Wavelengths

Southeastern Michigan
Electrical and Electronic Engineers Creating Our Future

Volume 60 – Issue 07

Contents

Upcoming Events

We have a number of events coming up this month. Be sure to check out the Section Website

https://r4.ieee.org/sem

As well as vtools:

IEEE Region 4 - SE Michigan Section Upcoming

Listed below are some of the events, FYI.

Event	Date	Time
Innovative & futuristic Applications of IoT	7/7/2020	6 PM
SEM Section ExCom Monthly Meeting	7/8/2020	5 PM
Ch8: AdCom Teleconference : Southeastern	7/8/2020	11 AM
A Quality Assessment of Cloud-hosted Services	7/16/2020	6 PM
Two-Day Online Tutorial: Introduction to C language	7/18/2020	9 AM
Report from the world of High Performance Computing	7/21/2020	6 PM
A Story of Gratitude: Life Lessons from a Woman	7/23/2020	1 PM
EduCom Monthly Meeting - Jul : Southeastern Mic	7/28/2020	7 PM

Chair's Message

Welcome to the July issue of the Wavelengths.

The Southeastern Michigan IEEE executive team continues to work diligently to bring great virtual events to our members. One great event, TEMSCON 2020, was held earlier this month. The event featured several great speakers and was organized by the SEM local Technology and Engineering Management Society.

Another great event, "A Story of Gratitude: Life Lessons from a Woman Engineer" will be held in July. The virtual event will feature Janice K. Means and her journey as an engineer. More information is available on Page 25 of this month's Wavelengths.

Our SEM Education Society and Computer Society Chapters are co-sponsoring a 2-day tutorial introducing program in C. That event will be held virtually on July 18 & 25. More information can be found on Page 20.

We've made the difficult decision to change our July face-to-face executive meeting to a Zoom Conference. The executive meeting is a great opportunity for new volunteers to get involved with section activities. We will be looking for ways to improve collaboration on the Zoom platform to make up for the lack of face to face connection.

Thank you for reading this month and stay safe.

Thank you for reading this month and stay safe.

David Mindham: **dmindham -At- ieee.org**

ISC 2020 Update

SE Michigan Computer & Education Societies Chapter
Present
"ISC 2020 Conference Update"
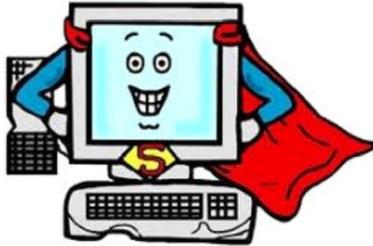
The recently concluded International Supercomputing Conference ISC 2020 (the European equivalent of the US-based Supercomputing Conference SC - supercomputing.org) had many new major announcements. This year due to the COVID-19 pandemic it was converted to an online/digital event.

In this tech meeting (held virtually) using a Linux powered laptop, I will give a detailed report on the many different news items and developments in from this event. HPC (High Performance Computing) impacts all of us, practically every second of our lives. Some of the highlights:

- ➢ The latest #1 supercomputer in the world
- ➢ Global HPC efforts against COVID-19
- ➢ Latest developments in HPC Architecture, Algorithms, Applications, Emerging Technologies, Parallel Programming & Performance Modeling
- ➢ Quick summary of select research posters
- ➢ Latest Achievements in HPC (keynote talk)

This tech session is open to all those interested in this field. The last time an HPC session was held, in the local IEEE Section was way back in 2017, so it is high time for an update!

- **When? Where? …**
  - July 21st 2020
  - 6 PM ➜ 7:30 PM
- **Audience:** All Students, Members, Professionals and Industry Techs
- **Where:**
  Online/Virtual using Webex

- - - - - - - - - - - - - -

Sponsored by
SE Michigan Chapter
Education Society
&
Computer Society

Pre-Registration Required!

https://events.vtools.ieee.org/m/233805

Amateur Radio 5

The 2nd FCC Defined Purpose for Hams:

Last month in this column, we looked at the fourth of the 5 basic reasons why the US Federal Government established the Amateur Radio Service.

This month, I want to focus on the 5th purpose in CFR part 97.1…

> **(e) "Continuation and extension of the amateur's unique ability to enhance international goodwill."**

When an amateur radio operator sends out a 'general call' "CQ" the variations of radio wave propagation may result in the call answered by another 'Ham' next-door, one or halfway around the planet. Of course, there are ways to 'predict' the probability how far a signal may travel. These involve an understanding of the effects of the frequency in use, the position of the sun and the effect of solar wind exciting the ionosphere layers, the current sun spot cycle, (i.e. 'Space Weather'). There is also terrestrial weather, the 'mode' in use: Voice (Single Side Band), FM, or CW (Morse code) one of the multiple of 'digital modes', how efficient the antenna is at the frequency in use, and how much power reaches the antenna, just to mention just a few.

The effects of all these variables are generally well known. However, the overall mix of them can result in some surprising connections. This often makes links up operators who might never have 'met' under different circumstances. When this happens often enough, many Hams become friends over the air, and eventually meet in person at Amateur Radio gatherings, or when one travels to the area or country where the other lives and they arrange to meet 'in person'.

Hams often exchange physical confirmations of on-the-air meetings through 'QSL' Cards and send 'messages' using the Amateur Radio 'National Traffic System'. Traffic messages are handled on regularly scheduled 'Nets' in which groups of Hams join each other on the air for the express purpose of 'passing traffic'.

This system is kept functional through the use of 'Routine' messages which are often 'greetings' of one form or another. However, the nets serious function takes over during regional or national emergencies when the messages become 'Welfare', 'Priority', or 'Emergency', and lives may depend upon accurate and rapid message handling. This is when all the 'practice' of 'Routine' message handling results in a remarkably efficient and effective communication system.

All of this national and international communications eventually results in Hams developing friendships around the world. Many countries have established 'Reciprocal Message Agreements' with United States Hams to allow send and receive messages to non-ham 3rd parties in each country.

Of course, some governments become 'nervous' about having their citizens becoming friends with people outside their country and culture. While most of them still allow their 'Hams' to talk with other 'Hams' in other countries (…trying to stop radio waves at the border is 'impractical'…), there are a number of countries that refuse to allow messages to be passed through the Amateur Radio services to their non-ham citizens.

Friendships among Hams all over planet earth continue to expand and recently has spilled over into the use of the internet as another mode of propagation. Several programs are now available to allow licensed Hams to talk to each other, link into the 'repeaters' around the planed, and at least one set of channels is devoted solely to Morse code communication on the internet.

****

Shown below is, in part, excerpted from the <u>United States Code of Federal Regulations</u> (CFR), CFR Title 47: Telecommunication

"The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:"
****

PART 97—AMATEUR RADIO SERVICE
<u>§97.1 Basis and purpose.</u>

(a) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.

(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

(c) Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.

(d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.

(e) Continuation and extension of the amateur's unique ability to enhance international goodwill."
(*The underlines above are my addition to the text.*)

Introduction to IoT

IEEE SE Michigan Seminar: Introduction to Innovative Applications of IoT

INTERNET OF THINGS

What is the Internet of Things?

