Telstar

THE NEWSLETTER OF S.T.A.R.S (SOUTH TOWNS AMATEUR RADIO SOCIETY) JUNE 2021 VOL 53 ISSUE: 10

STARS

STARS is the SouthTowns' largest ham radio club, with our clubhouse and tower located at the Town of Hamburg Recreation Center, Lakeview Rd.
To learn more about **STARS**, visit wb2elw.net.
During Covid restrictions, we have remained active with online meetings, collaborative contesting, our two nets, and local UHF chat.
So, warm up those radios and join us ON THE AIR and ONLINE!
Saturdays 10 AM HF net 3.925 MHz;
Mondays 8:30 PM UHF 446 MHz simplex chat for locals - bet you can hear us!
Tuesdays 7:30 PM VHF UHF net 147.090 (107.2) and 442.325 (88.5)
Zoom general meetings: first Thursday of the month at 7 PM.
Email Joe KB2JDB, club secretary, if you'd like to be invited!
Need help getting on the air? Let us know…
Thanks and 73! joe@joeclaus.com

The Telstar would like to thank all of those who wrote in with notes, suggestions, content submissions, etc.

All ideas are welcomed and encouraged! If there is something you would like included in next month's edition, please email: **TELSTAR@WB2ELW.COM or KD2UOE@GMAIL.COM**

We are always in search of new and exciting content and feedback from our audience is what keeps the ball rolling.—-WHAT DO YOU GUYS WANT TO SEE MORE OF?—-

Likewise, if something was published in error—please reach out via email so that corrections can be made, lawyers contacted and settlements reached.

Enjoy & please try to make it a point to pop in to the zoom meeting—new faces keep the hobby exciting and maybe you'll get a participation trophy for the best zoom background! Who knows!?

MONTHLY MEETING INFORMATION ON FOLLOWING PAGE:

ANNOUNCEMENTS:

STARS IS PROUD TO ANNOUNCE OUR FIRST IN-PERSON (HYBRID) MEETING.

HELP US MAKE IT GREAT! - BY ATTENDING!

WHEN: JUNE 3RD 2021 @ 7PM

WHERE: NIKE BASE "CLUBHOUSE"

2982 Lakeview Rd, Hamburg, NY 14075

THERE WILL BE FOOD AND BEVERAGES AVAILABLE WHILE SUPPLIES LAST—PLEASE R.S.V.P. VIA THE GOOGLE FORM LINK (HERE) IF YOU HAVE NOT ALREADY DONE SO.

"ZOOMERS":

First session **THURSDAY June 3rd** at approximately 7:00pm (Business Meeting) followed by General Meeting after. (ALL ARE WELCOME!)

NO PRESENTATION SCHEDULED , However; Joe (KB2JDB) is sure to steal the show with his display of Chinese Ham Memorabilia, portable power, go-box set-ups, demonstrations, etc. (WEATHER PERMITTING)

ZOOM CREDENTIALS AND LINK:

(CLICK HERE TO JOIN MEETING)

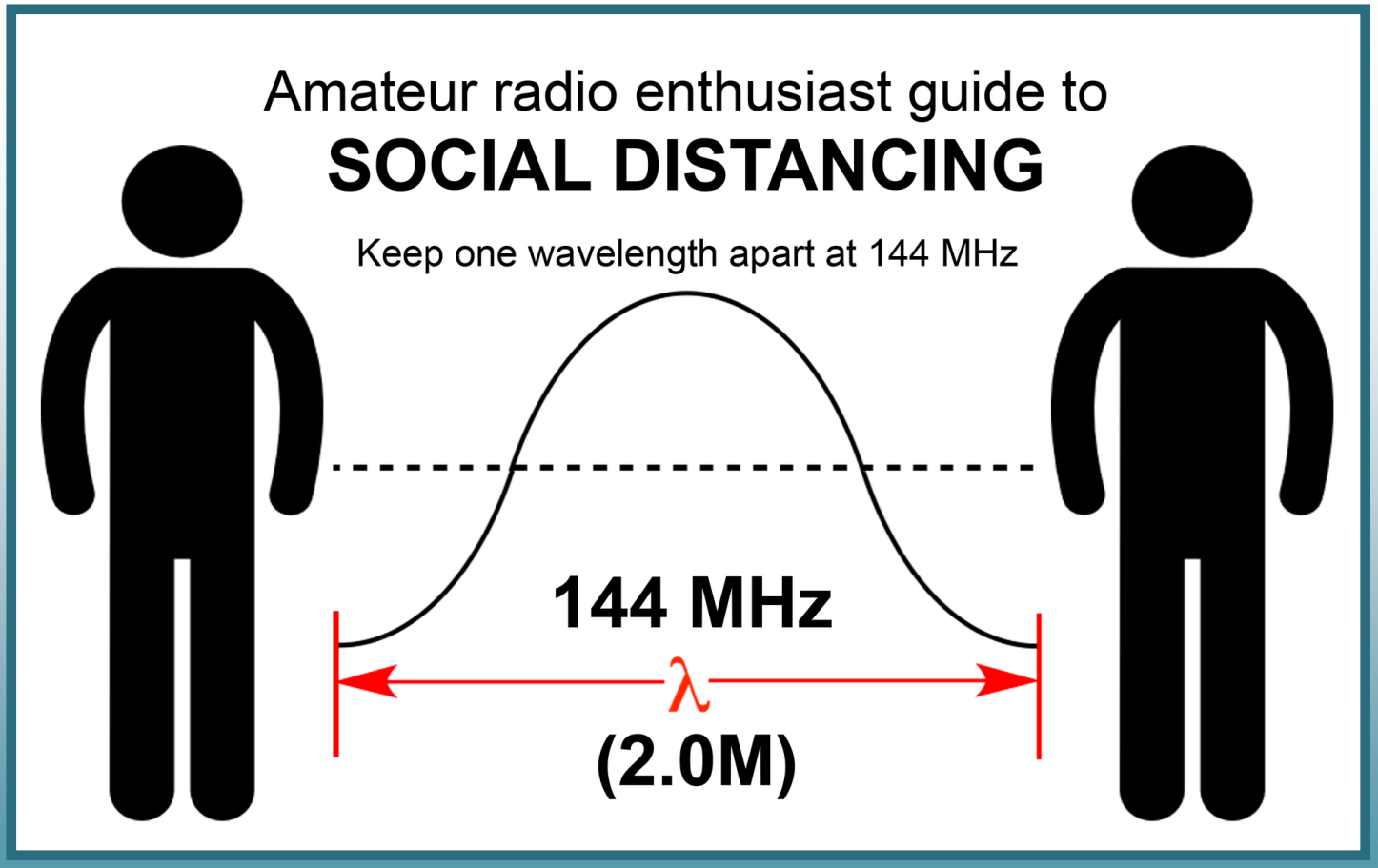
Meeting ID: 859 544 1881
Passcode: 888888

For phone audio dial-in, call: 1-408-638-0968 (SAME MEETING ID & Passcode)

