Bruce VE3QB made a motion to adjourn the meeting seconded by Tom VE3DXQ. Meeting closed at 8:50 pm.

## CORRESPONDENCE

Mike VE3MKX sent the following websites:

Hi All...

some amazing Radio pictures on the following link....

<https://www.pinterest.com/pin/293296994456167567/>

<https://www.youtube.com/watch?v=MpZqaVwaIYk>

<https://www.ve3lsr.ca/>

73 Mike

The picture for our front page is from the "Pinterest" website above.

See more from Mike on the next page.

Thanks again to Mike VE3MKX for sending the website for Jerry Clement, VE6AB from Calgary, Alberta.

<https://www.jerryclement.ca/HamRadio/HamRadio/i-MMqSxCv/A>



Jerry is an avid ham operator with a mobile set-up that is the envy of all "Rovers". But Jerry is also an amazing photographer. The website is "chock-full" of stunning pictures. And if you click on the bottom left of each picture, each one is annotated with a story of the photo.



Thanks to Jerry for permission to use some of his pictures.  
Go ahead and check out the website.  
**You won't be disappointed!**



Thanks to Tony, VE3DWI for sending the following VSWR chart.

## VSWR, Return Loss and Transmission Loss vs. Transmitted Power

VSWR	Return Loss (dB)	Trans. Loss (dB)	Volt. Refl. Coeff	Power Trans (%)	Power Refl (%)	VSWR	Return Loss (dB)	Trans. Loss (dB)	Volt. Refl. Coeff	Power Trans (%)	Power Refl (%)
1.00	—	.000	.00	100.0	.0	1.64	12.3	.263	.24	94.1	5.9
1.01	46.1	.000	.00	100.0	.0	1.66	12.1	.276	.25	93.8	6.2
1.02	40.1	.000	.01	100.0	.0	1.68	11.9	.289	.25	93.6	6.4
1.03	36.6	.001	.01	100.0	.0	1.70	11.7	.302	.26	93.3	6.7
1.04	34.2	.002	.02	100.0	.0	1.72	11.5	.315	.26	93.0	7.0
1.05	32.3	.003	.02	99.9	.1	1.74	11.4	.329	.27	92.7	7.3
1.06	30.7	.004	.03	99.9	.1	1.76	11.2	.342	.28	92.4	7.6
1.07	29.4	.005	.03	99.9	.1	1.78	11.0	.356	.28	92.1	7.9
1.08	28.3	.006	.04	99.9	.1	1.80	10.9	.370	.29	91.8	8.2
1.09	27.3	.008	.04	99.8	.2	1.82	10.7	.384	.29	91.5	8.5
1.10	26.4	.010	.05	99.8	.2	1.84	10.6	.398	.30	91.3	8.7
1.11	25.7	.012	.05	99.7	.3	1.86	10.4	.412	.30	91.0	9.0
1.12	24.9	.014	.06	99.7	.3	1.88	10.3	.426	.31	90.7	9.3
1.13	24.3	.016	.06	99.6	.4	1.90	10.2	.440	.31	90.4	9.6
1.14	23.7	.019	.07	99.6	.4	1.92	10.0	.454	.32	90.1	9.9
1.15	23.1	.021	.07	99.5	.5	1.94	9.9	.468	.32	89.8	10.2
1.16	22.6	.024	.07	99.5	.5	1.96	9.8	.483	.32	89.5	10.5
1.17	22.1	.027	.08	99.4	.6	1.98	9.7	.497	.33	89.2	10.8
1.18	21.7	.030	.08	99.3	.7	2.00	9.5	.512	.33	88.9	11.1
1.19	21.2	.033	.09	99.2	.8	2.50	7.4	.881	.43	81.6	18.4
1.20	20.8	.036	.09	99.2	.8	3.00	6.0	1.249	.50	75.0	25.0
1.21	20.4	.039	.10	99.1	.9	3.50	5.1	1.603	.56	69.1	30.9
1.22	20.1	.043	.10	99.0	1.0	4.00	4.4	1.938	.60	64.0	36.0
1.23	19.7	.046	.10	98.9	1.1	4.50	3.9	2.255	.64	59.5	40.5
1.24	19.4	.050	.11	98.9	1.1	5.00	3.5	2.553	.67	55.6	44.4
1.25	19.1	.054	.11	98.8	1.2	5.50	3.2	2.834	.69	52.1	47.9
