

# THE Signal

Bimonthly Publication of the Society of Broadcast Engineers



The Association for  
Broadcast and  
Multimedia Professionals

[www.sbe.org](http://www.sbe.org)

Volume 34, Issue 2 • April 2021

## Recruit a New SBE Member During the Drive

Once again, the Society of Broadcast Engineers is conducting a membership drive. The annual drive is an effort to recruit new members to the society, and you can benefit from your effort as well.

Recruit a new member during the Member Drive, and you will be entered into the drawing for prizes donated from our Sustaining Members and the SBE. If you recruit a new Sustaining Member, you'll earn five entries into the prize drawing. And if you recruit three or more Regular or Associate Members or one Sustaining Member you will also receive an upgrade to SBE MemberPlus.

You already know the benefits of being part of the society, so share it with your colleagues. The annual SBE Membership

Drive began March 1, so recruit someone now through May 31 to be eligible to win a prize. The grand prize is airfare and hotel to attend the SBE National Meeting, planned to be held during the 2021 NAB Show in Las Vegas, Oct. 9-13.

As a further bonus, for every new member you sponsor you will receive \$5 off your 2022 dues (up to \$25). And don't forget that if you recruit three or more new members, your membership will be upgraded to SBE MemberPlus.

SBE Sustaining Members who have contributed prizes are noted on page 15. Start recruiting now, and make sure your recruits list your name on their SBE membership applications so you get the credit. Details at [sbe.org/drive](http://sbe.org/drive).



See the list of prize donors on page 15.

## Still Time to Renew Your SBE Membership

It is still not too late to renew your membership in the Society of Broadcast Engineers and retain your membership benefits. Those in the Member, Senior, Student, Associate and Fellow membership categories may renew online at [sbe.org](http://sbe.org). Click on "Renew Membership" in the upper right-hand corner of the website home page (or the hamburger drop-down menu on a mobile device). The online system is available 24/7, is secure, and accepts Visa, MasterCard and American Express. The system automatically generates a receipt, sent to your email address. You will need your member number and website password to access the renewal system, but if you don't have them handy, there is an automated retrieval system available to you on the renewal page.

When renewing, consider joining more than 1,000 fellow SBE members who have

chosen the SBE MemberPlus option over the past year. For \$175, the SBE MemberPlus option provides all of the benefits of traditional membership, plus access to all archived SBE webinars and all new SBE webinars produced through March 31, 2022. That's more than 100 webinars covering a broad range of broadcast/media technology, regulatory and safety topics.

You may also renew your membership by mail, completing and returning the renewal form and your payment to the SBE national office:

Society of Broadcast Engineers, 9102 N. Meridian Street, Suite 150, Indianapolis, IN 46260; or by fax at 317-846-9120.

### Traditional and MemberPlus Members

Membership renewal was due April 1. SBE By-laws provides for a three-month grace period (extends through June 30).

To those members who chose the SBE MemberPlus option in 2020: If you did not renew by April 1, be aware that your SBE MemberPlus option benefits ended on April 1, 2021, and your membership was automatically converted to traditional membership for the duration of the grace period. If you renew during the grace period (or after), you can restore your free access to all SBE webinars by taking the SBE MemberPlus option.



## IN THIS ISSUE

- 4 Letter from the President
- 5 C-Band Repack
- 6 Certification Recognitions
- 8 Chapter Websites
- 10 The Public File
- 12 Shipping Container Sites
- 14 Member Spotlight

# QComm stands for Quality Behind the Scenes.

**Covered or not? That is the question. That's a pretty big gamble with a multi-million dollar project.**



- **Field Coverage Verification (CV) delivers recorded, visible data within +/- 1dbu**
  - o Actual data vs predicted
  - o Immediate pre-liminary reports
  - o Final reports within days, not weeks
- **Confirms system's operating integrity and FCC compliance**
  - o Identify Burn Outs before catastrophe (interior & exterior)
  - o Early detection of Nitro Leaks
- **Provides tools to accurately and effectively troubleshoot**
  - o Unparalleled data collection software and reports
  - o Certified pilots and proprietary training
  - o Easy to digest reports and long-term maintenance programs available.



**816-267-8141**

Phil Larsen

**YOUUUUU'RE OUT!!!**

**Don't get shut out by FCC's accelerated closeout for PH 0-5**

- **Multiple auditing agencies; FCC, GAO**
- **Approvals already rescinded by FCC**
- **10% onsite audits possible thru 2023 – 100% paper audit thru 2033**
- **Potential criminal investigations/charges without proof of vendor payments**

**Be prepared with a comprehensive Closeout Package (COP) by QComm!**

- **Complete project documentation, not just invoices**
- **Reviewed by an AFCCE Technical Consultant**
- **Problem areas identified early**
- **100% reimbursable**

**816-617-6012**

Nick Solano

**REPACK.TV**



Ask about our

**REPACK**  
Reimbursement  
Guarantee

**C-Band**  
Division

**HAVE THEY MADE CONTACT? C-BAND is real.**

Did you know you can SELF-PERFORM and be REIMBURSED? Yes, engineering, design and installation are all reimbursable by the FCC. The FCC has three ways to REBAND:

- LUMP SUM
  - CARRIER Direct – you just cooperate
  - SELF-PERFORM – all or part and reimbursed 100%
- (Ask yourself ONE question, Which of these three has your best interest in mind?)

QComm has participated in each and every FORCED RELOCATION by the FCC!

- Understanding the stations legal choices
- Engineering and Design
- Installation
- PM and OPM
- FCC documentation & reimbursement processing

**770-363-5974**

Mark Fehlig, P.E., CPBE



**PRESIDENT**

**Wayne M. Pecena, CPBE, 8-VSB, ATSC3, AMD, DRB, CBNE**

Texas A&M University/KAMU | College Station, TX  
wpecena@sbe.org

**VICE PRESIDENT**

**Andrea Cummis, CBT, CTO**

WLVT-TV | Bethlehem, PA  
acummis@sbe.org

**SECRETARY**

**Kevin Trueblood, CBRE, CBNT**

WGCU Public Media | Estero, FL  
ktrueblood@sbe.org

**TREASURER**

**Ted Hand, CPBE, 8-VSB, AMD, ATSC3, DRB**

Cox Media Group | Charlotte, NC  
thand@sbe.org

**DIRECTORS**

**Steve Brown, CPBE, CBNT**

Woodward Radio Group | Appleton, WI  
sbrown@sbe.org

**Roswell Clark, CPBE, CBNT**

Cox Media Group | Clearwater, FL  
rclark@sbe.org

**Mark Fehlig, PE, CPBE, 8-VSB, ATSC3**

Consulting Engineer | Walnut Creek, CA  
mfehlig@sbe.org

**Kirk Harnack, CBRE, CBNE**

Telos Alliance | Nashville, TN  
kharnack@sbe.org

**Charles "Ched" Keiler, CPBE, 8-VSB, CBNE**

HC2 Broadcasting/E Three Services | Ft. Lauderdale, FL  
ckeiler@sbe.org

**Thomas McGinley, CPBE, AMD, CBNT**

McGinley Enterprises | Missoula, MT  
tmcginley@sbe.org

**Geary Morrill, CPBE, CBNE**

Alpha Media | Saginaw, MI  
gmorrill@sbe.org

**Jason Ornellas, CBRE, CRO**

Bonneville International | Sacramento, CA  
jornellas@sbe.org

**Chris Tarr, CSRE, AMD, DRB, CBNE**

Magnum Media | Mukwonago, WI  
ctarr@sbe.org

**Shane Toven, CPBE, CBNT**

Educational Media Foundation | Antelope, CA  
stoven@sbe.org

**Dan Whealy, CBTE**

Quincy Media | Waterloo, IA  
dwhealy@sbe.org

**Fred Willard, CPBE, 8-VSB, CBNT**

Univision | Washington, DC  
fwillard@sbe.org

**IMMEDIATE PAST PRESIDENT**

**James E. Leifer, CPBE**

American Tower | Boston, MA  
jleifer@sbe.org

**SBE NATIONAL STAFF**

**James Ragsdale | Executive Director**

jragdale@sbe.org

**Megan E. Clappe | Certification Director**

mclappe@sbe.org

**Cathy Orosz | Education Director**

corosz@sbe.org

**Chriss Scherer, CPBE, CBNT**

**Member Communications Director**

cscherer@sbe.org

**Debbie Hennessey**

**Sustaining Membership Manager**

dhennessey@sbe.org

**Scott Jones | Database Manager**

kjones@sbe.org

**RJ Russell, CPBE, ATSC3**

**Frequency Coordination Manager**

rjrussell@sbe.org

The Signal is published bimonthly by the Society of Broadcast Engineers, Inc.; 9102 North Meridian Street, Suite 150; Indianapolis, IN 46260.  
©2021 Society of Broadcast Engineers, Inc.  
Editorial content and design: Chriss Scherer, 317-762-9723, cscherer@sbe.org.  
Advertising: Debbie Hennessey, dhennessey@sbe.org.  
SBE is a registered trademark of the Society of Broadcast Engineers.

**SBE National Office**  
317-846-9000 [www.sbe.org](http://www.sbe.org)

# SBE Awards: Nominate Today!

Who will be the next SBE Engineer of the Year award recipient? It could be you, or it could be someone you nominate. This is the ninth year that the Chapter Engineer of the Year award recipients are nominated by SBE Chapters. The chapter honorees are then entered into consideration for the Robert W. Flanders SBE Engineer of the Year award. Each chapter can establish its own criteria for the chapter award.



Individuals can also be nominated directly for the national award. For the national award, nominations need to be submitted to the National Office by June 15.

There are other honors as well. The James C. Wulliman SBE Educator of the Year; the SBE Technology Award; Facility Innovation of the Year; Best Technical Article, Book or Program by an SBE Member; Best Article, Paper or Program by a Student Member; and the Freedom Award are among the accolades. There are also a series of statistical awards.

Of the 13 awards recognizing chapters that are presented each year, a local chapter or SBE member submit nominations for 10 of them. Many SBE members are highly qualified and deserving of recognition. Likewise, many chapters do an excellent job promoting the ideals and goals of the SBE. Please nominate these members and chapters so they can receive the recognition they deserve.