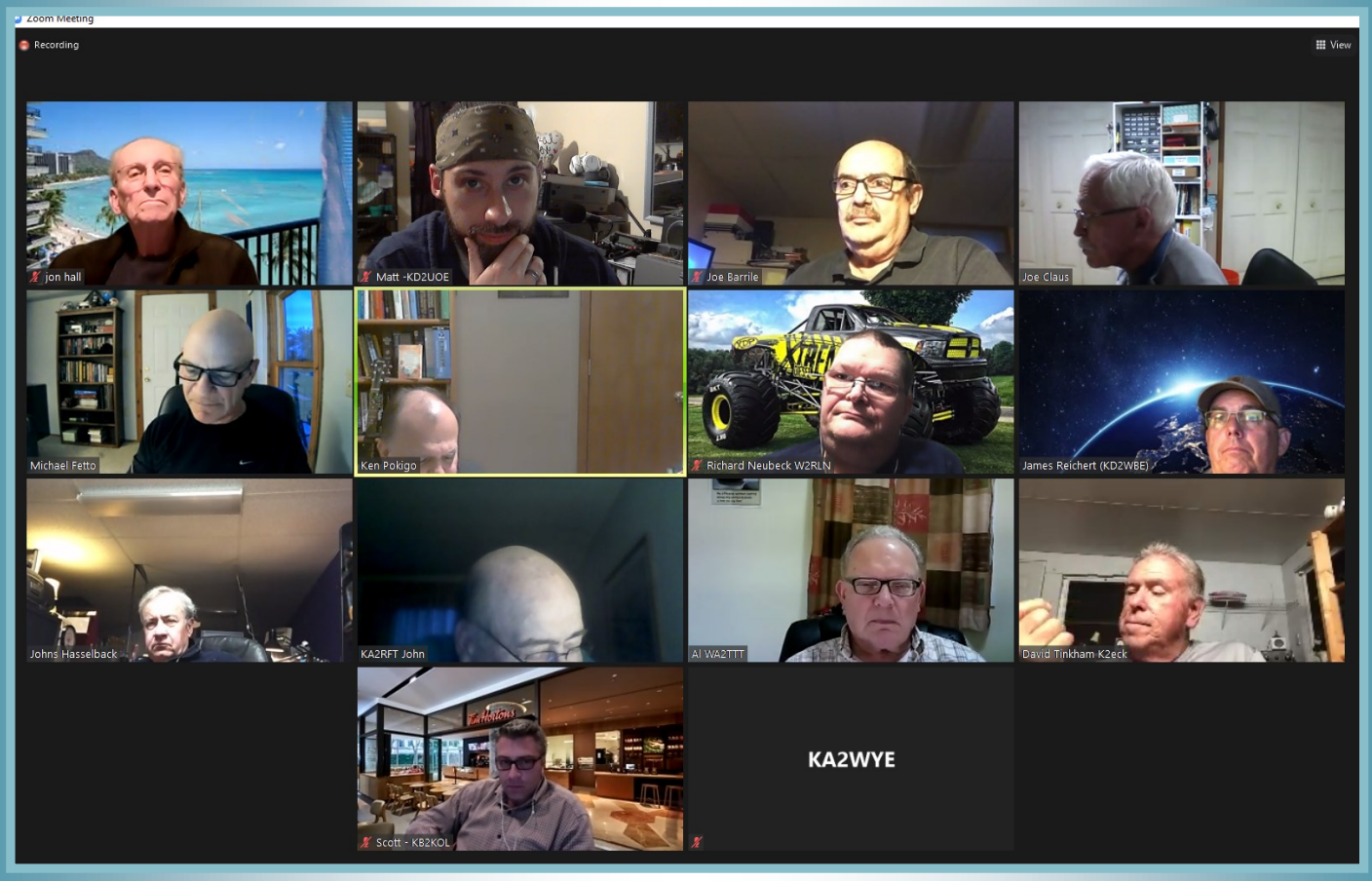
ANNOUNCEMENTS:

As a reminder, This Saturday's (June 5th) STARS HF (WB2EZU MEMORIAL) will be run by JOE (KB2JDB) as Bob (WA2YSJ) will be unable to do so. We welcome your check-in and look forward to hearing you. Net takes place every Saturday at 10am on 3.925 LSB

For Thursday's Meeting:



May's ZOOMERS pictured below discuss club topics such as Field Day, Tower work, the monthly $1000 giveaway and more—GREAT LOOKIN' GROUP OF GUYS.. We hope to start seeing some new faces with the upcoming hybrid style of meeting—JOIN US THE FIRST THURSDAY OF EACH MONTH!



-Scott (KB2KOL)

FIELD DAY IS APPROACHING—WHAT ARE YOUR PLANS AND ASPIRATIONS? GOT NEW GEAR? TRYING SOMETHING NEW? OPERATING FROM HOME? SEND US SOME OF YOUR FIELD DAY IDEAS, WE WOULD LOVE TO FEATURE THEM NEXT MONTH!

Field Day

By Gerry Maira KA2MGE

STARS will once again be participating in the ARRL Field Day event this year at the clubhouse. The STARS operation will run from 2 pm Saturday June 26 to 2 pm Sunday June 27.

This year with Covid 19 vaccinations now commonly available, we will for the most part be conducting the event as we did pre-Covid. Wearing masks will be optional but all members should bring one with them. If you have not been vaccinated, it is recommended that you wear a mask at all times.

More information will be announced soon and a website will be created for signing up for time slots.

Welcome to ARRL FIELD DAY

A Ham Radio "Open House"

ARRL Field Day is the most popular on-the-air radio event in the US and Canada. It's held on the fourth weekend of June every year, and more than 35,000 radio amateurs (known as "hams") gather to get on the air from parks, campgrounds, historic sites, and other places — mostly outdoors, which is why the event is called Field Day! ARRL Field Day is also an opportunity for radio amateurs to show the public all the things ham radio does. Hams like to think of it as an "open house" where non-hams can learn about amateur radio.

What is Field Day?

It's a Contest

Some hams compete against others to see who can contact more people on the air, or even competing with themselves to see if they can do better than they did last year. The temporary, outdoor, battery-and-generator-powered setups that are a hallmark of Field Day present an extra challenge for hams who may be used to getting on the air from their home stations.

It's Emergency Training

Some ham groups use ARRL Field Day to practice their emergency response capabilities. Ham radio has been called into action again and again to provide communications support in crises when it really matters. Hams also use these skills to help with events such as marathons, parades, fairs, and other planned, non-emergency activities.

It's Fun

ARRL Field Day brings radio amateurs together for a weekend of teamwork, friendly competition, skill building, and time spent with old and new friends — both in person and on the air. Many ham radio groups organize picnics, cookouts, campouts, games, and other activities to make their Field Day operations even more fun.

What is the ARRL?

ARRL is the national membership association for amateur radio in the US. We provide opportunities to discover radio, develop skills, and service your local community. Our mission is to advance the art, science and enjoyment of amateur radio.

What is Amateur Radio?

Often called "ham radio," the Amateur Radio Service has been around for more than a century. The worldwide community of licensed "ham" operators use the airwaves with every conceivable means of communications technology, from Morse code, to microphones, to bouncing signals off the moon. Ham radio operators can be any age, come from any background and all enjoy learning and being able to transmit voice, data, and pictures through the air to places near and far, without depending on commercial systems.

The amateur radio frequencies are the last remaining place in the usable radio spectrum where individuals can experiment with wireless communications.

For More Information visit
www.arrl.org/FieldDay

ARRL the national association for amateur radio®

Thanks to Bob (KA2WYE) FOR THIS REMINDER.

STARS AND THE TELSTAR WOULD LIKE TO RECOGNIZE MEMORIAL DAY AND THANK EVERYONE WHO HAS SERVED AND REMEMBER THOSE WHO MADE THE ULTIMATE SACRIFICE.