The Internet of things (IoT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. IoT is viewed as "the infrastructure of the information society." IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention.

IoT is being aimed at power plants, smart homes, intelligent transportation, medicine (hot area right now) and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2030.

State of Opportunity: Companies are challenged to find the people with skills in order to develop, maintain and expand IoT at all levels and cross sections.

Key Target/Objective: This entire seminar is designed to enable folks to become well informed on the higher level technical aspects of IoT, so they can step into this world with full confidence and the right perspective.

Details

- **When? Where?** *etc…*
- **Date:** July 7th, 2020
- **Time:** 6 PM to 7:30 PM
- **Audience:** All IEEE Students, Members, and Fellows
- **How Many:** 99 [Limited Webex Capacity]
- **Where:** Online using Webex (link to be sent only after successful registration)

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Pre-Registration Required!
Use vtools at
https://events.vtools.ieee.org/m/230184

IEEE COMPUTER SOCIETY

Australia Led The Way

The Australian School Where Students Live Hundreds of Miles From Their Teachers
BY ELLA MORTON SEPTEMBER 9, 2015

A SCHOOL OF THE AIR student in regional Queensland takes class via two-way radio, circa 1960. (Photo: Queensland State Archives/Public Domain/WikiCommons)

When you're a kid living in Woop Woop, you can't just take a bus to school.

Woop Woop is Australian slang for the middle of nowhere. But plenty of school-aged children are living there, in the outback, whether on family cattle ranches or in remote indigenous communities. To get an education, these kids attend the Alice Springs School of the Air. Encompassing 521,000 square miles, roughly double the size of Texas, Alice Springs is the largest classroom in the world.

The school, which began operating via two-way radio in 1951, provides distance learning for around 125 children. Each of these students is located hours from the nearest conventional school. From their homes or a community building,

pupils log in via satellite link each weekday to participate in group lessons, which are delivered by teachers at a studio in the outback town of Alice Springs. The kids send in completed schoolwork via email or snail mail to be graded and returned.

The Alice Springs School of the Air is one of many rural education schools now catering to hundreds of remote students in dusty locations across Australia. On a typical school day, students work on assignments from around 8:30 a.m. to 3 p.m., under the supervision of a parent, guardian, or a live-in "govie"—that's Australian for "governess." There is generally an hour-long virtual lesson each day, supplemented by written work.

The outback landscape, approaching Alice Springs. (Photo: Andy Mitchell/Flickr)

Art and physical education can also taught over long distances. At the Broken Hill School of the Air (motto: "Parted But United"), gym class consists of children doing pre-assigned physical activities around the cattle farm or "playing set games with their siblings." The day is broken up by a lunch break and two "smokos." Smoko was originally slang for "smoke break," but has now come to mean a snack break.

To account for students' isolation, teachers at the School of the Air have to get pretty creative with their lesson delivery methods. This is especially important when a video link fails or has not yet been incorporated into the teaching technology–Australia's broadband infrastructure in remote areas leaves much to be desired, and data transmission speeds are often frustratingly low.

Darryl Cooper, a teacher at Mount Isa School of the Air in Queensland, described his lesson-delivering approach to the *Guardian:*

Most subjects we can teach. We do the basics, of course, the mathematics, the language, the reading (though mime falls flat). We do manage with things like science activities and experiments, but you have to make sure that whatever you're

using in your lesson is something the children can easily get access to, because they can't slip out to the corner-store and buy stuff for the lesson. You must use common, everyday things they can get hold of.

Cooper also noted that his students have played musical instruments with one another via School of the Air—a tricky task, given the multitasking involved. "They hold their phones between their knees, that sort of thing," Cooper said, "and they do very well at it."
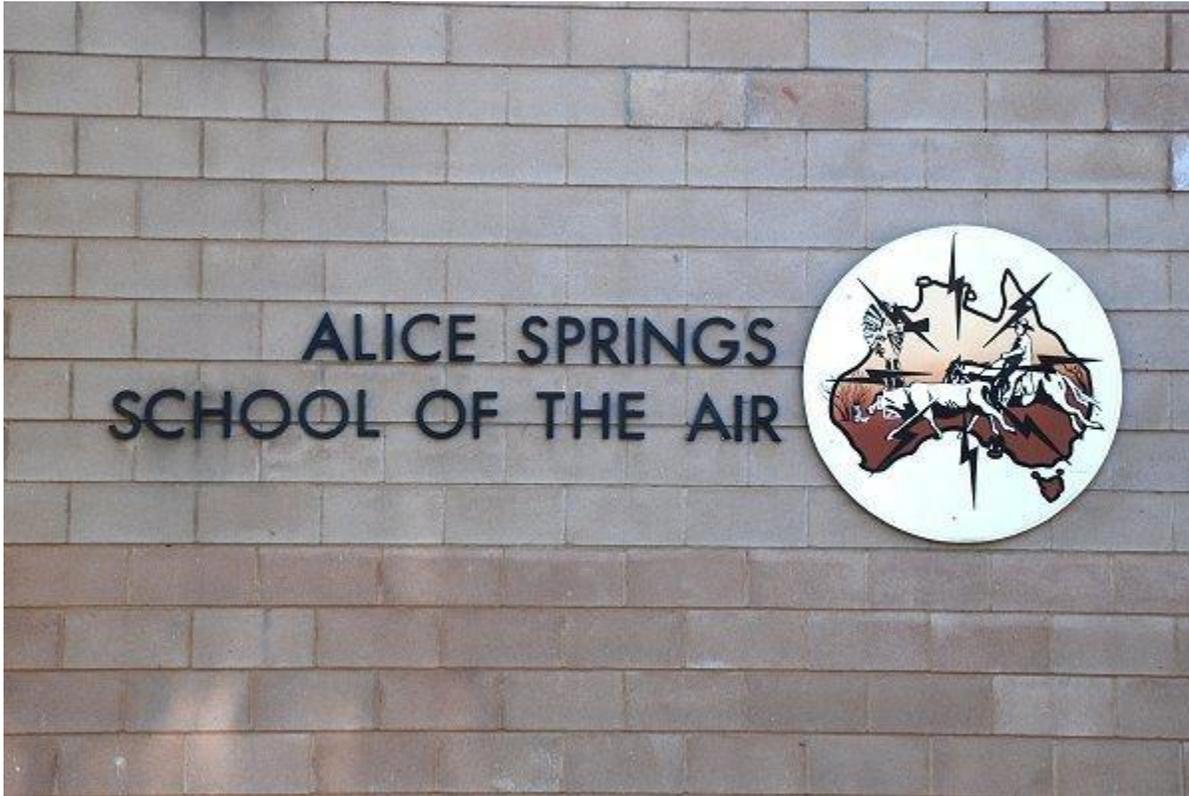
(Photo: LecomteB/WikiCommons CC BY-SA 3.0)

Teachers visit each student at their home once per year to check on their progress and consult with parents. Due to the harsh and lonely nature of the outback climate, teachers generally travel in pairs and check in regularly with their hub school to report back on their whereabouts. If the family reports that the roads are passable, teachers throw groceries and sleeping bags into the four-wheel-drive and head out to see their students. The car invariably arrives back at school encrusted with mud, dust, and the remnants of unlucky bugs.