For more information about all the SBE National Awards, visit [sbe.org/awards](http://sbe.org/awards) or contact Megan Clappe at the national office or by email at [mclappe@sbe.org](mailto:mclappe@sbe.org). Recognition by your peers is the highest honor. Honor your colleagues today.



## Certification Question

Answer on page 6

What is a primary reason for installing a LAN?

- A. To perform backups
- B. To share resources
- C. To process records
- D. To access word processing programs

**NEW!**

## DVEO ANNOUNCES

- CLOUD AD INSERTION
- IPTV MIDDLEWARE
- EVENT STREAMING
- CLOUD PLAYOUT
- CLOUD TRANSCODING (LIVE)
- CLOUD ARCHIVING

[sales@dveo.com](mailto:sales@dveo.com) | +1 858 613-1818 | [www.zumstream.com](http://www.zumstream.com)



## LETTER FROM THE PRESIDENT

By Wayne Pecena, CPBE, 8-VSB, AMD, ATSC3, DRB, CBNE  
SBE President  
wpecena@sbe.org

### Is it Radio, TV or Just Bits?

Technology has always changed for the broadcast engineer, although the rate of change has accelerated in recent years especially as broadcast technology has embraced the world of information technology in the broadcast technical facility. The familiar world of function-specific, dedicated-hardware boxes in our rack room has appeared as generic off-the-shelf IT boxes (servers) that provide the same functionality via specialized software. The broadcast engineer, now a broadcast information technology engineer, has his or her plate full with new ways of doing traditional things and new technology to matter to do those things.

The broadcast station and the broadcast engineer is commonly categorized by the broadcast content with which they are associated. The Federal Communications Commission licenses stations as AM, FM or TV broadcast stations, and the supporting technical staff become radio engineers or TV engineers by default. In some cases, the broadcast engineer may support all three broadcast station licenses.

You may have read in recent trade publications of Sinclair Broadcast Group/ ONE Media launching an ATSC 3.0-delivered audio services to the Seattle market. The audio services consisted of the audio streams from the four FM stations owned by Sinclair in the market plus 15 channels of over-the-top music streams provided by Stingray Music to form the STIRR XT digital audio services. This announcement offers a glimpse of how the industry might be changing. Some might discount as a passing fad, whereas the announcement might cause some AM or FM broadcasters to sit up straight in their chairs.

There is not likely cause for an immediate panic by the radio broadcaster of more competition in their space as a radio broadcaster. Whereas the audio service information may be broadcast today, there are probably only a handful of devices and individuals with those devices

that can actually receive the content. The industry saw the ONE Media MarkONE ATSC 3.0-enabled smartphone introduced last year. As more devices such as the MarkONE are in the hands of the consumer, the radio broadcasters might need to sit-up and take notice.

In another recent industry announcement, Sony and Pearl TV conducted mobile ATSC 3.0 reception. The test focus included consumer-oriented content reception as well as information oriented towards the autonomous-powered vehicle of the future. To me, this suggest the future automobile will have ATSC 3.0 reception capability, and decoding just a content stream of audio as well, only

**“It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change.”**

*~ Charles Darwin*

software. The industry has already seen AM radio reception capability removed from the automobile by some manufacturers. The potential of millions of ATSC 3.0 decoders deployed in the future is not that far-fetched.

The now broadcast IT engineer may now wonder how this works. Any time I see ATSC 3.0 mentioned, the virtues of high-resolution 4K ultra high definition video along with immersive 11.4 channel audio is the primary message to consumers. (Yes, 11.4 channel audio.) What maybe is not so prominent is the wide variety of audio decoding options offered by the ATSC 3.0 standard, which offers eight audio codec options. And of course an information stream may contain video as the content and another information stream containing the audio associated with the previous information stream. The Sinclair system chose the xHE-AAC codec, which provides stereo audio in 24 kb/s. ATSC 3.0 is all about bit allocation between services with varying robustness. The potential for multiple channels of audio content, plus 4K video content and data delivered to specialized applications become practical.

In the past, our roles were clearly defined by our broadcast content, whether radio or TV. In the not-too-distant future we remain broadcast engineers, but we simply broadcast digital information or

“bits.” What the bits actually represent become somewhat irrelevant even as our traditional monitoring tools become inadequate. Our traditional and familiar tools such as the waveform monitor, the reference color monitor and audio monitoring take a backseat to an eye-pattern display to insure the information or bits broadcast can be recovered by the receiver, whatever that device might be.

#### The SBE and ATSC

Speaking of ATSC 3.0, the SBE ATSC3 Specialist Certification has launched, the first certification exams have been offered and the first ATSC3 Specialist Certifications have been conferred. Congratulations to all SBE colleagues who have added the ATSC3 certification. If ATSC3 certification is of interest, let me recommend the Pearl TV Host Station Manual. Now in its 10th version,

this manual offers the best single ATSC 3.0 reference available today, whether you seek the SBE ATSC3 certification or you just want to expand your knowledge on the subject. Visit [pearlTV.com/station-resources](http://pearlTV.com/station-resources) for the manual.

The annual SBE Membership Drive is underway. The SBE needs your help to recruit a new Member, Associate Member or Sustaining Member by May 31, 2021. For each approved new member application you sponsor you will earn \$5 off your 2022 membership dues, up to \$25 and be eligible for the prize drawings. If you recruit three or more Regular or Associate Members, or one Sustaining Member, you will also receive an upgrade to SBE MemberPlus for the remainder of the 2021 membership period. Everyone becomes eligible for the Grand Prize consisting of airfare, two-night hotel accommodations at the SBE National Meeting planned to be held during the 2021 NAB Show in Las Vegas.

I personally want to know your suggestions, comments and concerns. Your feedback is essential to our collaborative effort to ensure the SBE meets our members career needs. Please reach out to me at [wpecena@sbe.org](mailto:wpecena@sbe.org) or by phone at 979-845-5662 for a more personal exchange. Always, a sincere thank you to those I have heard from. In the meantime, stay safe, stay healthy and keep learning!

**New Job? Promotion? Recognition?**  
**Get the recognition you deserve in**  
**Members on the Move**  
Send your news to  
[cscherer@sbe.org](mailto:cscherer@sbe.org)



## EDUCATION UPDATE

By Mark Johnson, CSRE  
Owner, LinkUp Communications  
mark@linkupcommunications.com

# Timely Tips to Successfully Navigate the C-Band Repack

The assignment phase of the C-band auction is over, marking an end to what has been noted to be the highest-grossing spectrum auction in FCC history. In all, a grand total of \$80.92 billion in gross bids was raised.

Now the real work begins. All registered broadcasters in the top 46 markets must have the first of a two-step filter installation complete by Dec. 5, 2021. But, depending upon whether or not your network or station chose the FCC's lump sum option, the allocation of work looks vastly different.

Broadcasters who registered their antennas with the FCC and did not choose the lump sum need not lift a finger to transition their network; they can expect visiting contractors by Intelsat or SES to carry out their respective transition plans.

However, broadcasters in those same markets who chose the lump sum option will need to either hire professionals or develop a detailed transition plan of their own.

### It's All About the Details

Because the C-band repack is moving at warp speed, transition and installation details have often been glossed over at the FCC level, leading to confusion and assumptions within the broadcast community about what exactly is required.

So if you're tasked with successfully transitioning your network's C-band downlinks, we suggest your plan be as thorough and comprehensive as possible.

### Evaluate Your Antenna

Before you even think about installing a 5G filter, take the time to complete a thorough checkup. Will the antenna need to be repointed? Can it be repointed? Do you need to install a new antenna?

For a proper evaluation, find the maximum rejection of the cross pole and document Eb/no, C/N and spectrum analyzer plots for transponders above and below the frequencies to be blocked by the new filter.

### Authentic Filters Only

True 5G filters are uniquely designed to mitigate 5G's overwhelming signal. Because of this, there are less than a handful of vendors who are producing this filter according to SES and Intelsat's specifications – specifications required by the FCC. Be wary of filters that are marketed as 5G, but do not have the required isolation performance.

TV broadcasters in the top 46 markets will need a two-filter solution. The red filter will block 5G below 3820 MHz and allow transponders from 7 to 23 to operate between Dec. 5, 2021, and Dec. 5, 2023. After 2023, all downlinks will require the blue filter to allow transponders 16 to 23 to pass while blocking all frequencies below 4000 MHz.

Top 46 market radio broadcasters, the blue filter will do. Most

radio programs on SES-2, SES-11 and Galaxy16 are already above 4000. Because of this, you can feel confident installing the blue filter now.

### Keep Track of a Tight Timeline

Throughout the entire C-band repack process, the one thing the FCC has made perfectly clear is its intention to stay the course. Neither a worldwide pandemic nor a mandated federal office shutdown has delayed the FCC's schedule for completing Phase One of the C-band repack. The appropriate filters must be installed and operational by the end of the year. No exceptions.

After the Dec. 5, 2021, filter installation, only two deadlines remain:

- A) 4000 MHz and below must be cleared for terrestrial usage nationwide by Dec. 5, 2023
- B) Protection for Fixed Satellite Services will cease by Dec. 5, 2025

### Capture Detailed Documentation

At C-band sites directed by the FCC's Clearinghouse, specific and detailed documents are required to be completed by technicians when installing the filters. These documents include information regarding the performance and efficiency of the equipment being installed. Routine audits of these reports are expected.

We highly suggest broadcasters who are transitioning their C-band networks themselves collect detailed documentation, as well. Clear, concise documentation collected now may be the very thing that protects your programming from 5G later.

Just because your network, station or group chose the lump sum option does not mean you must handle the C-band transition plan alone. There are trained satellite specialists available that are very familiar with the ins and outs of the repack that can help.

To find a qualified satellite technology company, ask about their qualifications, their test equipment, determine if they are GVF certified or, at the least, passed the online testing mandated by SES.



Mark Johnson tests the performance of a 3.8m Comtech with filter at iHeart Tallahassee.