1.26	18.8	.058	.12	98.7	1.3	6.00	2.9	3.100	.71	49.0	51.0
1.27	18.5	.062	.12	98.6	1.4	6.50	2.7	3.351	.73	46.2	53.8
1.28	18.2	.066	.12	98.5	1.5	7.00	2.5	3.590	.75	43.7	56.2
1.29	17.9	.070	.13	98.4	1.6	7.50	2.3	3.817	.76	41.5	58.5
1.30	17.7	.075	.13	98.3	1.7	8.00	2.2	4.033	.78	39.5	60.5
1.32	17.2	.083	.14	98.1	1.9	8.50	2.1	4.240	.79	37.7	62.3
1.34	16.8	.093	.15	97.9	2.1	9.00	1.9	4.437	.80	36.0	64.0
1.36	16.3	.102	.15	97.7	2.3	9.50	1.8	4.626	.81	34.5	65.5
1.38	15.9	.112	.16	97.5	2.5	10.00	1.7	4.807	.82	33.1	66.9
1.40	15.8	.122	.17	97.2	2.8	11.00	1.6	5.149	.83	30.6	69.4
1.42	15.2	.133	.17	97.0	3.0	12.00	1.5	5.466	.85	28.4	71.6
1.44	14.9	.144	.18	96.7	3.3	13.00	1.3	5.762	.86	26.5	73.5
1.46	14.6	.155	.19	96.5	3.5	14.00	1.2	6.040	.87	24.9	75.1
1.48	14.3	.166	.19	96.3	3.7	15.00	1.2	6.301	.88	23.4	76.6
1.50	14.0	.177	.20	96.0	4.0	16.00	1.1	6.547	.88	22.1	77.9
1.52	13.7	.189	.21	95.7	4.3	17.00	1.0	6.780	.89	21.0	79.0
1.54	13.4	.201	.21	95.5	4.5	18.00	1.0	7.002	.89	19.9	80.1
1.56	13.2	.213	.22	95.2	4.8	19.00	.9	7.212	.90	19.0	81.0
1.58	13.0	.225	.22	94.9	5.1	20.00	.9	7.413	.90	18.1	81.9
1.60	12.7	.238	.23	94.7	5.3	25.00	.7	8.299	.92	14.8	85.2
1.62	12.5	.250	.24	94.4	5.6	30.00	.6	9.035	.94	12.5	87.5

**CONTRIBUTIONS TO VE3ERC-CLUB  
NEWSLETTER**

Do you have an article you'd like to submit? Or photos? Do you have any comments you'd like to make?

Perhaps you'd like to share a photo of your shack, a special project you are working on or a special

interest!

**SEND THEM TO:**

**Bob bobve3ixx@gmail.com**

**(519-787-2279)**



*"... don't know if you heard it OM, but I've just had the call for lunch..."*

**WEDNESDAY NITE NET CONTROLLERS**

**JANUARY 9 - BOB VE3IXX**

**JANUARY 16 - TED VE3TRQ**

**JANUARY 23 - MEETING**

**JANUARY 30 - AL VA3TET**

**FEBRUARY 6 - REG VE3RVH**

**FEBRUARY 13 - TOM VE3DXQ**

**FEBRUARY 20 - PAUL VE3PVB**

**FEBRUARY 27 - MEETING**

**MARCH 6 - BRIAN VA3DXX**

**MARCH 13 - BOB VE3IXX**

**MARCH 20 - TED VE3TRQ**

**MARCH 27 - MEETING**



# ARISS

Amateur Radio on the International Space Station

## Contact the ISS

Some ISS crew members make random, unscheduled, amateur radio voice contacts with earth-bound radio amateurs, often called "hams". They can make radio contacts during their breaks, pre-sleep time and before and after mealtime. Astronauts have contacted thousands of hams around the world. The work schedules of the ISS crew dictate when they are able to operate the radios. The crew's usual waking period is 0730 - 1930 UTC. The most common times to find a crew member making casual periods are about one hour after waking and before sleeping, when they have personal time. They're usually free most of the weekend, as well. (The current crew work schedule is published on the NASA website.)