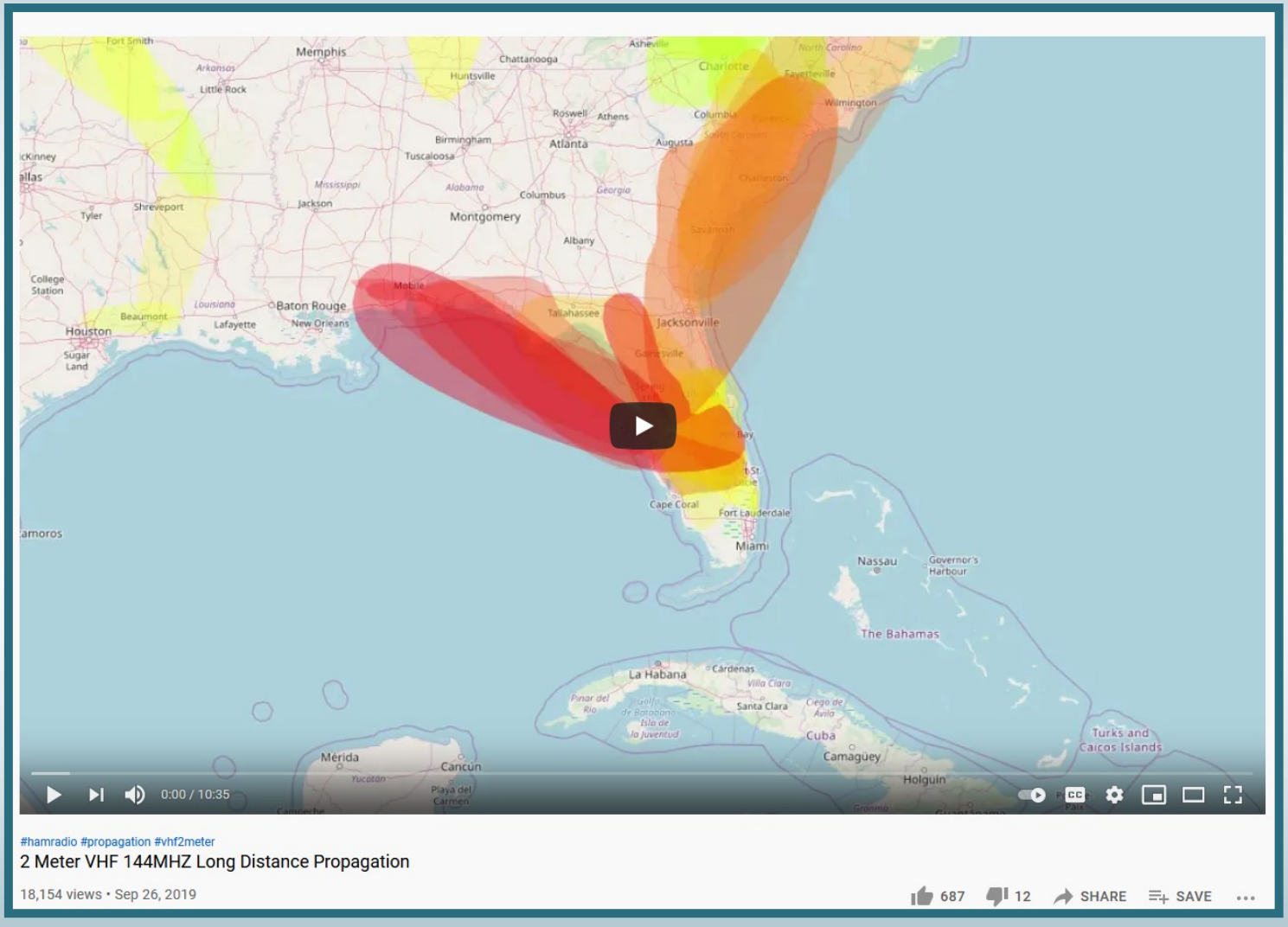
FEATURED HAM SITE OF THE MONTH:

THIS MONTHS FEATURED WEBSITES ARE:

http://aprs.mennolink.org/

https://aprs.fi.com/

https://www.aprsdirect.com/



WATCH A YOUTUBE VIDEO OF THE APRS.MENNOLINK SITE IN ACTION: (HERE)

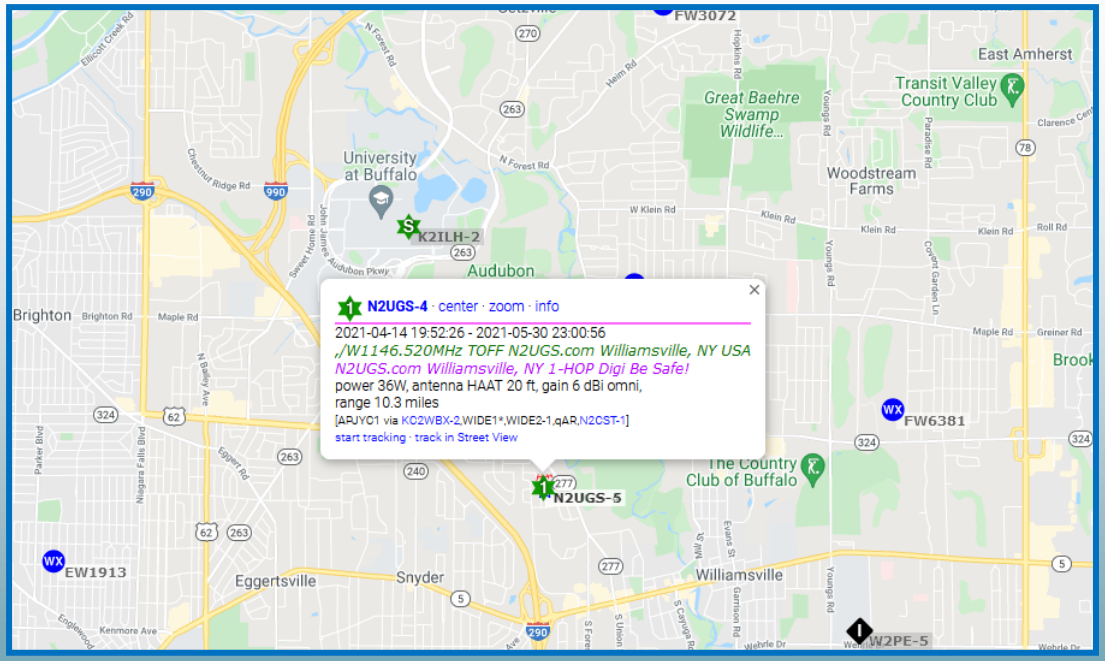
FEATURED HAM SITE OF THE MONTH:

https://www.aprsdirect.com

APRS Direct is a website that brings you global **real-time** APRS tracking and weather data (including CWOP). Our goal is to bring you a fast and easy-to-use map with the latest APRS activity. We can achive fast real-time updates since each user browser will be connected **directly** to our own APRS-IS server (with no intermediate database-server).

Visit APRS Direct on facebook, like/recommend us to stay up to date with new features.

What is APRS?
APRS (Automatic Packet Reporting System) is a digital communications system that uses packet radio to send real time tactical information (on amateur radio frequencies). The APRS network is used by ham radio operators all over the world. Information shared over the APRS network is for example coordinates, altitude, speed, heading, text messages, alerts, announcements, bulletins and weather data. APRS has been developed by Bob Bruninga, callsign WB4APR. More information about APRS can be found at www.aprs.org or at wikipedia.



Antenna secrets – the electron and radiation

Introduction

I have been intrigued for many years about how exactly an antenna radiates. How does it do this? For years I had assumed that the magnetic and electric fields of an antenna somehow combined to make an electromagnetic (EM) wave. But try as I might, I could not fathom out how, if the frequency was high enough, a piece of wire would suddenly acquire radiation resistance and start to radiate energy. My phasor diagrams just didn't work.

Reluctantly, I started to look at what happens microscopically – the behaviour of electrons – and here lies the answer. Without this particle we would not have antenna radiation and you may be surprised that, even at Droitwich, the tiny electron is all-important. This is the story of how the electron causes radiation.

Basics

First, the obvious question – what are radio waves? Like light and X-rays they are an example of electromagnetic radiation. They carry energy away from a source; the intensity (watts per square metre) falls off with the square of the distance ($1/D^2$). They are *transverse waves*, where the vibration is *across* the direction of motion and consist of an electric wave and a magnetic wave, vibrating at right angles to each other, but in phase. The field strength of each of these waves falls off with the inverse of distance ($1/D$) and they travel at the speed of light. And as we know, they can have wavelengths from millimetres to miles.

By contrast, the field from a magnetic pole falls with $1/D^2$, which is more rapid, so it is not so useful for communication. The electric field from a charged object, such as a metal plate on a wooden pole, behaves similarly. Communication with the island of Flatholm was established using these induction methods over a distance of about 3 miles, but radiated waves soon showed they could go much further, and four years later, in 1901, they crossed the Atlantic. But before I can talk about antenna radiation, we must notice that an antenna is an electric circuit – really just a slightly lossy transmission line, so we need to understand that first.