Though the students' widely disparate locations means they don't get to spend much time in the same room, the School of the Air does its best to make kids feel like they are part of a close-knit community. At the Alice Springs school, all students attend a virtual assembly every second Friday, where achievements and birthdays are announced. Around four times a year, students gather in person for up to a week of face-to-face lessons, overnight excursions, and sporting activities. When students travel to in-person classes and excursions, they are required to wear the school uniform, as is the policy in public schools throughout Australia.

The uniform requirement was instituted in the mid '50s after a chance encounter between two students who both attended School of the Air. "Two families, living over 200 miles apart and never having met, visited the Adelaide Zoo at the same time in December 1956. They met when one student recognized the voice of another student,"explains Sydney's Powerhouse Museum. This incident, according to the museum, "was the impetus for adopting a school uniform so that students of the school could be easily recognized."

A Flying Doctors air strip in the outback. (Photo: Public Domain/WikiCommons)

The School of the Air's technologically enhanced approach to rural education is very different from what outback kids experienced in the 1940s. In those days, children in isolated locations would have to do their schooling by mail or attend a boarding school in the nearest big town. That meant a school experience that was lonely, dispiritingly slow, or both.

The first School of the Air came about through the efforts of a woman named Adelaide Miethke. Miethke was then vice-president of the South Australian wing of the Royal Flying Doctor Service, an organization that used–and still uses–planes to deliver medical care to isolated Australians. Taking advantage of the Flying Doctors' radio network, Miethke began broadcasting lessons to outback children.

Initially, the thrice-weekly lessons were one-way broadcasts, but soon students were able to talk back, and participate in question-and-answer sessions at the end of each half-hour class. In addition to receiving radio instruction, students completed written work and projects, sending them to Alice Springs to be graded and returned. (With the postal service not always reliable, the Flying Doctors would occasionally use their "air ambulances" to deliver schoolwork to teachers.)

Over the decades, technological improvements have made it easier for students to hear lessons clearly, submit their work faster, and even see their classmates and teacher via video. Since 2006, the Alice Springs School of the Air has relied exclusively on satellite technology for lesson delivery. The kids may be isolated, but they get to talk to their schoolmates every day and see them in person on a few exciting weeks throughout the year, when everyone brings a snack to share for smoko.

ESD Gold Awards

GOLD AWARD
RECEPTION & RECOGNITION
2020

FEATURING
Gold Award
Affiliate Society Awards

SAVE THE DATE

September 16, 2020 · 5:30 P.M.
2020 Gold Award Recipient
Dr. Arup Gangopadhyay
Nominated by
The Society of Tribologists and Lubrication Engineers (STLE)

ESD
THE ENGINEERING SOCIETY OF DETROIT®
125 YEARS / 1895–2020

GOLD AWARD
RECEPTION & RECOGNITION
2020

Join the ESD Affiliated Technical Societies as we come together to honor and recognize our leaders – engineers, scientists and technical professionals who have distinguished themselves through outstanding achievement and service within their respective Societies.

Hosted by The Engineering Society of Detroit and its Affiliate Council, the event will feature this year's Gold Award winner. This award is given to an individual who is collectively upheld by the council for his or her outstanding contributions to the fields of science and engineering.

PROGRAM

September 16, 2020
Location TBD

5:30 PM
Strolling Reception

6:45 PM
Awards Program

COST

Before August 31:
$60 per person or $55 per person for 5+ reservations

August 31 and After:
$75 per person or $70 per person for 5+ reservations

$35 per student (no alcohol)

Cost includes:
A variety of hors d'oeuvre stations, beer and wine.

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IMF – Recession!

IMF Sees World in Worst Recession Since Great Depression
By Eric Martin April 9, 2020, 8:00 AM EDT *Updated on April 9, 2020, 10:53 AM EDT*

The International Monetary Fund sees the world economy suffering its worst recession since the Great Depression this year, with emerging markets and low-income nations in Africa, Latin America and Asia at particularly high risk.

With half of the IMF's 189 member countries seeking aid, the executive board has agreed to double access to its emergency financing to meet expected demand of about $100 billion, Managing Director Kristalina Georgieva said in a speech on Thursday.

The IMF's baseline outlook is for a partial recovery in the global economy in 2021 if the pandemic fades in the second half of this year to allow a gradual lifting of containment measures, Georgieva said. She stressed that uncertainty about the coronavirus duration means things may wind up being even worse.

The pandemic that has spread from the Chinese city of Wuhan to almost every corner of the globe has led to business closures and millions of lost jobs. Georgieva highlighted the hit to the retail, hospitality, transport and tourism industries and the effect on the self-employed and small- and medium-sized businesses.

"Because it is such a gigantic, dramatic development, a virtual standstill of the world economy, it requires massive, well-targeted measures," Georgieva said an hour later in a Bloomberg TV interview with Tom Keene.

In Recession
Global GDP tracker suggests a sharp downturn

Source: Bloomberg Economics

IMF – Recession! Continued:

The grim economic projections continue a reversal from the IMF's outlook from less than two months ago. As recently as Feb. 19, the fund was telling Group of 20 finance chiefs that "global growth appears to be bottoming out." Three days later, Georgieva predicted the virus would likely cut just 0.1 percentage point from the fund's 3.3% global growth forecast for this year, although she acknowledged "more dire scenarios" were being studied.

Georgieva reiterated the IMF's willingness to use its $1 trillion lending power. Should the crisis continue for longer than expected or if there's a second wave of the disease, the IMF may need to bolster its resources, she said. In that case, creating more reserve assets called special drawing rights, or SDRs, could help emerging markets avoid a cash crunch as they deal with the health crisis, economic stagnation and capital outflows, Georgieva said.

The IMF also is seeking $1.4 billion in donations from members to be able to provide debt relief to low-income countries so they can spend on health needs rather than debt repayment, Georgieva said in her speech. That's up from a previous $1 billion goal.

Read more: IMF Works to Speed Support for Record Developing-Nation Requests
The fund is looking at the use of precautionary credit lines to get cash to countries and establishing short-term loans, as well other funding options like the use of reserve assets called special drawing rights, or SDRs, Georgieva said. The IMF continues to call on rich governments to agree to a standstill of debt repayments by the world's poorest nations, she said.

The IMF and World Bank are preparing to hold their spring meetings via video conference for the first time ever next week. Their normal in-person meetings, which the organizations convene at their headquarters near the White House, typically draw thousands of delegates, observers and journalists from 189 member countries. The program has been pared down this year to be mostly media briefings, skipping the typical seminars and public discussions.

The IMF calculates that governments around the world have taken fiscal actions amounting to about $8 trillion, Georgieva said in a preview of key fund reports due to be released during next week's meetings, including the World Economic Outlook.

Georgieva stressed the need to continue with essential containment measures and support for health systems; shield affected people and firms with large, timely, targeted fiscal and financial-sector measures; reduce stress to the financial system and avoid contagion; and plan for an eventual recovery.