The crew can operate the 2-meter packet radio in unattended mode, and hams can make contacts with the ISS station when the crew members are working. Hams can also communicate with each other using the ISS packet (computer) radio mode, or receive slow scan television mode images. It all depends on what equipment is in service in space.



Astronaut Reid Wiseman, KF5LKT makes personal contacts with hams during the US Field Day exercise in June 2014.



ISS024E013398

A typical ground station for contacting the ISS station includes a 2-meter FM transceiver and 25-100 watts of output power. A circularly polarized crossed-Yagi antenna capable of being pointed in both azimuth (North-South-East-West) and elevation (degrees above the horizon) is desirable. But successful contacts have even been made with vertical and ground plane antennas.

Visit the "Beginners" sections of the AM-SAT-NA or AMSAT-UK websites for information on getting started with all modes of amateur radio satellite operation.

## Frequencies in Use

The following frequencies are currently used for Amateur Radio ISS contacts (QSOs): Voice and SSTV Downlink: 145.80 (Worldwide)

Voice Uplink: 144.49 for ITU Regions 2 and 3 (The Americas, and the Pacific and Southern Asia)

Voice Uplink: 145.20 for ITU Region 1 (Europe, Russia and Africa)

VHF Packet Uplink and Downlink: 145.825 (Worldwide)

UHF Packet Uplink and Downlink: 437.550

UHF/VHF Repeater Uplink: 437.80

UHF/VHF Repeater Downlink: 145.80

For a description of ITU regions, consult the ITU map.

Most ARISS operations are split-frequency (each station uses separate receive and transmit frequencies). The downlink is the earth station's receiving frequency. The uplink is the earth station's transmitting frequency. Earth stations can listen to the downlink frequency and transmit on the uplink frequency when the ISS is in range and crew members are on the air. Please do not transmit on the ISS downlink frequency.

## Call Signs in Use

The following call signs are available for use on the ISS:

Russian: RS0ISS

USA: NA1SS

European: DP0ISS, OR4ISS, IR0ISS

Packet Station Mailbox: RS0ISS-11 and RS0ISS-1

Other call signs may come into use as the station and crew change.

## QSL Cards

QSL cards are offered to confirm radio contacts with the ISS. Here's how to obtain one.

## Orbit Prediction Software

Commercial and public domain software is available to help track when the ISS will be in range of your station, and where to point your antenna. Various online programs allow you to follow the path of satellites, including the ISS.

You'll find one such pass prediction tool on the AMSAT website. Use the drop-down menu to select the "ISS" as the satellite you want to track and enter your longitude and latitude information. Click on the link provided on that page to view the current location of the ISS. You'll find this and other tools for satellite tracking on the AMSAT website at

[www.amsat.org/amsat-new/tools/](http://www.amsat.org/amsat-new/tools/).

## Radios, Modes and Antennas on the ISS

The ISS amateur radios are Ericsson MP-X handheld radios, a Kenwood TM D700 and a Kenwood D710.

Two hand-held Ericsson (M-PA Series) transceivers are on board in the ISS Columbus module: a VHF radio that receives and transmits FM voice or packet radio signals in the 2-meter (144 to 146 MHz) Amateur Band, and a UHF radio that receives and transmits FM voice or packet radio signals in the 70 centimeter (435-438 MHz) Amateur Band. Both radios are Ericsson (M-PA) series commercial grade radios. These radios look identical in size and features, but are specially

tuned to support the different bands. Up to 5 Watts of output power is available on any one of 64 possible channels.