'J J' and the electric current

In 1897, working at Cambridge, J J Thompson discovered the electron, the smallest 'piece' of electricity. It is negatively charged and has almost negligible mass. A number of electrons buzz around the positive nucleus of every atom. In a metal, the outer electrons are free to wander off and the material is full of an electron gas, or plasma. It is very dense, not at all like the wispy clouds of electrons in a valve. In a penny, for instance, the total charge from all these free electrons is huge, maybe 10,000 coulombs (remember that 1 coulomb = 1 amp per second, or 1 farad at 1 volt). As a result, if we want to pass a few milliamps through the penny, the electrons need only move very slowly to provide the current, maybe a millimetre an hour. But we are told that electricity travels at the speed of light, so how is this?

If you turn on a gas tap, gas emerges at once. The gas molecules don't travel at high speed in the pipe – they just drift along – but a pulse (a downward step function) travels back towards the gas company. It is telling all the gas molecules upstream to start moving slowly towards the cooker. The pulse is actually a sound wave, ie a mechanical pressure wave, a *longitudinal wave*, travelling in the gas as its medium. After the initial pulse, the increased flow continues. When you switch off, a high pressure wave travels along the pipe, telling the molecules upstream that you have turned off.

With electricity, when you close a switch, a pulse travels at nearly the speed of light to the generator, telling it to work harder. Once the steady flow has started, the electrons supply the energy by just drifting along. They never have to go fast and do not travel at the speed of light. The pulse is a mechanical wave of compression in the electron gas, and it travels at nearly the speed of light. During the pulse, the electrons just give a little wiggle: they do not themselves have to travel at the speed of light; the wave does that job. I must also mention that the compression wave is mainly carried by electrons near the surface, due to skin effect.

Transmission lines: speed of the wave on a wire

You might have heard a shunting engine bump a goods train – a wave travels along the train, rattling the couplings. The speed of the wave is controlled by the elasticity of the buffers and the inertia, or mass, of the trucks. In our wire, the inertia of the electrons – their reluctance to move – is mainly because they have to build a magnetic field around themselves once they are moving.

When the electron is moving, because it is charged, it is equivalent to a current and it has a magnetic field. When we accelerate the electron we are putting energy into a magnetic field and we have to push harder to supply the energy. This inertia effect is another name for inductance; it makes it hard to start a current and hard to stop it. Mass and inductance both contribute to inertia, but at radio frequencies the inductance effect is by far the larger.

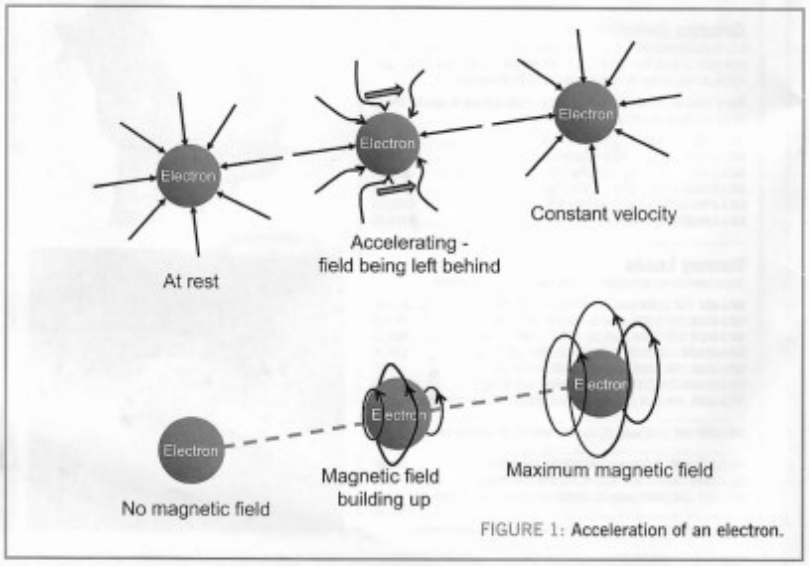


FIGURE 1: Acceleration of an electron.

 Telstar Thanks Larry (WA2TLY) for this submission.

The strength of the inertia (the magnetic field) is controlled by the *permeability* of free space. The strength of the elasticity (caused by electric repulsion when electrons pack together) is controlled by the *permittivity* of free space. The electron is not at all its own master – the mechanical forces controlling its motion are decided by the properties of free space.

In summary, we can say that electrons only make small movements, but enable a mechanical pulse to travel along a wire at nearly the speed of light. Like a sound wave, it is a longitudinal wave and as it travels it carries with it electric and magnetic fields.

If the wavelength is long and the wire is short, we do not, however, see much radiation. But if the wavelength is short and the wire is long, then we do. Now we can look at why this is.

The secret of radiation

Not only did 'J J' discover the electron, he also suggested how radiation works [1]. Each electron has lines of electric force sprouting out of it in all directions and extending out to 'infinity'. (Actually we don't notice any static electricity from the electrons in a penny because it is cancelled by the equal number of lines of opposite polarity coming from the nuclei). If an electron is moving at constant velocity, its field lines just move bodily along with it, as shown in **Figure 1**.

If we now suddenly accelerate the electron, the lines try to follow, but at a distance far from the electron they cannot immediately know what has happened, so they continue as before. The lines near the electron are now tracking its motion, but those further away are not. This causes a kink in the field line, as seen in Figure 1. The kink travels outwards at the speed of light and carries energy away as radiation. You may think that the opposite field from the nucleus would cancel the effect, but the nucleus is heavy and cannot accelerate quickly, so the kink is *not* cancelled out. The kink has a field component parallel with the motion and this is the *radiated electric field*. J J tells us that it is acceleration, not speed, that causes radiation.

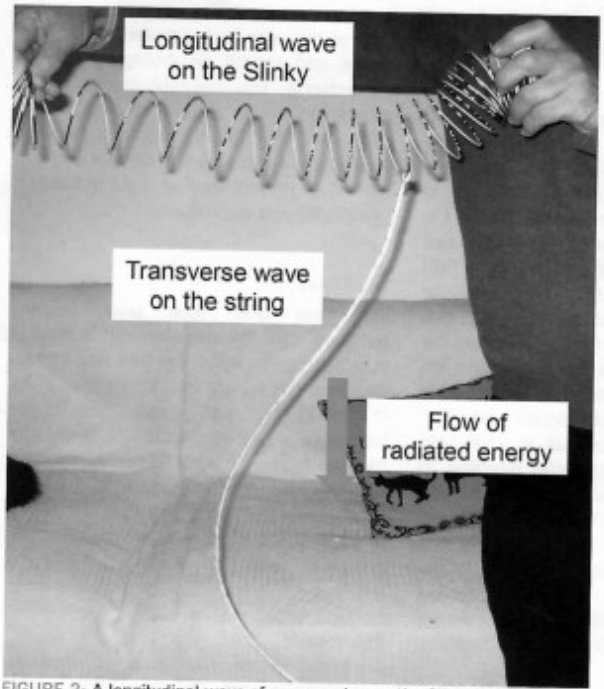


FIGURE 2: A longitudinal wave of compression on the Slinky creates a transverse wave on the string.

The two fields

An electromagnetic wave has two in-phase components, electric and magnetic. The one resulting from the kink is the electric radiation field. Acceleration does not in itself seem to cause the radiation of the magnetic field component, but Maxwell suggested that a varying electric field produces a magnetic one, and this is how the *magnetic radiation field* springs up as the wave passes an observer.

Energy relations

When we accelerate the electron and a kink develops, the field lines of the kink are pulling back against us. As we push the electron we are doing work against a resistance that is called the *radiation resistance*.

Part of our work goes into the radiated field, and travels away as the kink, to be lost for ever. After the acceleration is finished, the electron will be travelling faster, so it will have more energy, and this is a second part of the work we have expended. The moving electron has energy stored in a magnetic field, and in antennas we are familiar with this as the *magnetic induction field*.

If we arrest the motion of the electrons with a resistor at the end of the antenna, their energy is lost, but if we use, say, a metal plate, the energy will be transferred to the capacitance and will then be temporarily stored as an *electric induction field*.

Radiation from a wire

The mechanical impulse that we can send along a wire causes all the electrons in turn to give a little jiggle, and in this way we can cause all of them to radiate. Remember that there are a lot of them – the electron charge in a metal is enormous – so a slight movement is enough. Notice that a *longitudinal* mechanical wave running along the wire produces a *transverse* radiated wave – a radio wave.