(Updates with comment from Georgieva in fifth paragraph.)

Antenna Modeling

Ah Spring! And an opportunity to get outdoors and ….put up another experimental HF Amateur Radio antenna!

Assuming you are on the verge of building / installing any antenna you might consider using one of the available free antenna modeling programs, such as 4NEC2 to 'model' the antenna and see what Maxwell's equations can tell you about its behavior given different lengths, heights above ground, slant vs horizontal orientation, etc. as a software model before you get out your pliers and soldering iron.

It will be a lot faster to 'experiment' with it as a model than 'cut and try' in the real world.

When you eliminate most of the bad choices, you can proceed to 'fine tune' a physical antenna with more confidence and a lot faster than using only the 'cut and try' method.

(The plots in the photo insert here show the radiation pattern of a simple ground plane vertical antenna modeled for the 2 Meter band.)
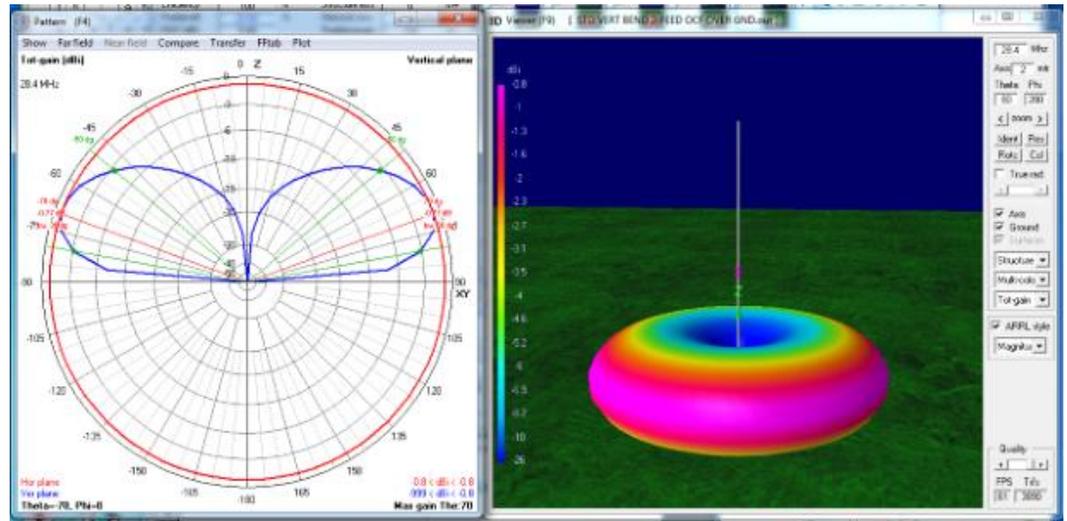
You may download the free copy **4NEC2** software from the web at: **https://www.qsl.net/4nec2/**

Note: Using this program will require study, practice and patience.
Don't give up, and use the Tutorials you will find on YouTube.

(I found this series of introduction to modeling with 4NEC2 to be simple enough for even me to follow.)
https://www.youtube.com/watch?v=6T58CLyqQa0&list=PLaGj1w4DXzYcKffgGZDUS3w1X-7f5PE4c&index=1

Also, I suggest you read parts 1, 2, 3 of A Beginner's Guide to Modeling with NEC, start at:
http://k6mhe.com/files/nec_part1.pdf

Part 1 will get you started. (There are 4 parts.)

With what you learn from an antenna model, your experimentation with the real antenna, and what you see on your NanoVNA, you should be able to zero in on an optimal antenna with fewer 'Ops' along the way.

Employee Appreciation

Here are six ways to mark Employee Appreciation Day today and every day:

Employee appreciation ideas 1) Ask employees what's important to them – why they accepted the job, why they stay, and how they would like to receive recognition.

Most employees will work their entire career without a manager ever asking these questions. Getting to know your employees better and differently costs nothing but a little time.

Employee appreciation ideas 2) Ask employees about the kind of work they want to do in the future and what they want to learn and gain exposure to. Write down what they say (so you don't have to remember) and give employees exposure to this type of work when it's appropriate (when there's a business need and when they've earned it by doing good work.)

Employee appreciation ideas 3) Give very specific, positive feedback regularly. Giving specific feedback demonstrates you're paying attention to employees' work and noticing the impact they're making. Employees want to know how they're doing. As odd as it may sound, feedback is a form of recognition. Taking the time to observe performance and give specific, timely feedback tells employees they matter.

Employee appreciation ideas 4) Tell the senior people in your organization what a great job your employees are doing. Employees have limited exposure to senior leaders. Don't make the people who can influence your employees' careers guess who's doing great work.

Employee appreciation ideas 5) Take the time to write a handwritten note. In my 15 years of working in a corporate environment, I received one handwritten note from one of my managers. I kept it for 10 years.

Employee appreciation ideas 6) Spend time with your employees. Every employee needs face time with his/her boss. Don't underestimate the value employees place on the time you give them. If you're not meeting with your employees on a one-on-one basis regularly, start. Meet for 30-minutes once a quarter. Then meet once a month. Employees create the meeting agenda and come prepared to give you an update on their work. You should be prepared to give both positive and upgrade feedback.

Notice not one of the employee appreciation ideas or ways to recognize Employee Appreciation Day above is monetary in nature. Employees want your time and attention. They want to learn and grow. Provided employees feel fairly compensated, money is secondary.

Today, and every day, find a way to say "thank you" that's meaningful to your employees. And the only way to know what employees will find meaningful is to ask.

Shari Harley <Shari_Harley@mail.vresp.com>

Visit: candidculture.com for more tips and tools on how to be candid in the workplace.

Please contact me anytime at shari@candidculture.com.

Particles x 3?