The Kenwood TM-D700 radio, located in the ISS FGB Service Module (Zarya), supports 2 meter (144-146 MHz) and 70 cm (435-438 MHz) operation. This radio provides a higher output power capability (restricted to a maximum of 25 Watts in ISS operation) supporting FM and packet operations. The higher power capability allows nearly horizon-to-horizon signal reception using simple hand-held radios or scanners. A set of 5 default options, or Programmable Memories, are embedded in the D700 to support ISS operations.

There are numerous channels programmed in the radios. Two of these channels on the 2 meter radio band support voice operations (145.80 down/144.49 up for ITU Regions 2 & 3 & 145.80 down/145.20 up for ITU Region 1). It is necessary to use two uplink frequencies to operate in accordance with region-to-region IARU band plan differences.

The crew switches between one frequency to the other; scanning is not used. For example, if a crew member begins a QSO over the US, they can track US stations until they hit the Atlantic and then they will quickly lose US stations. They can then switch over to the other frequency and pick up stations in Europe or Africa.

### Packet Operations

There are two radios on the ISS that operate as packet digipeaters--at any time, you might hear one, both, or neither. The Kenwood D700 is 10W and uses the SSID RS0ISS-4 (or -3). The Ericsson HT is about 5W and uses RS0ISS. Both respond to the alias "ARISS". With the Ericsson, you'll have better luck using more power and, if you have it, FM Narrow mode.

For information about using the ISS packet system, check out the resource provided by JoAnne Maenpaa, K9JKM.

### SSTV Operations

Slow Scan Television (SSTV) images can be transmitted from the International Space Station. An SSTV system is an integral part of one of the ARISS ham radio stations, NA1ISS/ RS0ISS in the Service Module. It transmits and receives JPEG still images. This system utilizes the Kenwood D700 and D710 radios and the ARISS antennas mounted on the Service Module. The SSTV equipment also includes SpaceCam and MMSSTV software, a radio/computer interface module and data cables. A Kenwood VC-H1 is also used to provide near real-time automatically transmitted images (usually earth views) once every 3 minutes, when active.

A Kenwood D710 radio located in the Service Module was deployed by the Russian Space Agency, Energia to provide extended support of imaging experiments using various SSTV formats. It employs SpaceCam and MMSSTV software to transmit stored images.

In preparation for future ISS SSTV events, a video demonstration of receiving SSTV from the ISS was created by avid ARISS supporter, John Brier, KG4AKV. In addition, John has provided an excellent online tutorial explaining in more detail how to configure a simple system to **acquire and view the SSTV images. Links to both can be found at <https://www.youtube.com/watch?v=7to9uX1sWC4> and <https://spacecomms.wordpress.com/iss-sstv-reception-hints/>.**

To view, or submit, SSTV received images transmitted from the ISS and to follow SSTV operations, check out the ISS SSTV blog site.

## HamTV System

The European Space Agency (ESA) worked with Kayser Italia to develop and manufacture a DATV transmitter on S-band. This transmitter, dubbed "Ham Video," is on board Columbus and generating blank transmissions. It is also used during scheduled contacts when the appropriate receiving station is available and crew time can be scheduled to set it up.

The Ham Video DATV transmitter developed for installation in the Columbus module features the following characteristics:

Downlink frequency: 2395 MHz

DVB-S standard (QPSK modulation)

Symbol rates: 1.3 Ms/s and 2.0 Ms/s

FEC : 1/2

SIF: 352x240 or D1:720x480

RF radiated power : approximately 10 W EIRP

Ham Video operates with a Canon XF-305 camera, provided by NASA.

Ham Video is downlink only. No DATV receiver is presently considered. Updates on the installation and testing of the HamTV are published on our News page.