An antenna is very much like a transmission line that is slightly lossy. Suppose, for instance, that the antenna has a characteristic impedance of 750 ohms. It might have only 75 ohms of radiation resistance, so if we terminate with a 750 ohm resistor we waste 90% of the power. If, however, we make the antenna series resonant, we see the 75 ohms at the sending end but we have a lot of stored reactive energy in standing waves. The energy radiated each cycle will only be 10% of that stored. This means that the structure has a high Q-factor, and has a bandwidth of only 10%.

Slinky

A good model to show radiation is the Slinky toy, seen in **Figure 2**. If we stretch it out, we can send a compression wave along it by moving our hand. Each point on the spring moves just a little, like our electrons, yet we see a travelling wave go rapidly down the Slinky.

We can visualise paper dots glued to the Slinky at intervals along its length to represent electrons and we can see that each of them executes a little sine wave motion as the wave passes. In a real case, each electron may move by less than its diameter (which is around 10^{-16}m).

David Sumner, CEng, MIET, G3PVH
davidjohnsumner@gmail.com

Telstar Thanks Larry (WA2TLY) for this submission.

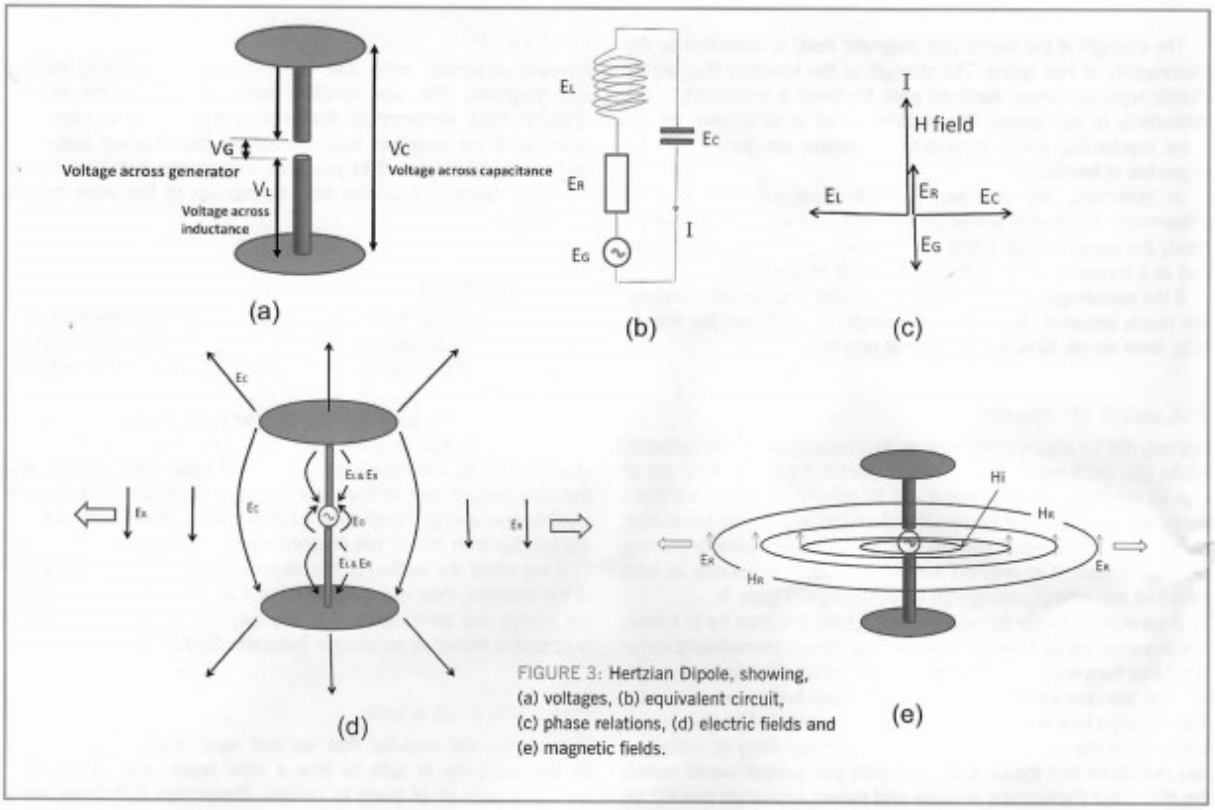


FIGURE 3: Hertzian Dipole, showing, (a) voltages, (b) equivalent circuit, (c) phase relations, (d) electric fields and (e) magnetic fields.

To simulate radiation, we can hang a string from one of the dots. As the longitudinal wave passes, a transverse wave is created on the string, like cracking a whip. The string represents the static field line from an electron in the wire, and the waves we see on the string are the kink we mentioned earlier. The wave on the string represents radiation; it is a *transverse wave*, different from the longitudinal wave on the Slinky; it takes energy away from the Slinky.

Hertzian dipole

We can summarise our knowledge by referring to **Figure 3a**, which shows the dipole used by Heinrich Hertz. It is driven at the centre and the ends are terminated with metal plates. At resonance, it is similar to the lumped equivalent circuit shown at **Figure 3b**. In that illustration,

E_R is the radiated electric field, the field developed across the radiation resistance.

E_L is the electric induction field across the antenna inductance – the electron inertia.

E_C is the electric induction field developed across the antenna capacitance – the springiness restraining the electrons.

H_R is the radiated magnetic field, caused by the moving radiated electric field.

H_L is the magnetic induction field caused by the velocity of the electrons.

H_C is the magnetic induction field caused by current flowing in the antenna capacitance.

I is the antenna current.

The electric fields are shown in **Figure 3c**. The generator has to push the electrons in the wire to accelerate them and they oppose this action. Firstly, the kink is pulling against the generator, creating the radiation resistance with its associated electric field. Another electric field arises across the inertial inductance of the electrons. I have called these two fields E_R and E_L. At the ends of the wire, the kinetic energy of the electrons is collected on the metal plates and stored as capacitive energy. This creates an electric induction field E_C. The generator has a local field E_G, which is in the opposite direction to its load – this is so the voltages round the circuit add up to zero. The electric radiation field (E_R) arises on the wire from the acceleration of the electrons, and continues outwards without spreading very much to start with, but then falls off as 1/D. This field creates the magnetic radiation field, Hr.

In **Figure 3d** we see the magnetic fields. Close to the antenna the magnetic induction field (H_L) is strong, caused by the velocity of the electrons after acceleration – in other words, the current. The magnetic induction field of the wire and radiation field are *in phase* and cannot be distinguished near the antenna. The magnetic induction field arising from the current flowing in the capacitance is opposing that from the wire. As we have a series circuit, there is only one current to consider flowing in the resistance, inductance and capacitance.

Summary

We have now seen how antenna radiation can be explained in terms of accelerating electrons. We find longitudinal compression waves in the electron 'gas' in conductors, and these then create transverse waves of radiation. A Slinky can be used to show the mechanisms involved. We can see that an antenna is like a slightly lossy transmission line and contains a large amount of energy stored in its induction fields.

Reference

[1] Bekefi, George, *Electromagnetic vibrations, waves and radiation*. MIT Press, ISBN 978-0-262-52047-8, page 255.

Telstar Thanks Larry (WA2TLY) for this submission.

HAMFESTS & HAPPENINGS:

HAMFEST/CONVENTION

06/05/2021 - CANCELED - Rochester Hamfest 2021

Location: Hilton, NY

Type: ARRL Hamfest

Sponsor: Rochester Amateur Radio Association

Website: https://rochesterham.org/hamfest.htm

Learn More

ROCHESTER AMATEUR RADIO ASSOCIATION, INC.

RARA

Since 1931

2021 Rochester HAMFEST

PO Box 93333, Rochester NY, 14692 Telephone Hotline: (585) 210-8910 Groups.io YouTube

Welcome to RARA
- RARA HOME
- Our Mission
- Club Meetings
- Public Service

Events
- Club Calendar
- Operating
- Rochester Hamfest
- Scouting

Learn
- Introduction to Ham Radio
- Licensing Courses
- License Testing
- Elmer's Corner
- RARA Academy
- Useful Links
- Morse Code (RXCWG)

Membership
- Why Join RARA

2021 Rochester Hamfest March Update

At the February 4 RARA Board of Directors meeting, at the recommendation of the Hamfest Committee, we made a decision to cancel our Rochester Hamfest that we were planning to hold on June 5, 2021 at the Hilton Exempts Fireman's Field.