## Education Almanac

### Webinars by SBE

- April 22: Cloud Streaming
- April 29: 2021 IP Networking Part 4 – Network Architecture & Design for Real-Time Media
- May 20: 2021 IP Networking Part 5 – Cybersecurity – Principles and Concepts

[sbe.org/webinars](https://sbe.org/webinars)

### Leadership Development Course

June 8-10: Atlanta

[sbe.org/ldc](https://sbe.org/ldc)





# CERTIFICATION UPDATE

By Megan Clappe  
SBE Certification Director  
mclappe@sbe.org

## Certification Volunteer Service Recognition

The SBE is made up of a multitude of volunteers. There are six employees who work at the National Office, but the real momentum of the SBE is because of those who dedicate their personal time to further the goals and objectives of broadcast engineering through the SBE. This includes, but is not limited to the Board of Directors, all the various SBE committees in addition to the Certification Committee and the local chapters including the chapter certification chairs.

Every year at the annual membership meeting during the NAB Show, the SBE recognizes the local certification chairs who devote volunteer time to the Program of Certification. These local certification chairs receive a plaque on the recurring five-year anniversaries. While the 2021 NAB Show has been postponed until the fall, we want to recognize the local efforts of these local volunteers now.

This year we will also celebrate anniversaries for members of the National Certification Committee. All of them will be recognized at the NAB Show in October.

Thank you very much to all the volunteers who devote so many hours to the SBE and the certification program!

### Chapter Certification Chairs

Timothy Wright, CPBE: Chapter 26



Darrell McCalla, CBRE, CEA, CEV, CBNT, CBT



Cris Alexander, CPBE, AMD, DRB: Chapter 48  
Tony Mancari, CBT: Chapter 78  
Emir Hadziahmetovic, CSTE: Chapter 101  
Eric Margeson, CPBE: Chapter 124



Steve Rowell, CPBE: Chapter 42  
James Sams, CSTE: Chapter 80



Terry Reynolds, CPBE: Chapter 89  
Noel Richardson, CPBE: Chapter 116



Eddy Arnold, CSTE: Chapter 61



### National Certification Committee

Joe Snelson, CPBE, 8-VSB  
Larry Wilkins, CPBE, AMD, CBNT



Ralph Hogan, CPBE, DRB, CBNE  
Rick Ryan, CPBE



Doug Garlinger, CPBE, 8-VSB, ATSC3, CBNE



### Answer from page 3

The answer is B

The fundamental reason for a LAN (local area network) is to share resources, such as storage, printers, and other network resources (e.g. internet access). The other options can be excluded as choices because they can be completed without requiring a network. Backups can be performed via a USB port. Records, in their simplest form, as elements of a database, can be contained within a single computer. Programs are generally located on a local drive and operate on the computer.

## Nominations Committee Seeks Board Candidates

By Roz Clark, CPBE, CBNT

The SBE Nominations Committee is beginning its work to assemble a slate of candidates for the upcoming SBE election. I have been appointed to chair the Nominations Committee.

The SBE Nominations Committee seeks qualified candidates who are voting members (Member, Senior, Fellow or the designated representative of a SBE Sustaining Member) in good standing (dues paid). Candidates must hold an engineering level of SBE certification (CBT or higher, or CBNE) and maintain it the entire duration of service on the Board, if elected. Candidates should have a desire to serve and lead, not only as a member of the board, but through service as a national committee chair or member. Members of the Board are "at large," meaning they represent all members, not any one specific region, state, city or chapter.

Members of the Board are expected to attend two meetings each year; in the spring, held during the annual NAB Show, and in the fall, at the annual SBE National Meeting. Other meetings may be called via conference call during the year.

The national SBE board includes 12 directors, four officers

and the immediate past president. Directors serve two-year terms, and officers serve one-year terms. Six director seats will be contested in 2021 as will all four officer positions. The SBE By-laws limits the number of terms of elected members of the Board. Directors may serve three consecutive terms, the secretary and treasurer may serve up to four consecutive terms, and the president and vice president may serve up to two consecutive terms. The maximum time anyone may serve on the board is ten consecutive years.

Members interested in offering their candidacy and serving on the national Board if elected are encouraged to contact the SBE Nominations Committee Chair Roz Clark, at roz.clark@cmg.com or via the SBE National Office at 317-846-9000. A slate of nominees will be assembled by the committee by May 3. Other qualified members may be nominated by members in good standing no later than July 12.

The election takes place from July 23 through Aug. 25. Those elected will be installed into office during the SBE National Meeting, planned to be held at the 2021 NAB Show in October.

# SBE Certification Achievements

## CONGRATULATIONS

<b>LIFE CERTIFICATION</b>	<p><b>Certified Broadcast Networking Engineer (CBNE)</b> Robert Lange, Morton Grove, IL - Chapter 26</p> <p><b>Certified Audio Engineer (CEA)</b> Terry Glaze, Broken Bow, NE - Chapter 74</p> <p><b>Certified Video Engineer (CEV)</b> Robert Lange, Morton Grove, IL - Chapter 26 Garry Wilson, Laurel, MD - Chapter 132</p>	<p><b>Certified Broadcast Radio Engineer (CBRE)</b> Michael Lennen, Omaha, NE - Chapter 74 H. Kent Randles, Portland, OR - Chapter 124</p> <p><b>Certified Broadcast Television Engineer (CBTE) 8-VSB Specialist (8-VSB)</b> Robert Lange, Morton Grove, IL - Chapter 26</p>	<p>Certified Professional Broadcast Engineers and certified senior broadcast engineers who have maintained SBE certification continuously for 20 years, are at least 59½ years old and are current members of the SBE may be granted Life Certification if so requested. All certified who have retired from regular full-time employment and are at least 59½ years old may be granted Life Certification if they so request. If the request is approved, the person will continue in his/her current level of certification for life.</p>
<b>CERTIFIED PROFESSIONAL BROADCAST ENGINEER (CPBE)</b>	<p>Glenn Leffler, El Paso, TX - Chapter 38</p> <p>Applicants must have 20 years of professional broadcast engineering or related technologies experience in radio and/or television. The candidate must be currently certified on the Certified Senior Broadcast Engineer level.</p>		
<b>NOVEMBER EXAMS</b>	<p><b>Certified Broadcast Networking Technologist (CBNT)</b> Kevin Schmidt, Saint Leonard, MD - Chapter 37 Lisa Stapley, Denver, CO - Chapter 48</p>	<p><b>Certified Radio Operator (CRO)</b> Samuel Opp, Centennial, CO - Chapter 48</p>	
<b>FEBRUARY EXAMS</b>	<p><b>Certified Broadcast Radio Engineer (CBRE)</b> Karlie Huckels, Loveland, CO - Chapter 48</p>	<p><b>Certified Broadcast Television Engineer (CBTE)</b> Douglas Ducote, Colorado Springs, CO - Chapter 48 Don Vaccari, White Plains, NY - Chapter 68</p>	<p><b>Certified Broadcast Networking Technologist (CBNT)</b> Samuel Jones, Eules, TX - Chapter 67</p>
<b>SPECIAL PROCTORED EXAMS</b>	<p><b>Certified Senior Radio Engineer (CSRE)</b> Chris Connely, Peyton, CO</p>	<p><b>Certified Television Operator (CTO)</b> Timothy Dourm, Akron, OH</p>	
<b>SBE CERTIFIED SCHOOL COURSE COMPLETION</b>	<p><i>DINFOS</i> Joshua Wyatt, Ft. Meade, MD - Chapter 37</p>		
<b>CERTIFIED BY LICENSE</b>	<p><b>Certified Broadcast Technologist (CBT)</b> Michael Ketchersid, Mustang, OK Ken Verbeck, Minden, NE</p>		
<b>CERTIFIED RADIO OPERATOR (CRO)</b>	<p>Clancy Callahan, Swifton, AR Summer Coff, Madison, WI Shannon Harrison, Houston, TX Karlie Huckels, Loveland, CO</p>	<p>Jonah Nemeec, Chicago, IL Taylor Norton, Twin Falls, ID Eric Scaee, Boulder, CO Emily Jean Versonza, Rocklin, CA</p>	<p><i>Southeastern Community College</i> Victoria Crumbley, Clearwater, FL Amy Milliken, Clearwater, FL</p>
<b>CERTIFIED TELEVISION OPERATOR (CTO)</b>	<p>Margaret Corpuz, Aurora, CO Shannon Harrison, Houston, TX Friendswood High School</p>	<p>Tommy Dearmond, Friendswood, TX Tanner Hill, Friendswood, TX</p>	<p>Cody Hobbs, Friendswood, TX Ryleigh Kennedy, Friendswood, TX Sara Nabizedeh, Friendswood, TX</p>
<b>RECERTIFICATION</b> Applicants completed the recertification process either by re-examination, point verification through the local chapters and national Certification Committee approval and/or met the service requirement.	<p><b>Certified Professional Broadcast Engineer (CPBE)</b> Lindsay Bold, North Las Vegas, NV - Chapter 128 Alan Kilgore, Oconto Falls, WI - Chapter 80 William Murdoch, La Grange, IL - Chapter 26 Christopher Scherer, Overland Park, KS - Chapter 59 James Wilson, Sellersburg, IN - Chapter 35</p> <p><b>Certified Senior Radio Engineer (CSRE)</b> J. Eric Hoehn, Washington, DC - Chapter 37</p> <p><b>Certified Senior Radio Television Engineer (CSRTE)</b> Thomas Lowther, Twin Falls, ID - Chapter 145</p> <p><b>Certified Broadcast Networking Engineer (CBNE)</b> Jessie Balos, Moreno Valley, CA - Chapter 131 Wiely Boswell, Montgomery, AL - Chapter 68</p> <p><b>Certified Broadcast Radio Engineer (CBRE) AM Directional Specialist (AMD)</b> Jack Roland, Wheat Ridge, CO - Chapter 48</p> <p><b>Certified Broadcast Radio Engineer (CBRE) Digital Radio Broadcast Specialist (DRB)</b> Jon Kasprick, Renton, WA - Chapter 16</p> <p><b>Certified Broadcast Radio Engineer (CBRE)</b> Wiely Boswell, Montgomery, AL - Chapter 68 Eric Schechter, Scottsdale, AZ - Chapter 9 Joseph Torsitano, Colorado Springs, CO - Chapter 141</p> <p><b>Certified Broadcast Television Engineer (CBTE)</b> Douglas Alman, San Marcos, CA - Chapter 36 Toni Baker, Charlotte, NC - Chapter 45 James Mertins, Sand Springs, OK - Chapter 56 Trenton Sheppard, Vashon, WA - Chapter 16 James Tronolone, Hackensack, NJ - Chapter 15 D. Neil Vickrey, Boise, ID - Chapter 115</p> <p><b>Certified Audio Engineer (CEA)</b> Jon Kasprick, Renton, WA - Chapter 16</p> <p><b>Certified Broadcast Networking Technologist (CBNT)</b> James Caldwell, Grove City, OH - Chapter 52 Gregory Carter, Fairport, NY - Chapter 57 Emmanuel Cobian, Henderson, NV - Chapter 128 David Erickson, Anchorage, AK - Chapter 89 James Ferguson, Mount Vernon, OH - Chapter 52 Gregory Foss, Riverside, CA - Chapter 131 William Harris, Albuquerque, NM - Chapter 34 J. Eric Hoehn, Washington, DC - Chapter 37 David Leishman, Antelope, CA - Chapter 43 Thomas Lowther, Twin Falls, ID - Chapter 145 David Palmeira, Winter Springs, FL - Chapter 42 Christopher Scherer, Overland Park, KS - Chapter 59 Michael Zurbrick, Rowlett, TX - Chapter 67</p> <p><b>Certified Broadcast Technologist (CBT)</b> B. John Boren, San Diego, CA - Chapter 36 James Caldwell, Grove City, OH - Chapter 52 Dana Davis, Portland, OR - Chapter 124 Roland Hoffman, Alta Loma, CA - Chapter 131 Dennis Kronenberg, Gaithersburg, MD - Chapter 37 David Leishman, Antelope, CA - Chapter 43 David Palmeira, Winter Springs, FL - Chapter 42 Nicholas Rieth, Castle Rock, CO - Chapter 48 Jeffrey Schick, Forest Hills, NY - Chapter 15 Frank Torbert, Apopka, FL - Chapter 42 James Vanaman, Melbourne, FL - Chapter 42 Jeffrey Wittman, Jr., Bessemer, AL - Chapter 68</p> <p><b>Certified Television Operator (CTO)</b> David O'Shaughnessy, Las Vegas, NV Nicholas Rieth, Castle Rock, CO - Chapter 48 Thaddeus Utech, Vermillion, SD</p> <p><b>Certified Radio Operator (CRO)</b> Mark Schildknecht, Sequim, WA</p>		