A HamTV website hosted by AMSAT-ON provides technical information for ground stations:

<http://www.amsat-on.be/hamtv-summary/>

## Antennas

A set of four antenna systems are deployed in the ISS Service Module supporting the current installation of the Kenwood D700 and D710 radios. Each of the four antennas can support amateur radio operations on multiple frequencies and allow for simultaneous automatic and crew-tended operations. Having four antennas also ensures that ham radio operations can continue aboard the station should one or more of the antennas fail. Three of the four antennas are identical and each can support both transmit and receive operations on 2 meter, 70 cm, L band and S band. They also support reception for the station's Russian Glisser TV system, which is used during spacewalks. The fourth antenna has a 2.5-meter (8 foot) long vertical whip that can be used to support High Frequency (HF) operations, particularly on 10 meters. Currently, one of the 3 VHF/UHF antennas is disconnected and the HF antenna has no radio hardware available for use.

Two antennas are installed in the Columbus module, currently serving the Ericsson radios deployed there. Frequencies available for transmission to and from Columbus are 2 meters, 70 centimeters, L-band and S-band. These antennas will also support the Ham TV DATV transmitter.

## About



Amateur Radio on the International Space Station is a program that lets students experience the excitement of Amateur Radio by talking directly with crew members of the International Space Station.

[Learn More](#)

# Make ham radio a habit

By Dan Romanchik, KB6NU

Every week, I get an email newsletter from Penguin Random House called *Signature*. *Signature* includes links to articles about books and writing. Being a writer, I clicked on the link to "5 Good Writing Habits You Need to Learn Now." As I was reading the article, it occurred to me that the advice could also apply to amateur radio.

So, with apologies to the author, Lorraine Berry, here are five things you can do to make ham radio a habit:

- 1. To get on the air more, or to do more building, set up a time to do it.** If you enjoy getting on the air or homebrewing, but never seem to be able to find the time to do it, you need to put it on your schedule. Set aside the time a couple of days, or a week, or even a month in advance, and you'll be more likely to do it. If you set up a regular time every week, pretty soon it will be a habit.
- 2. If ham radio is important to you, create an environment that encourages you to do ham radio.** To make ham radio a habit, you really need a place that's set up to do ham radio. If you have to dig out and set up your equipment every time that you want to get on the air, you're just not going to do it. You need a "shack" that makes it easier for you to engage in the hobby. Richards, K8JHR, gave me some great advice back in 2012 on where and how to set up a shack (<https://www.kb6nu.com/building-a-new-shack/>).
- 3. Create temptations that reward you for your new habit of ham radio.** For me, being able to make interesting contacts, or building some new gizmo, is reward enough, but you may want to reward yourself with a beer or some ice cream after an operating session.
- 4. Make it easy to do what you like to do.** This is related to #2. Your shack should have everything you need to easily do whatever ham radio activities you enjoy doing. If you enjoy operating, then it should have a nice operating desk. If you enjoy building, then set it up so that all of your tools are readily accessible. The easier it is to do, the more likely it is that you'll do it. If you enjoy operating portable, then build up a kit that has all the stuff you need, and have it ready to go when you're ready to go.
- 5. Start with the Two-Minute Rule for new habits and continue from there.** The "two minute rule" (<https://www.lifehack.org/articles/productivity/how-stop-procrastinating-and-stick-good-habits-using-the-2-minute-rule.html>) is a tool to help you overcome procrastination. The idea is to allot just two minutes to a task that you'd like to complete or a skill that you'd like to develop. It's a small commitment, but enough to get you started, and the idea is that once you're started on a particular task or project, continuing work on that task or project becomes a lot easier. Those two minutes could easily become a half hour or an hour once you've gotten the ball rolling.

Armed with this advice, I'm expecting you to be a more active ham in 2019. I'll be listening for you on 40 m.

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Dan Romanchik, KB6NU, is the author of the KB6NU amateur radio blog (KB6NU.Com), the "No Nonsense" amateur radio license study guides (KB6NU.Com/study-guides/), and one of the hosts of the No Nonsense Amateur Radio Podcast (NoNonsenseAmateurRadio.Com). His wife sometimes thinks that amateur radio has become too much of a habit for him.