Why Do Matter Particles Come in Threes?
A Physics Titan Weighs In. *Three progressively heavier copies of each type of matter particle exist, and no one knows why. A new paper by Steven Weinberg takes a stab at explaining the pattern.*
Charlie Wood Contributing Writer - QuantaMagazine
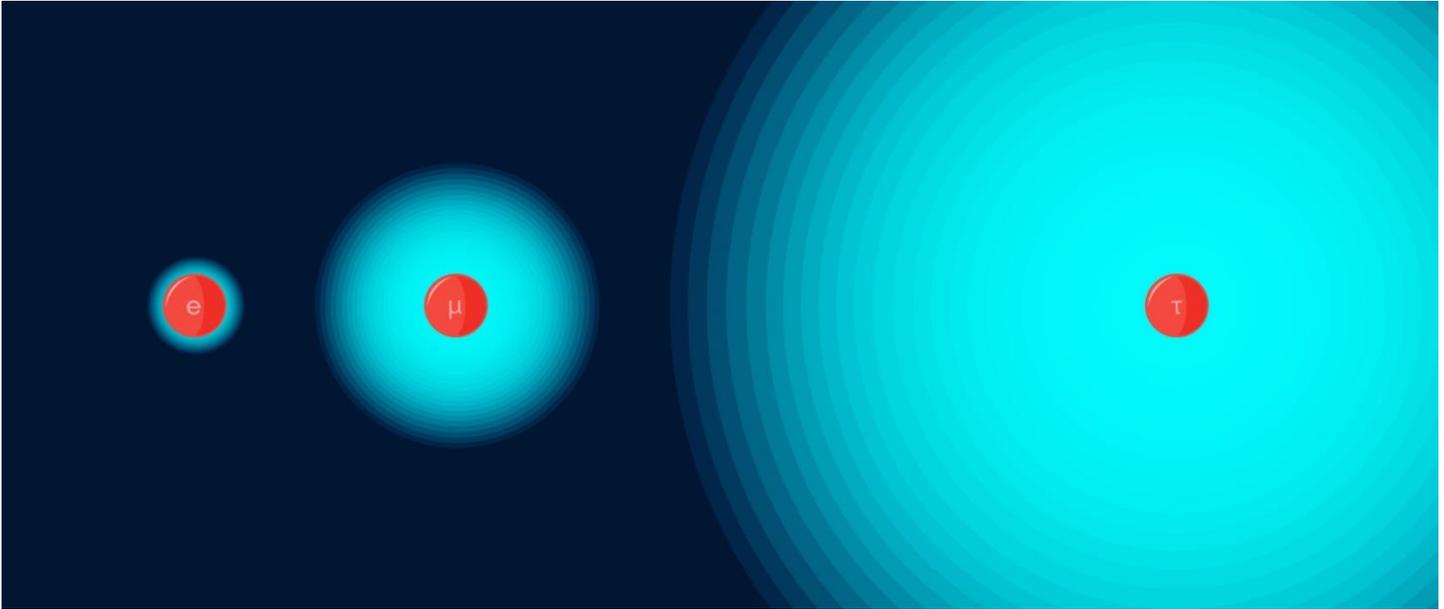
Puzzlingly, the laws of nature appear to be composed in triplicate, with three copies of all matter particles, each heavier than the last but otherwise identical.
Lucy Reading-Ikkanda/Quanta Magazine

The universe has cooked up all sorts of bizarre and beautiful forms of matter, from blazing stars to purring cats, out of just three basic ingredients. Electrons and two types of quarks, dubbed "up" and "down," mix in various ways to produce every atom in existence.

But puzzlingly, this family of matter particles — the up quark, down quark and electron — is not the only one. Physicists have discovered that they make up the first of three successive "generations" of particles, each heavier than the last. The second- and third-generation particles transform into their lighter counterparts too quickly to form exotic cats, but they otherwise behave identically. It's as if the laws of nature were composed in triplicate. "We don't know why," said Heather Logan, a particle physicist at Carleton University.

In the 1970s, when physicists first worked out the Standard Model of particle physics — the still-reigning set of equations describing the known elementary particles and their interactions — they sought some deep principle that would explain why three generations of each type of matter particle exist. No one cracked the code, and the question was largely set aside. Now, though, the Nobel Prize-winning physicist Steven Weinberg, one of the architects of the Standard Model, has revived the old puzzle. Weinberg, who is 86 and a professor at the University of Texas, Austin, argued in a recent paper in the journal *Physical Review D* that an intriguing pattern in the particles' masses could lead the way forward.

 "Weinberg's paper is a bit of lightning in the dark," said Anthony Zee, a theoretical physicist at the University of California, Santa Barbara. "All of a sudden a titan in the field is suddenly working again on these problems."

"I'm very happy to see that he thinks it's important to revisit this problem," said Mu-Chun Chen, a physicist at the University of California, Irvine. Many theorists are ready to give up, she said, but "we should still be optimistic."

The Standard Model does not predict why each particle has the mass that it does. Physicists measure these values experimentally and manually plug the results into the equations. Measurements show that the minuscule electron weighs 0.5 megaelectron volts (MeV), while its second- and third-generation counterparts, called the muon and the tau particle, tip the scales at 105 and 1,776 MeV, respectively. Similarly, the first-generation up and down quarks are relative lightweights, while the "charm" and "strange" quarks comprising the second quark generation are middleweights, and the "top" and "bottom" quarks of the third generation are heavy, the top weighing a monstrous 173,210 MeV.

The spread in the masses is vast. When physicists squint, though, they see a tantalizing structure in where the masses fall. The particles cluster into somewhat evenly spaced generations: The third-generation particles all weigh thousands of MeV, second-generation particles weigh roughly hundreds of MeV, and first-generation particles come in at around an MeV each. "As you go each level down, they get exponentially lighter," says Patrick Fox, a particle physicist at the Fermi National Accelerator Laboratory in Illinois.

In the equations of the Standard Model, the mass of each particle corresponds to the degree to which it "feels" a universe-filling field known as the Higgs field. Top quarks are heavy because they experience intense drag as they move through the Higgs field, like a fly stuck in honey, while wispy electrons flit through it like butterflies in air. In this framework, how each particle feels the field is an intrinsic attribute of the particle.

The Standard Model of particle physics includes three copies of each type of matter particle, which form the quadrants of the outer ring of the diagram.
Lucy Reading-Ikkanda/Quanta Magazine
In the heady days of the Standard Model's youth, explaining where these attributes came from was seen as the next logical step. Zee recalls asking his then-graduate student Stephen Barr to calculate the mass of the electron as his doctoral project — a task Weinberg's recent paper struggles with today, more than 40 years later. Barr and Zee published a rough idea in 1978, but string theory exploded onto the scene just a few years later, Zee says, sweeping away such efforts.

Barr and Zee's main idea, partly inspired by Weinberg's earlier works, was to follow the mass. Compared with the top quark's ponderous bulk, the masses of the electron and other particles look like rounding errors. Perhaps that's because they are. Barr and Zee suggested that only the heft of the heavier particles is fundamental in some sense.

A 2008 theory by Fox and Bogdan Dobrescu of Fermilab picked up where they left off. The top quark's mass happens to be roughly the same as the average energy of the Higgs field, so Fox and Dobrescu assumed that only the top quark slogs through the field in the standard way. "The top is clearly special in some regard," Fox said.