Got your SBE Certification pin?  
[sbe.org/pins](http://sbe.org/pins)

## 2021 SBE Compensation Survey Open

The SBE is conducting its sixth (and ongoing) compensation survey. Launched to provide practical information to SBE members about individual compensation (salary and benefits) based on facilities, market size and years of experience, SBE members will have access to the full report.

While each annual survey has seen a successful response rate, your participation is important to provide the large sample pool for the most reliable results.

All survey responses are anonymous. Find the survey link in email communications and on the SBE website. With your help we can provide a useful and practical resource to SBE members.

Highlights of the survey will be reported in *The Signal*. The full report will be available for download to members from the SBE website. Take the survey today.



# Writing and Maintaining an SBE Chapter Website



Persons

By Mark Persons CPBE, AMD, CBNT

**S**BE chapter websites are a resource to members and the world. Every chapter should have a website to tell the story of who and what they are. I just finished a re-write of sbe17.org. It was a fun and challenging experience. Websites should not be thought of as “billboards” on the internet highway, but as information windows for everyone, even non-members. The site I wrote is only eight pages but

covers the subject. Of special interest are stories from recent chapter meetings.

## Web Writing Tools

I wrote the original website using basic HTML code, but it was difficult to write and did not display well on smartphones. The new one was done through weebly.com at \$144/year. It is all in the cloud and edited through a web browser. Web hosting is included in that price.

Wix.com, at \$156/year, is another easy-to-use website builder. There are more, and no special experience is necessary. With this kind of writing, you can easily add text or a photo by dragging and dropping onto a page. The result is a good-looking website on a desktop, tablet, and smartphone. Content is automatically arranged for the screen it is displayed on.

Every chapter has a chair, vice-chair, secretary, treasurer, etc. The position of web writer (or similar title) is another volunteer position. Take it seriously. Make sure the chapter leaders know the username and passwords for the domain name and website tool or web server. The website administrator could die suddenly, and the information might die with him or her.

It's best to stick with the established scheme of SBE, chapter number, org (sbeXX.org). Remember, we are not-for-profit organizations and should avoid any reference to being commercial with a dot-com address.

## Content and Links

Tell the story of your chapter. Think of a website as a book or brochure where the content can be changed frequently to fit the situation. It can and should be a news source of what is currently going on. It makes sense to put calendar items on the home page rather than try to squeeze one into a small space in a monthly calendar.

I gleaned ideas from other websites before creating this one. It is not intellectual property. You are welcome to use the basic format ideas on sbe17.org. After all, copying is the greatest form of flattery. There is even a slide show with the group and scenes from around town. It's easy to do.

Start by putting links

to national SBE and its programs. Then add the NAB, the FCC and anything handy to broadcast engineers. Be sure to code the links so they open in a new tab when clicked in the browser. Otherwise, the visitor will leave your site and may not find a way back.

Images are what make a website interesting. The file size (bytes) of images is important. You want to keep each one down to less than 400 KB. Even that is a little big for those viewing on a slow internet connection. Photos straight from a camera are typically 2 MB, which is way too big! You will want to use photo editing software, like Photoshop or Lightroom, to fix that. Do not use photos you find on the internet unless they are listed as free or you pay for them. Do your own photography. Remember, it is about your chapter and what you are doing.

## Maintenance

As broadcast engineers, we understand the value of maintaining what we have. Every chapter website needs to be updated at least twice a month. There should be a meeting notice with time and date. Then, put on a short story about the meeting under the stories menu. Those who did not attend will see what they missed and are less likely to skip the next one. It might even attract new members.

A worst-case scenario is where a website has outdated information. It gives the organization a black eye. Do not let that happen to your chapter. It is worse than not having a website.

Do your chapter proud by telling the world that we are members of an organization of broadcast engineers. It can help change our public image for the better.



The recently relaunched SBE Chapter 17 website.

## ENNES EDUCATIONAL FOUNDATION TRUST

The trust offers scholarship and educational programming and grants that benefit broadcast engineering and the broadcast engineer. Submit tax-deductible donations, payable to the Ennes Educational Foundation Trust, to the Society of Broadcast Engineers; 9102 N. Meridian St., Suite 150; Indianapolis, IN 46260.

### THANKS TO THE FOLLOWING SUPPORTERS FOR THEIR CONTRIBUTIONS

#### Harold E. Ennes Scholarship

Jamie Baumann, San Antonio, TX  
Ralph Brancato, Jr., St. Louis, MO  
Louis Caesar, Jr., New York, NY  
Ronald Capan, Pittsburgh, PA  
Martin Hadfield, Ocean Shores, WA  
William Harris, Albuquerque, NM  
Philip Hartman, San Francisco, CA  
Stephen Hawes, Berkeley, CA  
Craig Holderbaum, Annandale, NJ  
Victor Jester, Marietta, GA  
William McCombs, Wichita, KS  
Noel Richardson, Charleston, WV  
Robert Sleight, Apex, NC  
Joseph Sweeney, Natick, MA  
Richard Thomas II, Okemos, MI

#### Robert E. Greenberg Scholarship

Louis Caesar, Jr., New York, NY  
Craig Fox, Syracuse, NY  
Russell Harbaugh, Southfield, MI

#### In Memory of Chris Tobin

Kirk Harnack  
Terence O'Driscoll  
Trevor Smith

#### John H. Battison SBE Founder's Scholarship

Lawrence Behr, Greenville, NC  
Louis Caesar, Jr., New York, NY  
Ronald Gaier, Kettering, OH  
Ron Thompson, Long Beach, CA  
John Turner, Mountain Lakes, NJ

#### Gino Ricciardelli Scholarship

Rachel Copher, Milwaukee, WI

#### Youth Scholarship

Jay Adrick, Cincinnati, OH  
Louis Caesar, Jr., New York, NY  
William Cherry, Indianapolis, IN  
Kyle Facey, Portland, ME  
Marc Fenton, Moreno Valley, CA  
William Gaddis, Tuscaloosa, AL  
Stephen Hawes, Berkeley, CA  
Robert Leskovec, Richmond Heights, OH  
H. Douglas Lung, Honomu, HI  
David Peabody, Gardner, MA

Mark Persons CPBE, AMD, CBNT, is a Life Member of the SBE. He received the SBE Robert W. Flanders SBE Engineer of the Year Award in 2018, and the SBE John H. Battison Award for Lifetime Achievement in 2020. He retired in 2017 and mentors four radio broadcast engineers in the SBE Mentor Program. He is a member of the National Radio Systems Committee and is the webmaster of SBE Chapter 17 Twin Cities. teki@mwpersons.com

# 2020 SBE Financial Year in Review

The Society of Broadcast Engineers, Inc. completed 2020 with net revenue from all operations of \$199,630. Gross income from all sources was \$1,223,898, while expenses were \$1,024,269. The value of SBE savings and investments as

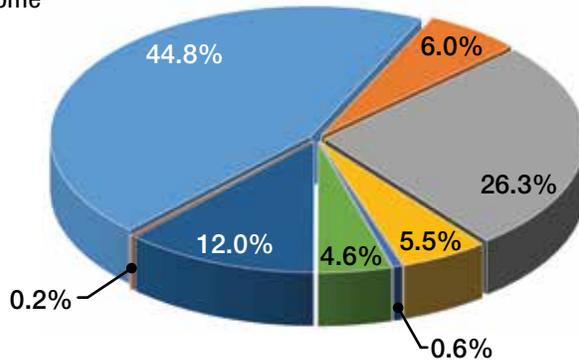
of December 31, 2020 were \$1,372,307. Total SBE assets as of December 31, 2020 were \$1,410,587, an increase of \$199,593. Long-term investment gain totaled \$100,065.

A percentage breakdown of SBE in-

come from program operations and expenses is depicted in the accompanying charts. A financial statement will be published in the June issue of *The Signal*, following completion of the Society's annual financial audit.