All of us agreed that there was too much uncertainty surrounding the COVID situation as the date draws closer. We very much want to have the event, but the health safety of attendees and volunteers is our priority. In addition, we want to protect club resources from possible loss resulting from committing funds then having to cancel the event.

Moving forward, we will look for ways for RARA to participate in any events that do happen. We have indicated our interest in holding the 2022 Rochester Hamfest at the Hilton Exempts Fireman's Field.

2021 Rochester Hamfest Team

https://rochesterham.org/hamfest.htm

HAMFESTS & HAPPENINGS:

KNOW OF A HIDDEN GEM? HEARD OF A CANCELLATION THAT ISN'T LISTED? PLEASE KEEP THE CLUB INFORMED AT: TELSTAR@GMAIL.COM.

HAMFEST/CONVENTION

06/06/2021 - Long Island Hamfest and Electronics Fair

Location: Bethpage, NY
Type: ARRL Hamfest
Sponsor: Long Island Mobile Amateur Radio Club
Website: http://www.limarc.org
Learn More

HAMFEST/CONVENTION

06/12/2021 - Cortland Hamfest & Technology Fair

Location: Cortland, NY
Type: ARRL Hamfest
Sponsor: Skyline Amateur Radio Club of Cortland
Website: http://skylineradioclub.org
Learn More

HAMFEST/CONVENTION

07/10/2021 - RAGS Hamfest

Location: Camillus, NY
Type: ARRL Hamfest
Sponsor: Radio Amateurs of Greater Syracuse
Website: http://www.ragsclub.org
Learn More

HAMFEST/CONVENTION

07/17/2021 - Batavia Hamfest

Location: Alexander , NY
Type: ARRL Hamfest
Sponsor: Lancaster Amateur Radio Club
Website: http://w2so.org
Learn More

HAMFEST/CONVENTION

08/21/2021 - Keuka Lake Amateur Radio Association Hamfest

Location: Avoca, NY
Type: ARRL Hamfest
Sponsor: Keuka Lake Amateur Radio Association
Website: https://www.klara.us
Learn More

2020 NYQP Contest Results

By Gerry Maira KA2MGE (2020 NYQP Chairman)

Once again the club took part in the NYQP contest back on Oct. 17, 2020, using the special event call sign W2E. As with Field Day last year, this event was scaled down a lot due to limitations from the Covid pandemic. Operators were Bill KD2QLF, Scott KB2KOL and I, with some guidance from John KA2RFT who normally chairs the event. We operated as a Multi-One Low Power Phone entry, making 261 SSB QSO's with 72 multipliers for a score of 18,792. This effort earned the club another NYQP first place plaque! Thanks to all who participated or helped out in some way.

Being new to the hobby and seeing the many ways in which we all radiate always intrigues me. There must truly be an antenna in every shape and size to meet anyone's application… that said—I had the privilege of talking to Matt K2EAG regarding his big wheel "clover" antenna (which allows us to talk simplex from Eggertsville to Hamburg with ease) and thought I would share for those unfamiliar or wanting a fun project.

CLICK THE LINK TO REDIRECT TO THE ONLINE DOCUMENT.

-Matt KD2UOE

A New Spin on the Big Wheel

A popular 2 meter antenna returns in an improved, easier to reproduce form.

L. B. Cebik, W4RNL, and Bob Cerreto, WA1FXT

In his "Antenna Options" column in the Jan/Feb 2008 issue of *QEX*, L.B. Cebik discusses some different options for omnidirectional horizontally polarized antennas. Here he and Bob Cerreto provide the details on how to build and use two versions of an update to the Big Wheel antenna from the '60s.

Most attempts to develop a horizontally polarized omnidirectional (HPOD) 2 meter antenna have sought to minimize the antenna's size. Shapes such as circles (halos), squares and rectangles usually result in the need for either hypercritical dimensions or difficult matching conditions — or both. By turning to more conventional full size structures using three dipoles, we can reduce the number of critical parameters and ease the process of replicating the antennas in a home workshop. In fact, we shall describe two versions of the same basic antenna. One is a triangle of three dipoles that folds into a flat package, suitable for easy transport to a hilltop. The other is a circle of three dipoles that requires somewhat less space but needs greater precision in construction. Both antennas share a common feed system and display broadband characteristics that ease the builder's task.

The Basic Three Dipole Design

A 1961 *QST* article described a horizontally polarized 2 meter antenna called the big wheel.[1] The authors described it as three full wavelength (λ) loops with a parallel connection at the central hub and feed point. Unfortunately, their description proved to be off target. In fact, the antenna is a continuous loop with three high-impedance feed points, as shown by the current curves on the left in Figure 1. (All wire models of the same antenna show the same results, but are less clear to read when converted to graphics showing the current distribution.) The legs constituted transmission lines (with variable spacing in the original) that transformed the high impedance at the rim to a low impedance at the hub. By judicious sizing of the circle and the legs, the authors managed a very good omnidirectional antenna.

Unfortunately, many amateurs had difficulty replicating the design because the antenna's dimensions are critical at every point. Small changes in the leg (transmission line) spacing or even differences in the tubing curvature at the rim could throw off the impedance values at the hub.

The big wheel is difficult to model because numerical electromagnetic code (NEC) based antenna modeling tools implementation of transmission line models are not fully accurate when applied to a low current position along the antenna's geometry. The antenna proved equally difficult to build due to the sensitivity of the structure to small dimensional changes. Therefore, we decided to re-explore a territory that the big-wheel authors had set aside: the use of three dipoles to form the same HPOD patterns. The center and right outlines in Figure 1 show the triangular and circular forms that emerged. Note that the current magnitude curves place the feed points of the dipoles at high current, relatively low impedance positions, removing the big wheel's matching challenge.

Both forms are very broadband in virtually every operating parameter once the builder gets the dimensions correct. The triangle, with a wider separation between the dipole end tips, is less critical with respect to dimensions, but requires more space. The circular version, with tighter coupling between dipole tips, requires more careful construction, but results in a more compact structure. In fact, for the same performance, the circular three dipole antenna is smaller than the original big wheel.

The far-field performance of the three dipole HPODs and the big wheel are virtually identical. Therefore, the data in Figure 2 applies equally to all three designs. At a height of 20 feet above average ground, the three elements in all of the designs provide

[1]Notes appear on page 7.

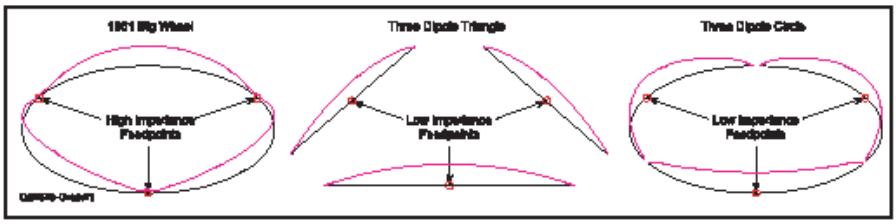


Figure 1 — Relative current magnitudes on three different three element HPOD antennas.

WEB LINK TO PDF (CLICK HERE) - TO CONTINUE READING...

ANTENNA SQUAD

Do you have plans for the nice weather?.... Looking to install or modify your antenna setup?... Hoping to plant some seeds and start your own antenna farm?... Get put on the list for ANTENNA SQUAD… the hope is to connect people that need some help with people that can offer it, so that we can all enjoy a better (and hopefully easier & safer) experience!

Write in to the Telstar at TELSTAR@WB2ELW.COM if you can offer help or want to get on the list. Those looking for help will be added to the Antenna Squad mailing list, where (hopefully) we can connect and offer each other the elbow-grease and brain-power to get some more metal in the air.