The other particles experience the Higgs field indirectly. This is possible because quantum mechanical uncertainty allows particles to materialize for brief moments. These fleeting apparitions form clouds of "virtual" particles around more

The Standard Model
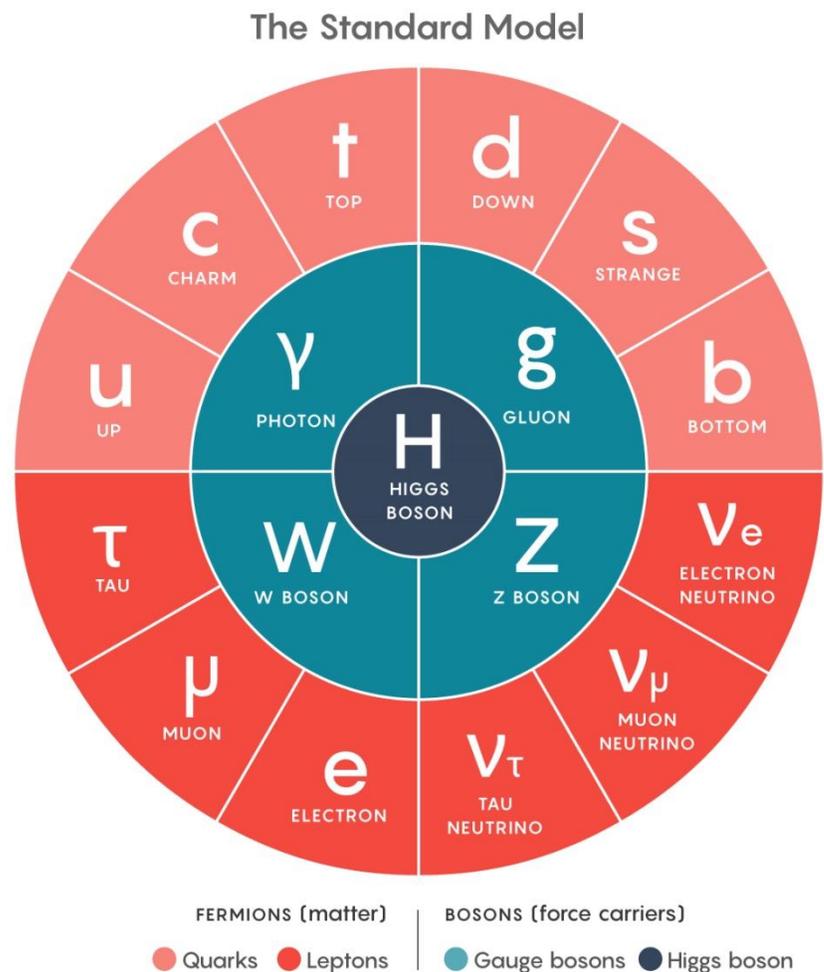
permanent entities. When virtual top quarks crowd around a (second-generation) muon, for example, they could expose the muon to the Higgs field by means of a mutual interaction with a new theoretical particle, giving the muon a bit of mass. But because the exposure is indirect, the particle stays much lighter than the top.

A second round of this game of quantum telephone makes the first-generation electron lighter again by a similar factor, explaining the rough generational spacing of thousands, hundreds, and a few MeV of mass. (The lightest particles of all, neutrinos, also come in three generations. But they act so differently from the other fundamental massive particles that they don't fit into such schemes.)

Weinberg's recent publication considers a whole variety of ways this telephone game could work. He grants the ability to feel the Higgs field to the entire third generation of matter particles — that is, the top quark, bottom quark and tau particle. Mass trickles down to the second and first generations from there via interactions with exotic virtual particles.

Weinberg's and Fox and Dobrescu's attempts both fall short, however. The latter two ended up increasing (rather than decreasing) the number of unexplained constants in the Standard Model in order to account for the three-generation particle masses. Weinberg's proposal gets the relationships between certain masses wrong and fails to describe how higher-generation particles can transform into lower-generation ones (the phenomenon that explains why we don't see atoms made of second- or third-generation particles). Weinberg was not available to discuss his work, but Fox suggests that Weinberg likely wrote the paper to encourage newcomers to take up the challenge and to flag the problems they're bound to run into.

Fox sees these hurdles not as fatal blows, but as signs that the theories need more tweaking. "Nature is never exactly how you imagine it at first pass," he said. "You have some beautiful idea and it sort of gets you 80% of the way there."

Others aren't convinced that singling out the third generation and massaging temporary clouds of particles is the right path in the first place. "It seems rather ad hoc because it's something you put in by hand," Chen said. She hopes to explain the three generations by embedding the Standard Model within a larger framework like string theory. One model she studies reduces the number of fundamental mass values by adding several new Higgs-like fields to the universe, although the exotic particles associated with these hypothesized fields are far too heavy to search for with Europe's Large Hadron Collider.

The only solid evidence that could support or distinguish between theories of the matter particles' masses would be the discovery of the various exotic particles each predicts. The Large Hadron Collider hasn't seen any, but Fox hasn't entirely lost hope that the phantasms could someday show up. He believes that experiments probing rare particle transformations, such as the muon-to-electron decay that Fermilab's Mu2e experiment will study when it goes online this year, have the best chance of indirectly detecting the meddling particles and shaking the Standard Model.

"We don't know if any of this makes sense," he said. "We'll have to wait and see."

This article was reprinted on Wired.com.

Intro to C Programming

SE Michigan Computer & Education Societies Chapter
Present
"An Introduction to Programming in C"
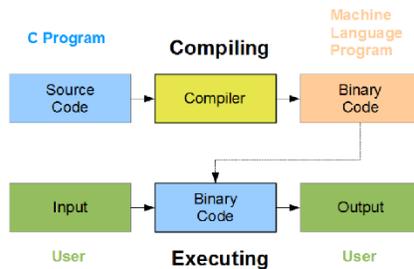
Although not originally designed for embedded software development, the C language allows a range of programming styles from high-level application code down to direct low-level manipulation of hardware registers. As a result, C has become the most popular programming language for embedded systems today. This 2-day tutorial, with exercises, uses appropriate examples to help you understand C programming quickly. Those who complete both days and pass the final exam will be awarded a proficiency certificate in C language programming.

Audience
This tutorial has been prepared for beginners to help them understand the basics of the C language. All attendees will receive a hardcopy of the lecture notes/course material. You can work from home on your Windows 10 laptop and submit the source programs for grading/evaluation. Instructions for downloading a C compiler will be provided. After completing this 2-day tutorial, you will find yourself able to handle C programs, from where you can advance further.

Prerequisites
Basic knowledge of programming (any language), computer architecture, and software development, coding, testing, etc. A fee of $49 (students), $99 (IEEE members) and $199 for non-members) is required to cover materials and logistics.

Instructor: Sharan.Kalwani@ieee.org

• When? Where? …
July 18 & 25th 2020

9 AM → 1 PM

• Audience: All Students, Members, Professionals and Industry Techs

• Where:
Online/Virtual using Webex

- - - - - - - - - - - - - -

Sponsored by
SE Michigan Chapter
Education Society
&
Computer Society

Pre-Registration Required!

https://events.vtools.ieee.org/m/233289

Death of Morse code?

By RALPH VARTABEDIAN   **TIMES STAFF WRITER**

In orbit high above Earth, a multibillion-dollar formation of communications satellites stands ready to instantly connect military leaders in Washington with every American warship and military base in the world.

But what if this technological masterpiece should go haywire or be knocked out by an enemy attack? The Pentagon's sophisticated communications net could go silent and leave troops groping for leadership.

Not to worry. The Pentagon has a backup plan, in part using technology that was invented in 1835, the year Mark Twain was born. It's the Morse code, the language of dots and dashes that has survived the assault of higher technology for a century and a half.

Even in an age when the human voice can be synthesized by a machine and lasers can transmit data over glass-fiber cables, Morse telegraphy has held firmly to the place it has staked out. It is used not only by the military but routinely by civilians and commercial enterprise.