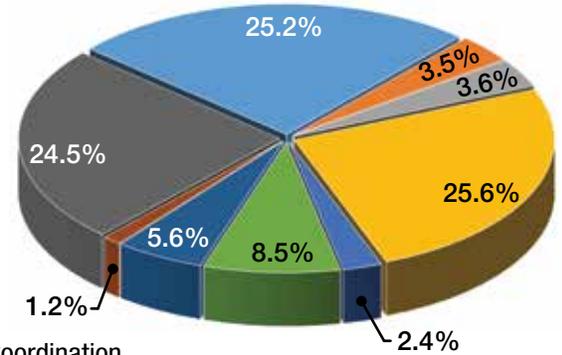
## Income

- Frequency Coordination
- Publications/Advertising (non-Cert)
- Membership Dues
- Sustaining Member Dues
- National Meeting
- Certification
- Education
- Other Income



## Expenses

- Frequency Coordination
- Communications w/ Members
- Chapter Rebates
- Member Services
- National Meeting
- Certification
- Education
- Depreciation
- Administration



## The Highest Density DSP-Powered 1RU IP Audio Codec



# Gateway

**AES67**

Ready out-of-the-box

**WheatNet-IP**

Optional at purchase

**ST 2110-30**

Ready out-of-the-box

Supports: 16 Channels, SIP EBU N/ACIP 3326 & 3368, Analog, AES3 I/O



Americas: +1-317-845-8000 | sales@tieline.com | tieline.com



## LEGAL PERSPECTIVE

By Chris Imlay, CBT  
SBE General Counsel  
cimlay@sbe.org

### Who Is In Trouble Now?

As we are in the middle of a license renewal cycle for radio stations now, it seems timely to look at some of the pitfalls in the process. At the core of the process now are the representations made by license renewal applicants. A few of these representations affect online public files, a maintenance task that often falls to broadcast engineers. The two key certifications in a license renewal application pertaining to online public files are the certification that has to be made that the contents of the file are complete, and that the documents that have to be included were included timely. These representations are easily checked, and in fact are actually checked by Commission Media Bureau staff, so it is absolutely critical in the license renewal process to make accurate representations, and if the inclusion representation or the timeliness representation can't be truthfully made, an exhibit explaining the circumstances of the omission in detail is also absolutely critical.

The good news is that Commission staff has been more than helpful in many cases, notifying licensees of incomplete online public files that are noticed in normal review of online public files, before renewal applications are due in a particular state. This affords a licensee time to bring the file up to par before filing the renewal application, but it does not of course excuse untimely inclusion of materials required for the file. And no licensee should rely on a Commission notification, because Commission staff review of online public files is necessarily anecdotal. Do it yourself, and carefully.

#### Common Omissions

What are the most often encountered online public file omissions? In our experience, licensees often fail to include quarterly issues and programs lists in the online public file on time. This is a frequently encountered omission, quickly noted by FCC staff, and the one most often subject to Commission admonitions based on staff review of the files. But the Commission takes very seriously any failure of licensees to include all necessary materials relative to political broadcasting in their online public files. A spate of consent decrees have been entered into between the Commission and licensees to settle these noted violations where the licensees have pending license renewal applications. Why? Principally because the public file requirements regarding political files (which are a subset of the online public file for full power radio stations) are based on statutory requirements that the FCC can't waive even if they wanted to.

In these recent cases, the FCC has noted that Section 315(e) (1) of the Communications Act requires radio station licensees to maintain and make available for public inspection information about each request for the purchase of broadcast time that is made: (a) by or on behalf of a legally qualified candidate for public office, or (b) by an issue advertiser whose advertisement communicates a message relating to a political matter of national importance. Section 315(e)(3) of the Act requires stations to place information about such requests into their political files "as soon as possible." Section 73.1943(a) of the FCC Rules requires stations to maintain and make available for public inspection information about all requests for broadcast time made by or on behalf of candidates for public office, and section 73.1943(c) requires stations to upload such information to

their online political files "as soon as possible," meaning "immediately absent unusual circumstances."

In the orders released recently announcing that consent decrees had been entered into by several licensees resolving the violations and allowing the renewal applications to go forward, the Commission noted the public interest justifications for holding licensees' feet to the fire on political file completeness. They said that it is crucial that stations maintain political files that are complete and up-to-date because the information in them directly affects, among other things, the statutory rights of opposing candidates to request equal opportunities and present their positions to the public prior to an election. Section 73.1941 of the FCC Rules gives candidates only one week from an opponent's initial "use" to request equal opportunities for airtime. So, if a station doesn't timely upload information about each "use" by a candidate, then opposing candidates are denied the information they need to claim their statutory rights to equal opportunities for airtime. Furthermore, the disclosures included in the political files contribute to the First Amendment's goal of an informed electorate that is able to evaluate the validity of political messaging.

#### Firm but Fair

The Commission is necessarily strict about compliance with political file contents, but it is not heartless. In the past, these consent decrees recently entered into would have inevitably included a substantial monetary forfeiture, in accordance with the standard forfeiture amounts in the Part 1 rules. However, in these recent cases, there is reflected an understanding on the Commission's part about the financial straits that radio stations are in now due to the Covid-19 pandemic, and no monetary forfeitures are included. The FCC said in one of these cases that it "acknowledges that the COVID-19 pandemic caused a dramatic reduction in advertising revenues which, in turn, placed the radio broadcast industry, including the [licensee], under significant, ongoing financial stress. The Bureau believes that the [licensee]'s disclosures in its license renewal applications combined with the exceptional circumstances brought about by the pandemic present a unique situation which, on balance, warrant resolution of the Bureau's investigation under the terms and conditions described [in the Consent Decree]."

Several conclusions can be drawn from this. First, the political file's completeness is a big deal. Second, if a station's online public file, especially in the area of political file content, is deficient, it is important to disclose that candidly and fully in the renewal application. Third, it should NOT be assumed that the Commission will be as benevolent in terms of not calling for monetary forfeitures for these kinds of violations after the Pandemic is over. Finally, the compliance programs that the Commission has necessitated for licensees to settle these violations are in each case detailed and place substantial, ongoing obligations on licensees to make sure that the problem doesn't happen again, and subsequent violations of the compliance programs very specifically, in the Consent Decrees, subject the license to substantial monetary forfeitures. Let's avoid this at the outset. Keep the online files complete. All the time. 



## FOCUS ON SBE

By James Ragsdale  
SBE Executive Director  
jragdale@sbe.org

# It's About the Next Generation

Hopefully, you have heard about the new program the SBE announced in December, the Technical Professional Training Program. I have heard from many within and outside the SBE who are excited about this new program. I, too, am excited, because the program recognizes the value our profession brings to the industry now, and it provides a forward-looking path toward the future of broadcast and multimedia technology professionals.

The TPT is designed to leverage many of the products and services that were already available through the SBE. By packaging them together, it provides a one-stop shop to help those new to broadcast and media engineering gain the knowledge and experience they need to fill available industry positions in the broadcast engineering field.

As technology continues to advance, the need for qualified technical personnel increases. The SBE Technical Professional Training Program was designed to make it easier not only for individuals to take advantage of these SBE products and services, but for employers, station groups, state broadcasting associations and other groups to identify and invest in new talent for the future.

This package is attracting a lot of attention in our industry. Broadcasters have seen the reduced number of technical talent entering the field. The program gives those on the business side the opportunity to invest in developing a broad technical talent pool. Industry associations have seen the opportunity and are asking us how they can support the development effort. We are asking them and their members to participate by identifying the individuals who show aptitude and provide the funding for them to participate in the program.

You may be asked to help identify these people. For a single fee and one application form, the TPT participant receives many SBE member benefits:

- SBE membership at the SBE MemberPlus level (\$175 value)
- Access to all SBE webinars (SBE MemberPlus level benefit)
- A copy of the *SBE Broadcast Engineering Handbook* (\$159 value)
- Enrollment in the SBE Mentor Program
- A copy of SBE CertPreview sample testing software (\$35 value)
- SBE CBT certification exam

As an SBE member, you can help grow the talent pool by promoting the SBE Technical Professional Training Program to your employer and other broadcast organizations. The application fee for a young person entering the field is an investment in that person's future. While the cost of enrolling in the program might be too much for an individual, it can likely be easily justified and paid for by a station, station group or other broadcast organization.

### Future Investment

There is another way that you can get involved: become a mentor through the SBE Mentor Program. Qualifications to become a mentor are:

- Current SBE member; values the organization, its mission and its work
- Currently in the profession of broadcast engineering
- Minimum of five years working in the profession
- Ability to commit to calls every other week with your mentee for one year
- Desire to help others grow and excel in their careers
- Positive attitude toward the profession and learning



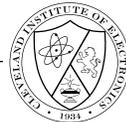
If you have questions regarding the SBE Mentor Program, contact Cathy Orosz at 317-846-9000 or corosz@sbe.org.

The Mentor Program demonstrates two characteristics that I have witnessed within the SBE. Our members are committed to growth of their technical knowledge and are willing to invest in less-experienced members of their profession by helping them become more knowledgeable. This program provides a mechanism for others to join the profession by learning through webinars and textbooks, identifying where their knowledge needs to develop to pass certification exams, and troubleshooting real world problems with more experienced broadcasting engineers.

I want to thank the SBE staff and the numerous volunteers who helped develop the program. Because it is so far-reaching, there is almost nothing that happens within the SBE that doesn't support this effort, including chapter meetings, mentoring, webinar development, SBE WEBXtra, national meetings, membership services, certification services, education services, the SBE Store, and the SBE website to name a few.

Please look for those individuals who show an aptitude and interest in the work, encouraging them to take advantage of the funding from their stations or broadcast associations.

## Earn Your Diploma at Home!



### Cleveland Institute of Electronics

**Distance learning** programs in electronics and computer technology!

#### Programs offered:

- Broadcast Engineering
- Electronics Tech with FCC
- Electronics Communications
- Industrial Electronics PLC
- Wireless
- Robotics and more!

[www.cie-wc.edu](http://www.cie-wc.edu)

Course descriptions & tuition prices.  
Request a FREE Course Catalog!

[www.ciebookstore.com](http://www.ciebookstore.com)

Learn iPhone Repair, Video Production,  
PC Repair & more! DVDs, labs & tools.