73

Matt KD2UOE

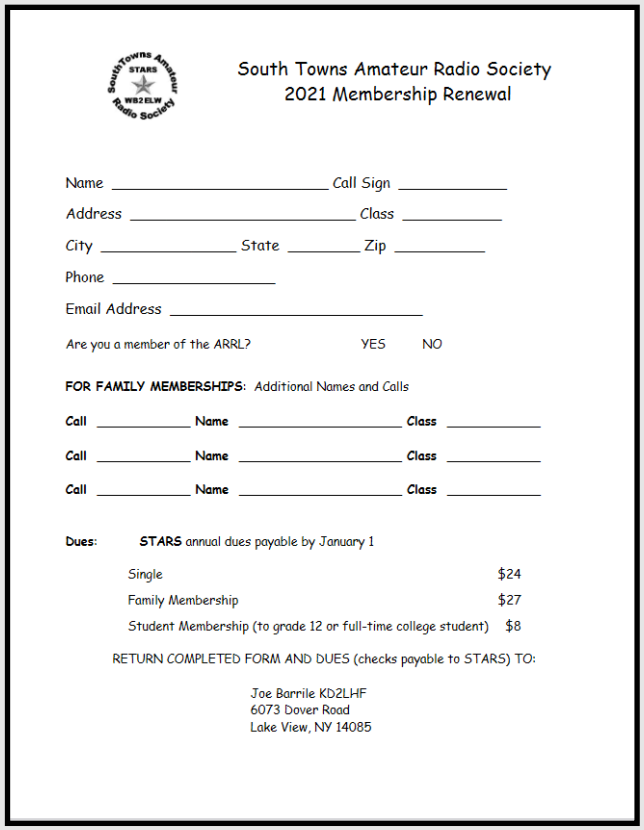
THIS PAGE WILL NOT CHANGE:

BELOW PLEASE FIND A COPY OF THE MEMBERSHIP RENEWAL FORM AS WELL AS THE NEW MEMBER APPLICATION FORM.

THE LINKS ABOVE EACH WILL TAKE YOU TO THE CORRESPONDING FILE ON THE WB2ELW WEBSITE AND ALLOW YOU TO PRINT THEM.

RENEWAL FORM (CLICK HERE)

APPLICATION FORM (CLICK HERE)



South Towns Amateur Radio Society
2021 Membership Renewal

Name _____ Call Sign _____

Address _____ Class _____

City _____ State _____ Zip _____

Phone _____

Email Address _____

Are you a member of the ARRL? YES NO

FOR FAMILY MEMBERSHIPS: Additional Names and Calls

Call _____ **Name** _____ **Class** _____

Call _____ **Name** _____ **Class** _____

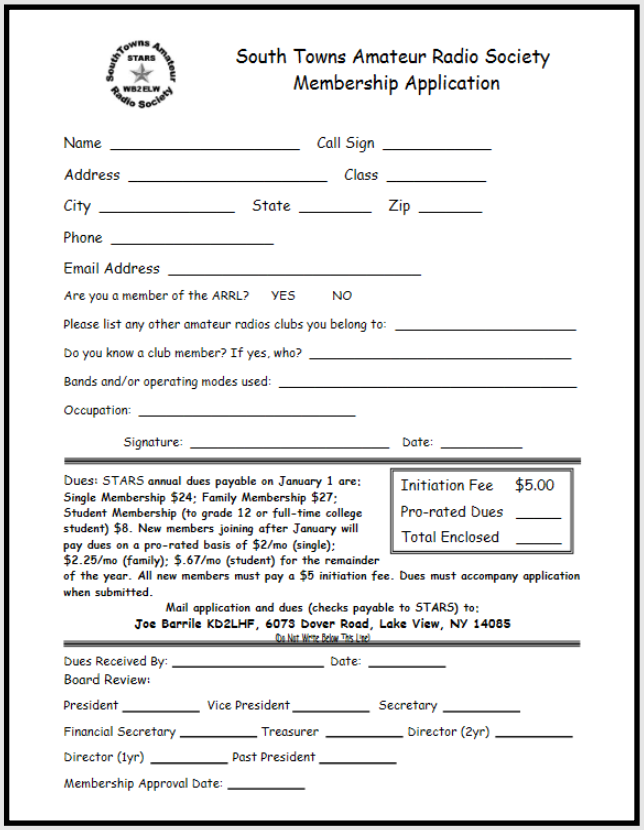
Call _____ **Name** _____ **Class** _____

Dues: **STARS** annual dues payable by January 1

Single	$24
Family Membership	$27
Student Membership (to grade 12 or full-time college student)	$8

RETURN COMPLETED FORM AND DUES (checks payable to STARS) TO:

Joe Barrile KD2LHF
6073 Dover Road
Lake View, NY 14085



South Towns Amateur Radio Society
Membership Application

Name _____ Call Sign _____

Address _____ Class _____

City _____ State _____ Zip _____

Phone _____

Email Address _____

Are you a member of the ARRL? YES NO

Please list any other amateur radios clubs you belong to: _____

Do you know a club member? If yes, who? _____

Bands and/or operating modes used: _____

Occupation: _____

Signature: _____ Date: _____

Dues: STARS annual dues payable on January 1 are: Single Membership $24; Family Membership $27; Student Membership (to grade 12 or full-time college student) $8. New members joining after January will pay dues on a pro-rated basis of $2/mo (single); $2.25/mo (family); $.67/mo (student) for the remainder of the year. All new members must pay a $5 initiation fee. Dues must accompany application when submitted.

Initiation Fee	$5.00
Pro-rated Dues	_____
Total Enclosed	_____

Mail application and dues (checks payable to STARS) to:
Joe Barrile KD2LHF, 6073 Dover Road, Lake View, NY 14085

(Do Not Write Below This Line)

Dues Received By: _____ Date: _____

Board Review:

President _____ Vice President _____ Secretary _____

Financial Secretary _____ Treasurer _____ Director (2yr) _____

Director (1yr) _____ Past President _____

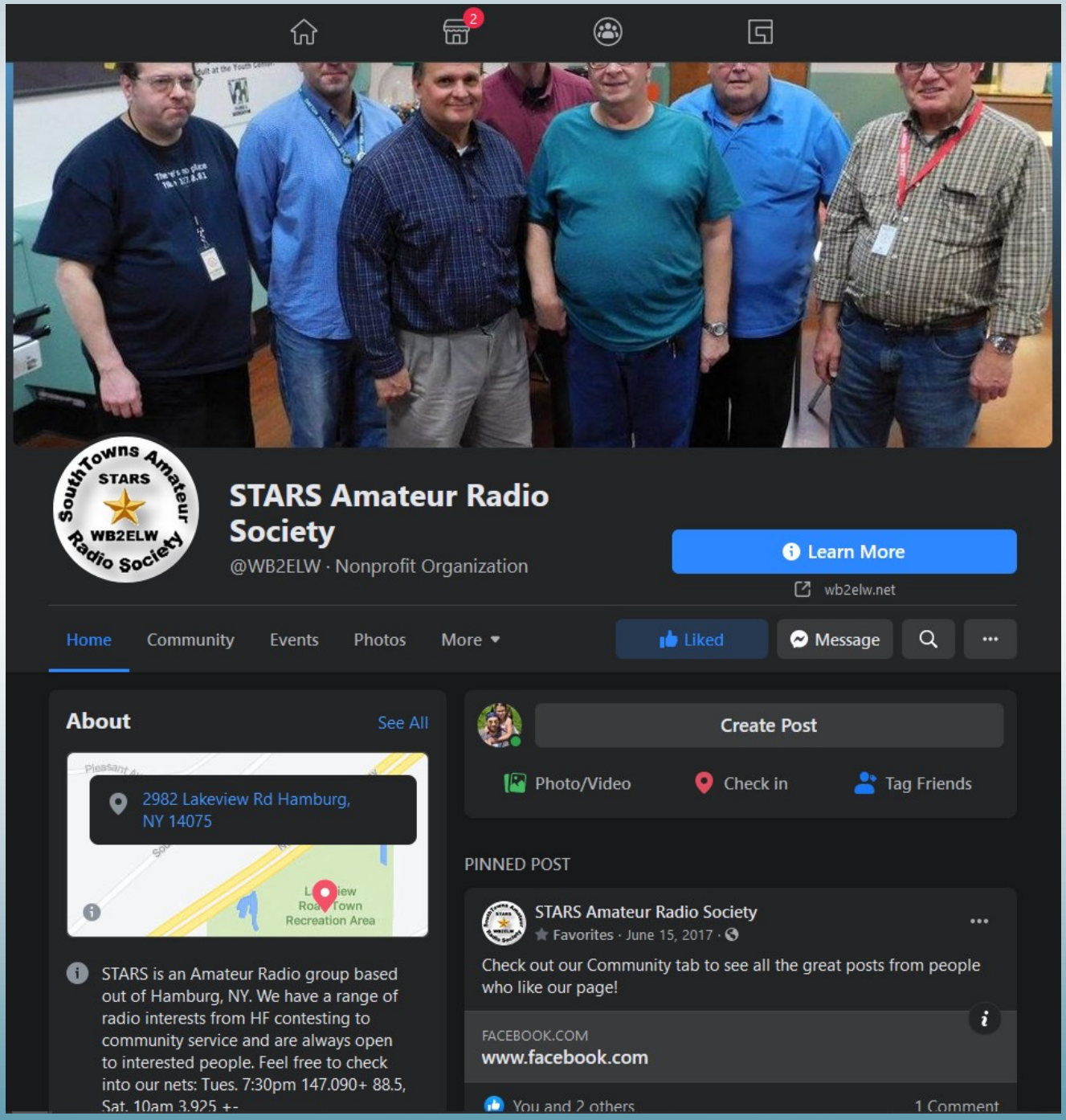
Membership Approval Date: _____

IF YOU ARE UNSURE IF YOUR MEMBERSHIP IS UP TO DATE, PLEASE CONFIRM WITH MEMBERSHIP CHAIR, JOE BARILLE (KD2LHF) , TO ENSURE YOU ARE KEPT UP TO DATE WITH THE LATEST TELSTAR PUBLICATION, CLUB EVENTS, PROMOTIONS, ETC.

Just a friendly reminder of the STARS Amateur Radio Society Facebook Page…

If you are on Facebook—stop by, like and share!

Here is a link: https://www.facebook.com/WB2ELW



BLUE & UNDERLINED:

WHEN YOU SEE SOMETHING IN TELSTAR IN BLUE LETTERS AND UNDERLINED, IT MEANS IT IS AN INTERNET LINK. CLICK ON IT TO OPEN THE ASSOCIATED LINK IN A BROWSER.

HERE,TRY THIS!…… (CLICK HERE)

THANK-YOU TO OUR BOARD OF DIRECTORS FOR ALL THAT YOU DO TO KEEP THE CLUB IN ORDER AND FUNCTIONING (BOTH LOCALLY AND FROM AFAR)….

THANKS RICK (W2RLN) FOR RUNNING THE TUESDAY NIGHT NET AND ALWAYS BEING PROMPT AND PRESENT,. AND THANKS TO BOB (WA2YSJ) FOR YOUR COMMITMENT WITH THE HF NET ON SATURDAY MORNINGS!

THANKS ESPECIALLY TO MIKE (KB2FX) AND KEN (KC2AYK) FOR HANDLING THE TECHNICAL SIDE OF THINGS, BEHIND THE SCENES…. IT'S A LOT OF WORK AND WE ALL APPRECIATE YOU! -STARS MEMBERS

CLUB OFFICERS 2021

President Ken Pokigo KC2AYK

V. President Al Mitzo WA2TTT

Treasurer John Leitten KA2RFT

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Bob Koster KA2WYE

Telstar Editor Matt Ovitt KD2UOE

VE Team Liason Bob Koster KA2WYE

Webmaster

Field Day Chair Gerry Maira KA2MGE

GIZMOS, GADGETS AND WHAT-HAVE-YOU!?

LOOKING FOR SOMETHING? GOT SOMETHING TO SELL OR TRADE?

THAT'S WHAT YOU'LL FIND HERE!

FEEL FREE TO SUBMIT YOUR I.S.O. (IN SEARCH OF) OR WANTED TO SELL AD TO THE TELSTAR AT:

TELSTAR@WB2ELW.COM

IN HOPES TO FIND OLDER LAPTOP (XP). MUST HAVE RJ45 JACK FOR NET CABLE AND SERIAL (DB9) PORT… PLEASE CONTACT JOE IF YOU HAVE SOMETHING - HE IS DESPERATE AND WILLING TO BARTER OR BUY IN A SELLERS MARKET.

-JOE KB2JDB

HAVE MANY HP DESKTOP P.C. TOWERS, OPERATIONAL, CLEAN W/ FRESH INSTALL OF WINDOWS 7 OR 10. MAKE FOR GREAT SHACK COMPUTERS, SOME COULD USE RAM OR EXTRA HARD DRIVE. MANY ARE i5 OR i7.

ASKING $30.00/EACH—OR TRADE FOR HAM GEAR.

-MATT KD2UOE

GIZMOS, GADGETS AND WHAT-HAVE-YOU!?

Gear from James Blosser KC2QG (SK)

Radio Shack TRC-495 Base Station Transceiver 40C

Radio Shack 10M Transceiver HTX-10

Ham-Key

MFJ Econo Keyer II MFJ-401C

Qty 2 Audio & Video Selector VSW81

MFJ-260C 300W Dry Dummy Load

Radio Shack Stereo Speaker Selector

Pyramid 13.8V Power supply 6A 8A Surge

Mirage BD-35 144/440 Amplifier -- 45W on VHF, 35W on UHF

ARRL Small Antennas for Small Spaces 2ED (Book)

Arrl Operation Manual for Amateurs 11th edition

The ARRL Handbook for radio communications Volumes 1-6 (2021)

MFJ Deluxe Versa Tuner II

Uniden Speaker BC7

Tenway UV5R PRO

Radio Shack 100 Channel Programmable Scanner 800MHz Hyperscan

Radio Shack Pro 2066 150 channel Trunking Scanner

GT-3TP Dual Band Handheld (Baofeng 8W)

Ideaworks mini digital multiband receiver with alarm clock

CCRANE shortwave reel antenna

Cannon Battery Charger only for Cannon Battery

Comet Duplexer CF-706

World radio tv handbook (2020)

ARRL Repeater Directory 2020

Radio Shack DX-399 Portable SW Receiver

Gear listed here is to be offered to STARS members only for the time being

Interested parties are asked to contact Jon AA2CC (716)361-8757

- Jon AA2CC

GIZMOS, GADGETS AND WHAT-HAVE-YOU!?

(4) LINKSYS SPA941 VOIP PHONES W/ POWER ADAPTER
(READY TO USE WITH HAMSHACK HOTLINE) - $20/EA

-MATT KD2UOE

Cushcraft #10-4CD 4 element 10 Meter yagi on a 16' boom (new-still in the box) $175.00

Cushcraft #A503S 3 element 6 Meter yagi on a 6" boom (new -still in the box) $130.00

Alliance #HD-73 heavy duty antenna rotator w/control box and length of control cable (like new) $150.00

Midland #23-126 field strength indicator/standing wave bridge (vintage) $15.00

Heathkit #GD-1B grid dip meter w/coils (vintage) $15.00

Vibroplex keyer paddle (vintage) s/n 260796 $20.00

Heathkit #DX-35 (vintage) 50 watt xtal controlled cw/am transmitter $50.00

Drake #2-NT (vintage) 70 watt xtal controlled cw transmitter $50.00

Bird #25-T-MN 25 watt RF load (new) $20.00

Microwave Assoc. #44004 100 watt RF load (used) $50.00

Antenna mount kit (chimney) up to 1-1/2" mast $15.00

1 pr heavy duty galvanized mount brackets wall or pole to antenna mast $20.00

1 pr heavy duty galvanized mount brackets pole to antenna mast $30.00

1 pr heavy duty galvanized mount brackets telephone pole to antenna mast $50.00

Anyone interested in any of the above can contact me by e-mail or telephone (WA2YSJ@roadrunner.com or 716-947-4974 there is an answering machine)