[J-38 Morse 'Straight Key']

Dots and Dashes

Named after its inventor, Samuel F.B. Morse, the code is a series of combinations of short and long tones (dots and dashes) representing letters of the alphabet that can be transmitted manually by a key operator.

A telegrapher combines the dots and dashes to form letters and words. It is a seemingly tedious procedure but skilled operators can transmit and receive faster than most secretaries can type. The fastest Morse transmission ever recorded was 84 words per minute, sent by an operator named T.L. McElroy.

Morse telegraphy may seem like a quaint anachronism--with its brass sounder and key operated by the world's most basic tool, the human finger. In fact, however, it is sometimes vital to worldwide communications.

"When the Mexico City earthquake occurred (in 1985) and all the power went out, guess who was transmitting calls for international help? It was amateur radio operators using Morse telegraphy," said Marcus Stevens, an official at the Federal Communications Commission.

Reliable Standby

Advanced communications satellites can transmit 100 volumes of an encyclopedia in a second, whereas a journeyman Morse operator can send about 50 words per minute. But if sophisticated space systems fail, a portable, battery-powered Morse transmitter would be invaluable.

"We see the Morse code as a dying art, but we refuse to let it die completely," said Maj. Gen. Leo M. Childs, the Army's chief signal officer. "Newer isn't always better. Even though it is old and slow, Morse is still the most reliable in difficult conditions."

Of course, the most difficult condition imaginable would be a nuclear war, in which any survivors could have only Morse telegraphy for long-distance communications. In the event of widespread devastation, the Pentagon has organized 4,500 civilian amateur radio operators across the country who would attempt to operate a national communications system by broadcasting in Morse code.

But Morse code is not just for use in time of war. Every merchant ship bearing the U.S. flag must carry a radio officer who can both transmit and receive Morse code. Under U.S. law, the officer must spend eight hours every day at sea monitoring the radio for Morse distress calls.

Death of Morse code?

Should you ever find yourself adrift at sea in a lifeboat launched from a sinking passenger cruise ship, it will be equipped with a single communications device: a Morse transmitter that automatically signals a distress call and a keyboard in case you happen to know the Morse code.

Perhaps the best-known bit of Morse code is the call for help--SOS, which stands for "Save Our Ship" or "Save Our Souls." In the code, it is

Taxi passengers in major cities often hear radio dispatchers send a stream of Morse code. Under FCC rules, such private broadcasting operations must periodically identify their station and typically use Morse code to send their call letters.

Industrial Burst

The enduring use of Morse telegraphy is the legacy of a burst of industrialization in 19th-Century America, when railroads and telegraph developed side-by-side.

"The telegraph revolutionized the way people lived," said W.K. Dunbar, president of the Morse Telegraph Club in Normal, Ill. "It created for the first time the ability to transmit news across the country almost instantaneously."

Most of those railroad telegraph lines were used into the mid-20th Century, well after radio, television and computers became commonplace.

['Side-Swiper' Morse Key: Releived strain on operators using 'Straight Keys' for hours of sending.]
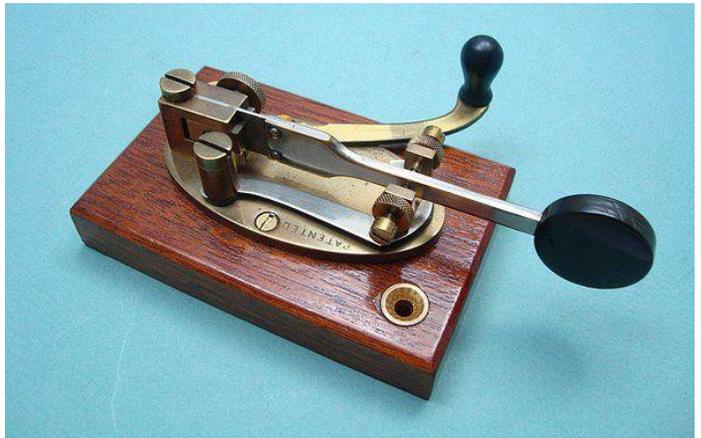
Until 1985, the Milwaukee Road had a Morse telegraph line between Milwaukee and La Crosse, Wis., that was used routinely to relay orders to train crews.

The telegrapher in La Crosse would write down on paper an order from Milwaukee and would pass it to a moving train by holding up a loop of string with the message attached. The engineer would lean out of the locomotive and catch the loop in his arm--"on the fly," as railroaders say.

This Milwaukee Road operation was shut down quietly three years ago, when Howard Hangas sent telegraph operator Fred Becker in La Crosse what may have been the last telegraph in American railroading.

"I sent the last message to Fred," recalled Hangas, a dispatcher on the Milwaukee Road, in a recent interview. "It said that after this message, Morse code wouldn't be used any more. At that point, we pulled the power on the Morse lines."

Of course, it was not the end of Morse code, even in railroading. It is still used by railroads in developing nations, including Mexico.

"About one month ago, I was on an excursion down in Sonora, and a couple of stations were still using telegraph land lines," said Chard Walker, a retired railroader who is now with the Orange Empire Railway Museum in Perris, Calif.

Some old-timers claim that a few branch rail lines in the United States still use the manual telegraph, but that could not be confirmed. "Are you talking about the dots and the dashes?" asked a dispatcher at the Elgin, Joliet & Eastern Railroad in Illinois. "We are behind the times, but we aren't that bad."

Serious Users

But the military services do not consider themselves behind the times, and they continue to be the most serious users of Morse telegraphy.

Death of Morse code?

While billion-dollar satellites and sophisticated ground networks are good in theory, such communications systems can break down on the battlefield. In the U.S. invasion of the Caribbean island nation of Grenada in 1983, for example, communications became so tangled that one soldier was forced to make a credit card call to a U.S. military base from a telephone booth on the island.

"As a matter of prudence," Gen. Childs said, the Army keeps a basic Morse capability. "Suppose our satellites were being jammed? The Morse code is the last-ditch method.".

Morse code signals can get through because they require much less broadcasting power to transmit than voice messages. In addition, even a distorted Morse signal can be interpreted, whereas a distorted voice transmission is virtually useless.

The Army annually trains about 2,800 men and women in Morse code for a variety of signal jobs in infantry, artillery, intelligence and even Special Forces.

[BUG 'Morse key' made 'automatic' dits and allow Morse speeds up to 40 wpm without stress on the operator's sending 'fist'.]

For example, Army commandos who are sent behind enemy lines to organize dissident civilians must be able to communicate clandestinely. They do it with Morse telegraphy that is transmitted in bursts too short to be located by enemy listening posts, Childs said.

The Navy considers Morse code capability of critical importance, owing to atmospheric disturbances that sometimes block radio voice transmissions.

Sunspot Cycle

"During the 11-year cycle of sunspots, you can run into times in certain areas of the globe where you cannot communicate with any of your equipment except with a Morse signal," said Senior Chief Petty Officer Alexander Constantopoulos, a Navy radio operator. "A machine can do only so much. If it doesn't get a quality transmission, you are going to get garbage. But with Morse, no matter how much distortion there is, you can copy that signal. Only human hearing can do that."