Or call 1-800-243-6446

1776 E. 17th, Cleveland, OH 44114

Registration Certificate 70-11-0002H



## ENGINEERING PERSPECTIVE

R. Matt Gholston, CBRTE, CBNT  
Chief Engineer, Townsquare of Lafayette  
Matt.Gholston@townsquaremedia.com

# Build a Hardened Transmitter Site in an ISO Shipping Container

What two things do all OTA broadcast media companies have in common?

1. We all need transmitter sites to deliver our product to the consumer.
2. We all need to build them within a budget that works for our bottom line.

There are many options available on the market today to house a transmitter site. What considerations do we need to take into account when selecting the best one to fit our needs?

- Cost per sq. foot
- Ability to meet state and local building codes.
- Ability to be hardened against natural disaster, vandalism and theft.
- Long term durability
- Potential to be relocated if needed.

What material options are available? They are almost endless: wood, metal, concrete, the list goes on and on. There are also prefabricated dedicated communications shelters available on the market. Each has advantages and disadvantages, but I would

like to highlight another option that could be a good possibility for those on a budget. This would be the international intermodal shipping container or ISO shipping container. ISOs from the outside loosely resemble a rail car or an 18-wheeler trailer, but they are an entirely altogether different animal.

ISOs are engineered to exacting tolerances under the ISO 688 standard. (See links.) Built using high quality steel, they are watertight and tough as nails easily withstanding hurricane force winds; my most recent build has already survived two hard Cat 4 Storms. They can be easily be moved by truck or train cross country and can be converted into excellent facilities which with careful planning can even be built offsite and moved at a later date with minimal trouble.

While these units come in a wide variety of sizes with wood or metal floors, I favor the 40' x 8' x 9' High Cube (because it has a 9' ceiling height), or the 20' x 8' x 8' GP. Expect to pay an average of \$3,500 to \$5,500 for a quality 40' HC or 20' GP model in the Cont. US (delivered to your site). The 20' models normally are not cheaper because of supply. Specify a unit that is one-trip no-leak. (Containers are manufactured in China, so to get to North America, all containers are at least one-trip.)

If I choose this route, what considerations should I take into account when planning my site?

### 1. Make a CAD Drawing

Exactness will become your friend. Containers are tight spaces. Plan the placement of all systems, equipment, pathways, and modes of egress prior to construction. A tip I use: Before any money is spent I take masking tape and mark off the floor of

the unit so I can visualize everything exactly and revise my plan if necessary.

It makes good common sense that an engineer would require enough room to safely service equipment, so it can't be too close to a wall, etc. To that end, in an 8' wide unit I recommend placing equipment down one side (opposite the door) if possible, turned perpendicular to the entry and creating a walkway down the side near the door. This will allow one plenty of room to maneuver and the highest density of equipment to be placed in the space.



This transmitter site in Lake Charles, LA, was hit by Hurricane Laura (Cat 4 with 150 mph winds) during construction. The building survived.

With liquid-cooled transmitters you might be amazed at the density of what can be placed into a container.

### 2. Create the building system and thermal envelope

This is first a building like any other. Consider carefully that it must be properly installed, insulated, ventilated and moisture controlled to prevent long term issues.

Construct a raised foundation of pilings, a stem wall, block or piers to support it off the earth, and I recommend that you place ground fabric and limestone underneath to prevent vegetation growth. Anchor it in place with structural steel cables and listed ground anchors. Most areas won't permit the structure without that.

Use closed-cell spray foam to create an insulating vapor barrier against the steel structure. In my builds, I construct a 2x4 substructure on the inside on 24" centers left proud of the steel by 2" with the bottom plate glued and screwed to the floor. Spray APX 3" of closed cell foam on the steel, then fill the remainder of the cavity with Rockwool batting to provide a flame barrier to the already fire-retardant foam. Also foam both the ceiling and underneath the unit to complete the thermal envelope. This will give you APX R-30 with a 100% thermal break. I recommend you roll a coat of paint over the foam underneath the unit for protection.

At minimum, seal the floor with a clear poly- or spar urethane, but I recommend VCT tile or outdoor-rated carpet tiles, which have a solid rubber back. Both will form a vapor barrier and seal the floor with glue.

Lastly, wrap the walls with your choice of material: 5/8" sheetrock, concrete board or 3/4" tongue-and-groove plywood sprayed with fire-resistant paint are all good options.

I recommend against using the large cargo door and instead install a door opening cut into the side of the unit with an insulated steel frame welded in. The large door offers almost no advantages after move-in, but it causes plenty of disadvantages such as moisture, condensation and outside dust. In addition,

see ISO, p. 15

## NEW SUSTAINING MEMBER



**AC Video Solutions • 2014**  
Andrea Cummis 201-303-1303  
Consulting, Systems Design/Integration

**American Tower Corporation • 2000**  
781-926-4772  
Development/Construction/Management

**Audemat-Worldcast Systems Inc. • 2000**  
Christophe Poulain 305-249-3110  
Control Manufacturer

**Belden Electronic Division • 1991**  
Rose Lockwood 203-500-4743  
Fiber and Copper Cabling Infrastructure

**Blackmagic Design • 2012**  
Terry Frechette 408-954-0500  
Production Switchers, Digital Cameras,  
Routers, Video Editing and Monitoring, Color  
Correction, Video Converters

**Bracke Manufacturing LLC • 2012**  
Patra Largent 949-756-1600  
RF & Microwave Components

**Broadcast Depot • 2018**  
John Lackness 305-599-3100  
TV, Satellite, Radio, IP

**Broadcast Devices, Inc. • 2015**  
Robert Tarsio 914-737-5032  
Audio/RF Support Products

**Broadcast Electronics Inc. • 1978**  
Perry Priestly 217-224-9600  
Radio Equipment Manufacturer

**Broadcast Software International • 2016**  
Marie Summers 888-274-8721  
Radio Automation, Audio Logging

**Broadcast Supply Worldwide • 1986**  
Shannon Nichols 800-426-8434  
Audio Broadcast Equipment Supplier

**Broadcasters General Store • 2004**  
Buck Waters 352-622-7700  
Broadcast Audio Video Distributor

**Burk Technology • 2019**  
Jim Alinwick 978-486-0086 x7404  
Transmitter Facility Control Systems

**Calrec Audio • 2016**  
Helen Carr 703-307-1654  
Audio Mixing Equipment

**Complex • 2017**  
Daniel Coscarella 800-445-7568 x7409  
Fiber Optic Cable Assembler

**Canon USA Inc. • 1985**  
Larry Thorpe 201-807-3300,  
800-321-4388  
Broadcast Lenses & Transmission Equipment

**Cavell, Mertz & Associates Inc. • 2011**  
Gary Cavell 703-392-9090  
Consulting Services

**Comrex Corporation • 1997**  
Chris Crump 978-784-1776  
Audio & Video Codecs & Telephone Interfaces

**Continental Electronics • 1976**  
Dale Dalesio 412-979-3253  
TV and Radio Transmitters

**CueScript • 2014**  
Michael Accardi 203-763-4030  
Teleprompting Software & Hardware

**Cumulus Media, Inc. • 2021**  
Conrad Trautmann 212-419-2940  
Audio Media Company

**Davicom, Division of Comlab, Inc. • 2014**  
Louis-Charles Cuierrier 418-682-3380 x512  
Remote Site Monitoring and Control Systems

**Dielectric • 1995**  
Cory Edwards 207-655-8131  
TV & FM Transmission & Cellular Products

**Digital Alert Systems, LLC • 2005**  
Bill Robertson 585-765-1155  
Emergency Alert Systems

**DoubleRadius, Inc. • 2012**  
Jeffrey Holdenrid 704-927-6085  
IP Microwave STL

**Drake Lighting • 2015**  
Dave Sheppard 270-804-7383  
FAA Obstruction Lighting - Medium and High  
Intensity

**DTS Inc./HD Radio Technology • 2014**  
George Cernat 443-539-4334  
HD Radio Technology

**du Treil, Lundin & Rackley, Inc. • 1985**  
Jeff Reynolds 941-329-6000  
Consulting Engineers

**The Durst Org. - 4 Times Square • 2004**  
212-997-5508  
TV/FM/Microwave Tower Site

**DVEO - Division of Computer Modules Inc. • 2011**  
Laszlo Zoltan 858-613-1818  
Everything About Transport Streams

**Econco • 1980**  
Debbie Storz 800-532-6626,  
530-662-7553  
New & Rebuilt Transmitting Tubes

**ENCO Systems Inc. • 2003**  
Samantha Bortz 248-827-4440  
Playout and Automation Solutions

**ERI - Electronics Research • 1990**  
Zachary Bailey 812-925-6000  
Broadcast Antennas, Transmission Line,  
Filters/Combiners, Towers and Services

**Floral Systems • 2008**  
Shawn Maynard 877-774-1058  
Television Broadcast Automation

**Fujifilm/Fujinon • 1986**  
Gordon Tubbs 973-686-2769  
Broadcast & Cine Lens Products

**Heartland Video Systems, Inc. • 2011**  
Dennis Klas 920-893-4204  
Systems Integrator

**Highlights, Inc. • 2016**  
Timothy Nash 352-564-8830  
Obstruction Lighting Maintenance

**Hitachi Kokusai Electric Comark • 2013**  
Jack McAnulty 413-998-1523  
Manufacturer Broadcasting Transmission  
Equipment

**iHeartMedia, Inc. • 2019**  
Troy Langham 918-664-4581  
Radio Group Owner

**Indiana Broadcasters Association • 2019**  
Dave Arland 317-701-0084  
Indiana Association for Radio & TV  
Broadcasters

**Inovonics Inc. • 2012**  
Gary Luhrman 831-458-0552  
Radio Broadcast Equipment

**JAMPRO Antennas Inc. • 2011**  
Alex Perchevitch 916-383-1177  
DTV, FM-HD Radio, DVB-T/T2, ISDB-T, DAB

**JVC Professional Video • 2014**  
Edgar Shane 973-317-5000  
Professional Video Products, Camcorders,  
Display Monitors, Recording Decks

**Kathrein USA Inc. • 1985**  
Les Kutasi 541-879-2312  
Antennas for Broadcasting & Communications

**Kintronc Labs, Inc. • 2015**  
Joaquin Raventos 423-878-3141  
Radio Broadcast Antenna Systems - ISO9001  
Registered Company

**LBA Technology Inc. • 2002**  
Juan Macias 252-757-0279 x221  
AM/MW Antenna Equipment & Systems

**Linkup Communications Corporation • 2017**  
Mark Johnson 703-217-8290  
Satellite Technology Solutions

**LYNX Technik • 2007**  
Steve Russell 661-251-8600  
Broadcast Terminal Equipment Manufacturer

**Markertek • 2002**  
Adam June 845-246-2357  
Specialized Broadcast & Pro-Audio Supplier

**Micronet Communications Inc. • 2005**  
Jeremy Vize 972-422-7200  
Coordination Services/Frequency Planning

**Microwave Video Systems • 2011**  
Warren J. Parece 781-665-6600  
Microwave Equipment Rental, Sales & Service

**Moseley Associates Inc. • 1977**  
Bill Gould 805-968-9621 x785  
Digital STLs for Radio and Television

**MulticAM Systems • 2020**  
Mary Ann Seidler 207-776-5338  
Fully automated live video production

**MusicMaster • 2014**  
Jerry Butler 352-231-8922  
Advanced Music Scheduling Solutions

**Nascar Productions • 2014**  
Abbey Kielcheski 704-348-7131  
Live/Post Production Services

**National Association of Broadcasters • 1981**  
Industry Trade Association 202-429-5340

**National Football League • 1999**  
Michael Katzenoff 212-450-2368  
Game Day Coordination Operations

**Nautel Inc. • 2002**  
Jeff Welton 877-662-8835  
Radio Broadcast Transmitter Manufacturer

**Nemal Electronics Int'l Inc. • 2011**  
Benjamin L. Nemser 305-899-0900  
Cables, Connectors, Assemblies and Fiber  
Optic

**Neutrik USA, Inc. • 2012**  
Kathy Hall 704-972-3050  
Ruggedized Optical Fiber Systems

**NPR Distribution Services • 2019**  
Dan Riley 202-513-2624  
Your Content Delivery Partners

**Orban Labs, Inc. • 2011**  
Mike Pappas 480-403-8300  
Audio Processing AMFMTV

**Pasternack Enterprises • 2001**  
Christine Hammond 949-261-1920  
Coax & Fiber Products

**Potomac Instruments • 1978**  
Zachary Babendreier 301-696-5550  
RF Measurement Equipment Manufacturer

**ProAudio.com- A Crouse-Kimzey Co. • 2008**  
Mark Bradford 800-433-2105 x560  
Proaudio Broadcast Equipment Distributor

**Propagation Systems Inc. - PSI • 2010**  
Doug Floss 814-472-5540  
Quality Broadcast Antenna Systems

**QCcommunications • 2019**  
Tony zumMallen 816-729-1177  
Services Behind the Scenes

**Quintech Electronics and Communications Inc. • 2002**  
James Herbstritt 724-349-1412  
State-of-the-art RF Hardware Solutions

**QVC • 2011**  
Kevin Wainwright 484-701-3431  
Multimedia Retailer

**Rohde & Schwarz • 2003**  
Walt Gumbert 724-693-8171  
Transmitters, Test & Measurement, Video

**Ross Video Ltd. • 2000**  
Jared Schatz 613-228-0688  
Manufacturer, Television Broadcast Equipment

**Sage Alerting Systems Inc. • 2010**  
Harold Price 914-872-4069 x113  
Emergency Alert Systems Products

**SCMS Inc. • 2000**  
Bob Cauthen 800-438-6040  
Audio and RF Broadcast Equipment Supplier

**Seacomm Erectors, Inc. • 1997**  
John Breckenridge 360-793-6564  
Tower/Antenna Erections

**SEG • 2014**  
Chris Childs 913-324-6004  
Supply Chain Products and Services

**Shively Labs • 1996**  
Dale Ladner 888-SHIVELY  
FM Antennas & Combiners

**Shure Incorporated • 2012**  
Bill Ostry 847-600-6282  
Microphones, Wireless Systems, Headsets

**Sierra Automated Systems and Eng. Inc. • 2011**  
Al Salci 818-840-6749  
Routers, Mixers, Consoles, Intercoms

**Solid State Logic • 2014**  
Steve Zaretsky 212-315-1111  
Digital Audio Mixing Consoles, Networked  
Audio Routing, Embedded Audio Solutions

**Staco Energy Products Co. • 2010**  
Paul Heiligenberg 937-253-1191 x128  
Manufacturer of Voltage Regulators, UPS

**SuitLife Systems • 2019**  
Nigel Brownnett 310-405-0839  
Manage. Monitor. Control

**Sutro Tower Inc. • 1989**  
Eric Dausman 415-681-8850  
Broadcast Tower Leasing

**Synthax Inc. • 2020**  
Jason Finder 954-296-3936  
Audio Codecs and Converter Solutions

**Technical Broadcast Solutions, Inc. • 2018**  
Robert Russell 302-414-0055  
Engineering and Consulting Services

**Telos Systems/Omnia/Axia • 2003**  
John Bisset 216-241-7225  
Telos Systems Talk-Show Systems

**Teradek • 2011**  
Jon Landman 949-743-5783  
Camera-top ENG Solutions

**Tieline The Codec Company • 2003**  
Dawn Shewmaker or Jacob Daniluck 317-845-8000  
Audio Codec Manufacturer

**Unimar Inc. • 2001**  
Thad Fink 315-699-4400, 813-943-4322  
Tower Obstruction Lighting Designer,  
Manufacturer, Distributor

**Wheatstone • 2010**  
Jay Tyler 252-638-7000  
IP Consoles, Routers & Processors

**WideOrbit • 2012**  
Jim Hammond 415-675-6700  
Radio Automation and Playout

**Wireless Infrastructure Services • 2006**  
Travis Donahue 951-371-4900  
Repacking Services - West Coast Turnkey  
Services

**Members With 25 or  
More Years of Membership  
New Sustaining Members  
Become a sustaining member.  
Apply online or call 317-846-9000.**

# Member Spotlight: Tim Neese

## Member Stats

**SBE Member Since:** 1993  
**SBE Certifications:** CPBE  
**Chapter:** 86 Greenville Area  
**Employer:** MultiTech Consulting, Inc.

**Position:** President  
**Location:** Swannanoa, NC  
**I'm Best Known For:** Always being up for a project.

**Q** What do you value most about your SBE involvement?

**A** I have always enjoyed the networking and camaraderie opportunities afforded by SBE membership.

**Q** What got you started in broadcast engineering?

**A** As a young boy, I was fascinated with electronics and radio. When I was about ten, my parents bought me a Radio Shack 150 in 1 Project Kit and my father encouraged me to pursue amateur radio. We studied for the novice license exam together, and both got our amateur tickets on the same day! I became hopelessly hooked on radio and, subsequently, engineering.



**Q** Who do you consider a mentor?

**A** Perhaps the biggest influence was one of my college professors: Bill Greaves. Prior to teaching, Bill spent years designing, building and maintaining broadcast facilities; designing and fabricating custom audio consoles; and basically being all things "electronic." He was a true inspiration and a great mentor.

**Q** What do you like most about your job?

**A** The diversity of work locations and activities keeps the job interesting. I know it's cliché, but truly no two days are alike, as evidenced in my photo.

**Q** When I'm not working I...

**A** ...still enjoy working the amateur bands from time to time.

Tim inspects an FM panel antenna before it is raised into position.

## WELCOME TO THE SBE

### NEW MEMBERS

Justin W. Adams - Sherman, TX  
James Aills - Seattle, WA  
Jesus V. Amaro - Austin, TX  
Luis A. Arias - Austin, TX  
Taylor Bascue - Riverton, WY  
Matthew J. Beardsley - Green Bay, WI  
Kelvin R. Benson - Austin, TX  
Douglas R. Bernhardt - Woodway, TX  
Danny Bravo - Lakewood, CA  
Jon S. Brunner - Van Nuys, CA  
Kevin J. Campbell - Glendale, CA  
Mick Carberry - Toronto, ON  
Orlando Cardenas - Houston, TX  
David Cardoza - Monterey, CA  
J.C. Chernicky - Fountain Valley, CA  
Jarrett L. Clifton - Deland, FL  
Scott A. Colombe - Redwood Falls, MN  
Daniel P. Costello - Carbondale, CO  
Thomas R. DeLuca, III - Kerrville, TX  
Dhananjay C. Deshpande - Westbury, NY  
Steve Doman - Nutley, NJ  
Matt P. Donovan - Dana Point, CA  
David E. Ewing - Huntington Beach, CA  
Aaron W. Fairfield - Twin Falls, ID  
Dean Field - Davenport, IA  
Charles A. Foster - Walker, IA  
Kevin L. Geddings - St. Augustine, FL  
Michael Hernandez - Miami, FL  
Chuck Horvath - Hampton, NJ  
Christian J. Hoyer - Eau Claire, WI  
Dewayne Irvin - Corvallis, OR

Mark A. Johnson - Columbia, MO  
Aaron J. Jones - Mount Pleasant, MI  
Caleb T. Jordan - Odessa, TX  
Ashok K. Kilam - Haryana, India  
Erol Simoun C. Laguardia - San Diego, CA  
Nicholas Lindholm - Austin, TX  
Jonathan W. Linnell - Washington, DC  
Bryan C. Lovett - Sitka, AK  
Alan E. Maldonado - Pasadena, TX  
John D. McDonough - Hales Corners, WI  
Daniel McKenrick - Fredericksburg, VA  
Eli G. Mendoza - El Paso, TX  
Hugh D. Metz - Van Alstyne, TX  
Elizabeth Michel - San Antonio, TX  
Rick Mitchell - Bowling Green, KY  
Andrew Olson - Wausau, WI  
Daniel P. Petrolito - Hartford, CT  
Adam B. Phillips - Charlotte, NC  
Keith Pittman - Black Mountain, NC  
Clay Redden - Prattville, AL  
Alan Spindel - Nashville, TN  
Benjamin VanPatten - Horseheads, NY  
Abraham G. Walters - Traverse City, MI  
Adrian O. Washington - Riverside, CA  
Michael A. Watson - Greenbush, ME  
Robert M. Weissinger - Austin, TX  
Thomas D. Wild - Bemidji, MN  
Shaughn Williams - Waldorf, MD  
Joshua M. Wyatt - Ft. Meade, MD  
James J. Yaskulski - Great Falls, MT  
Jonathan Yirka - Farmington, MN

### RETURNING MEMBERS

Evangel V. Arcega - Abu Dhabi, UAE  
Alejandro G. Argerich - Davie, FL  
Jim P. Beahn - McLean, VA  
Duncan R. Brode - Los Angeles, CA  
Frank S. Certo - Trenton, NJ  
Mark E. Chesterton - Vineland, NJ  
Benjamin A. Davis - Evansville, IN  
William C. Deloney - Memphis, TN  
Michael E. Gurthie - Charlotte, NC  
Stephen L. Guye - Loomis, CA  
Lance E. Harper - Pasadena, CA  
Joshua Harstad - Denver, CO  
Michael D. Ketchersid - Mustang, OK  
Brian K. Kroth - Knoxville, TN  
David Martin - Philadelphia, PA

Raymond H. Mayberry - Richmond, VA  
Randy S. McCann - Martinsburg, WV  
Aaron T. McEachern - Davison, MI  
Timothy J. Mott - Arcade, NY  
Jonathan Palmer - Davisville, WV  
Paul E. Pedziwiatr - Raleigh, NC  
Ricki O. Peters - Waterloo, IA  
Thomas F. Presite, Jr. - Harrisburg, PA  
Joseph D. Rother - Springfield, IL  
David Tallacksen - Sycamore, IL  
Ronald L. Thompson - Long Beach, CA  
Mason A. Washer - Springfield, VT  
Jeffrey M. White - Renton, WA  
Jose V. Zerpa - Miami, FL

### NEW YOUTH MEMBERS

Chloe J. Abrams - Vacaville, CA  
Ryan T. Butler - Vacaville, CA  
David R. Cassinelli - Vacaville, CA  
Vincent D. Ferreira - Vacaville, CA  
Eamon C. Hoskins - Vacaville, CA  
Drew E. Hurst - Jasper, IN  
Aaron M. Jesinger - Vacaville, CA  
Ryan K. Lee - Fairfield, CA  
Allison H. Little - Vacaville, CA  
Thomas Peebles - Fairfield, CA  
Marlena N. Ramos - Vacaville, CA  
Luke C. Simmons - Travis AFB, CA  
Joseph Tarrar - Fairfield, CA  
Andrew C. Thompson - Fairfield, CA  
Layla M. Whitaker - Fairfield, CA

### NEW STUDENT MEMBERS

Craig A. Neuhardt - Salisbury, NC  
Johnathon C. Russell - Granite Bay, CA  
Cooper Sutherland - University Place, WA

### NEW ASSOCIATE MEMBERS

James W. Ragsdale - Anderson, IN  
Mary E. Schnelle - Cincinnati, OH  
Jeff K. Williams - Santa Ynez, CA



## SBE 2021 Membership Drive Prize Donors

Thanks to these SBE Sustaining Member companies for providing prizes to the 2021 SBE Membership Drive. Recruit a new member now through May 31, and you could win one of these prizes or the Grand Prize: a trip to the SBE National Meeting in October.

[sbe.org/drive](http://sbe.org/drive)

Donor	Prize	Donor	Prize
Comark	Two 12 oz. drinking tumblers	Orban	1101e card and breakout cable
Comark	Zippered portfolio with techtrap elastic organizer	SBE	SBE Store/SBE Bookstore \$25 gift certificate
Davicom/Comlab	Digital Temperature Probe Interface (DTPI) with two temperature sensors	SBE	Copy of CertPreview
Dielectric	Two Dielectric-logoed polo shirts	SBE	Two SBE coffee mugs and magnets
Heartland Video Systems	\$100 Amazon gift card	SBE	SBE-logoed hat
Heartland Video Systems	Notebook and mousepad	SBE	Webinars by SBE registration
Heartland Video Systems	Rocketbook Matrix smart notebook	Shively Labs	\$200 Amazon gift card
Heartland Video Systems	Travel pack (USB stick, mini-light, luggage tag)	Telos Alliance	Omnia Volt
Heartland Video Systems	Wireless charger and mini notebook	Telos Alliance	Telos swag pack
Heartland Video Systems	Zippered throw and tote bag	Tieline	\$25 Amazon gift card
LBA	\$250 in LBA online safety courses	Tieline	Two \$25 Dunkin gift cards
		Tieline	\$25 Starbucks gift card

### ISO from p. 12

the seals wear after a few years of operation and cost \$250/side to replace. It's better to leave them shut.

#### 3. Plan the mounting methods

Consider mounting horizontal Unistrut spaced every 2-4' all the way across the ceiling. It is inexpensive, makes installation a snap and saves labor. Try to budget for at least one run of cable ladder if possible.

#### 4. Electrical plan

Map where the equipment will be placed and then plan the electrical routing. Follow building codes. You need to leave minimum distances around certain devices such as panel boards and service disconnects.

I recommend running electrical in EMT if possible. You will end up with a cleaner system, better shielding, and mounting will be simpler.

As for grounding and cable entry, consult and follow closely both the NEC as well as Nautel's excellent guide to site prep that treats this far better than I could here. That said, make sure the electrical service entrance where your utility ground is located is bonded to the master station ground with a low-Z jumper or bus bar. Connect a jumper from the ground point to the frame of the container structure. This is important for several safety reasons, not least protecting from dangerous touch potentials to the metal container should you lose the utility neutral.

#### 5. HVAC

Consult with an HVAC professional to calculate a proper system based on heat load and geographic zone conditions.

For most installations, I recommend exploring a mini-split system that has a dry mode. These basically work like a dehumidifier when cooling is not needed and remove moisture from the room. If you are building a small site like an AM or Class A, you may not generate much heat load, and with a well-insulated building you don't want to have a moisture issue. I generally put two smaller units rather than one large one if I can (often they can be traded by many stations) and run one on cool and one on dry. You end up with a very low humidity environment. These use around 40% less electricity when in dry mode.

While I have been involved with several Class C and C1 stations operating from containers using tube transmitters, if you are running 20kW or more and starting from scratch in a container, consider liquid cooling. Air cooling will be greater than a mini-split system capability (4-5 ton). I also recommend against cutting the large holes that a package unit or wall-pack requires.

#### Conclusions

While a turnkey communications shelter is a common option, it may not always be the best or most affordable option, especially if build timing is a key factor. If you have the resources to use your own skills and labor or possibly creatively barter for such goods and services to reduce the cash outlay, an ISO container may be a good option. You may even be able to barter for the container itself.



Inside the Lake Charles, LA, site. Two transmitters are yet to be moved in, one where the coax and wiring await. The other transmitter will be placed just out of frame. This installation occupies 28' of the 40' container.

Plan and budget with a careful eye and compare an ISO against a prefab shelter to make sure you are getting a good value for money. In many cases it is viable, especially if you are in a remote area where freight on a building would be excessive, or site conditions prohibit traditional construction.

A transmitter site is what you as the engineer make it. There is no reason you can't have a really nice durable site in one of these units if you put in the time to do it properly.

#### LINKS

**Nautel Site Prep Guide**  
[bit.ly/NautelSitePrep](http://bit.ly/NautelSitePrep)

**ISO Container Specifications**  
[bit.ly/ContainerSpecsWiki](http://bit.ly/ContainerSpecsWiki)

**Painting a Shipping Container**  
[bit.ly/PaintingContainer](http://bit.ly/PaintingContainer)

PRESORTED  
STANDARD  
U.S. POSTAGE  
PAID  
INDIANAPOLIS, IN  
PERMIT #9555

## MEMBERS ON THE MOVE



◀ The Indiana Society of Association Executives recognized former SBE Executive Director **John Poray**, CAE, with the 2020 ISAE Star Award as Association Executive of the Year.



◀ **Jeffrey Rosenberg** is vice president of technology and operations at Texas Public Radio, San Antonio, TX.

▶ **Jason Ornellas**, CBRE, CRO, has received the Radio World Excellence in Engineering Award 2020-2021. He is currently the regional director of engineering for Bonneville International and is based in Sacramento, CA.



▶ **C. Jason Mancebo**, CBT, is chief engineer, global communications at Hewlett Packard Enterprise in San Jose, CA.



*Have a new job? Received a promotion? Send your news to Chriss Scherer at [cscherer@sbe.org](mailto:cscherer@sbe.org).*

## MARK YOUR CALENDAR

S	M	T	W	T	F	S
<b>SBE WEBxtra</b> <span style="float:right">online</span>						
April 19, 2021 <span style="float:right"><a href="http://sbe.org/webxtra">sbe.org/webxtra</a></span>						
<b>SBE WEBxtra</b> <span style="float:right">online</span>						
May 17, 2021 <span style="float:right"><a href="http://sbe.org/webxtra">sbe.org/webxtra</a></span>						
<b>SBE Certification Exams</b> <span style="float:right">Local Chapters</span>						
June 4-14, 2021 <span style="float:right"><a href="http://sbe.org/certification">sbe.org/certification</a></span>						
Application deadline April 16, 2021						
<b>SBE Leadership Development Course</b> <span style="float:right">Atlanta</span>						
Jun 8-10, 2021 <span style="float:right"><a href="http://sbe.org/lcd">sbe.org/lcd</a></span>						
<b>SBE WEBxtra</b> <span style="float:right">online</span>						
June 21, 2021 <span style="float:right"><a href="http://sbe.org/webxtra">sbe.org/webxtra</a></span>						
<b>SBE WEBxtra</b> <span style="float:right">online</span>						
July 19, 2021 <span style="float:right"><a href="http://sbe.org/webxtra">sbe.org/webxtra</a></span>						
<b>TAB Convention &amp; Trade Show</b> <span style="float:right">Austin, TX</span>						
Aug. 3-4, 2021 <span style="float:right"><a href="http://tab.org">tab.org</a></span>						
<b>SBE Certification Exams</b> <span style="float:right">Local Chapters</span>						
Aug. 6-16, 2021 <span style="float:right"><a href="http://sbe.org/certification">sbe.org/certification</a></span>						
Application deadline June 11, 2021						

# WHEN IT COMES TO LIVE AUDIO DON'T SETTLE FOR "GOOD ENOUGH"



## Make guest interviews simple with Opal



[www.comrex.com](http://www.comrex.com) | 1-800-237-1776 | [info@comrex.com](mailto:info@comrex.com)