In addition to ships, some of the Navy's older airplanes, such as the early P-3 Orions and A-6 attack jets, also carry Morse telegraphy keys in their cockpits.

The Air Force trains hundreds of enlistees each year in Morse code, principally to monitor communications by foreign armed services. The Red Army continues to use the code for its communications, according to a former Soviet radioman.
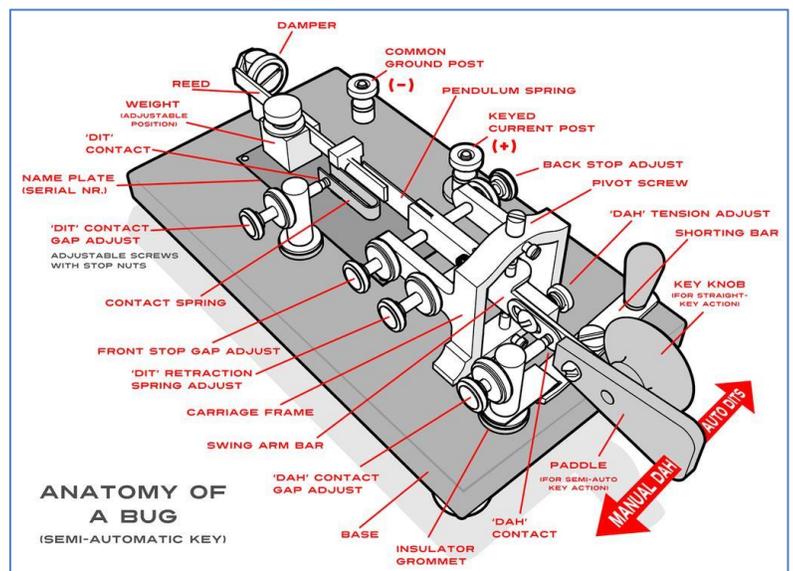
Death of Morse code?

Although nobody can forecast what a nuclear war would be like, virtually all worldwide communications would be shut down by two different nuclear effects.

An electro-magnetic pulse would create powerful shocks over a wide area to electrical devices and wires, probably destroying most radios, computers and communications gear, according to Kosta Tsipis, a physicist at the Massachusetts Institute of Technology.

The second effect in the aftermath of a detonation would obstruct radio transmissions. "The atmosphere would be saturated with ionized particles such that you will not be able to communicate with voice or data," explained Constantopoulos, the Navy radio operator. "But a Morse transmission will get through. It is very slow, but it is the most reliable."

He added: "He who communicates first, no matter how primitive, will come out on top."

In that case, retired railroad telegraph operators would probably take over the world. Each evening, the amateur radio waves come alive with the Morse transmissions of the retired railroaders, known among themselves as "old heads."

"I get on the air and use the code every night to talk to old railroad men," said Becker, the retired Milwaukee Road telegraph operator who received the railroad's final telegraph message in 1985. "There are lot of telegraphers around. Every night you hear them pecking."

Experienced Morse operators say the code is not so much a clatter of sounds as a language, because operators don't hear dots and dashes.

"You can sit back and hear a conversation," said Dunbar, the president of the Morse Telegraph Club. "You aren't an operator until you hear the words."

There are two Morse codes--the international code and the American railroad code--with some differences in the dot-dash combinations. The American code primarily uses sounders that produce clicks; the dots and dashes are distinguished by the time intervals between clicks. The international code normally uses an audio tone for the dots and dashes, making it easier to distinguish between them.

When Morse inaugurated telegraph service in 1844, he wired from Baltimore to Washington the now-famed message: "What hath God wrought?" Ever since then, the demise of Morse code has been predicted regularly. But for more than five decades after the invention of the telephone in 1864, Morse telegrams were the world's dominant form of telecommunications.

Far More Weight

"Telegraph was there before the telephone and carried on for years after," said Burke Stinson, a public relations man for American Telephone & Telegraph Co. "You have to appreciate that the written word carried--and still does carry--far more weight than the spoken word."

Only a third of American homes had a telephone by 1936, and during World War II the Western Union Telegraph Co. had 15,000 messengers to deliver telegrams across the country.

Western Union continued to use the telegraph until the mid-1960s. And it was not until just this year that it quietly dropped the word telegraph from its name and officially become the Western Union Corp.

Although the telegraph has receded from public view, experts say that they cannot envision an end to its use any time soon.

"I can carry a very small Morse key in my pocket and transmit around the world," said Stevens, the FCC official. "I don't think you will ever see the Morse code die. It is going to be difficult to find another method that is just as good."

WiE event

A Story of Gratitude:
Life Lessons from a Woman Engineer

ABSTRACT:

This presentation is intended to inspire and encourage young women and others to pursue their STEM/STEAM dreams no matter what challenges they may encounter. Attendees will hear Janice's story—a story of becoming an engineer and a story of gratitude for those who assisted her on the way. Starting from humble beginnings with uneducated parents, her curiosity and passion for math, science and education were cultivated and encouraged by her amazing mentors. The important life lessons that she learned in the last seven decades will be freely shared with the audience.

SPEAKER: Janice K. Means, PE, LEED® AP, FESD

Janice K. Means, PE, LEED® AP, FESD, Professor Emeritus, College of Architecture and Design, Lawrence Technological University, in Southfield-MI, has diverse experience in industry, engineering consulting and higher education. Ms. Means holds 2 undergraduate degrees from Oakland University in Rochester-MI and a Master's Degree in Mechanical Engineering from the University of Michigan. She is a Fellow in the Engineering Society of Detroit (ESD), a Michigan Registered Professional Engineer, a LEED Accredited Professional and has earned multiple distinguished service awards at the local level from ESD and at the local, regional and international level from ASHRAE. She also mentor's students and has done tremendous technical contributions in her field.

AGENDA:
1. Introduction
2. Presentation
3. Q&A

PRICE: Free
WHEN: Thursday, July 23rd, 1:00 P.M – 2:30 P.M.
WHERE: https://us02web.zoom.us/j/85715211847?pwd=cmwvZnl6YnVSOHJuTWRwRVpBeTFxdz09
             Meeting ID: 857 1521 1847
             Password: 573210
             +19292056099,,85715211847#,,1#,573210# US (New York)
             +13017158592,,85715211847#,,1#,573210# US (Germantown)
             +1 312 626 6799 US (Chicago) , +1 669 900 6833 US (San Jose)
             +1 346 248 7799 US (Houston)

REGISTER: https://events.vtools.ieee.org/m/233271

WiE Speaker Bio

Brief Bio of Janice Kathleen Means
Janice K. Means, PE, LEED AP, FESD, jmeans@LTU.edu

Janice K. Means, PE, LEED® AP, FESD, Professor Emeritus, Lawrence Technological University, Southfield, MI, has amassed diverse experience since becoming an engineer in the late 1970's.

Professor Means has engineering experience in the industry areas of natural gas pipelines, blasting, facilities and alternative energy. During the last 15 years of her career, Professor Means has coordinated and taught architecture and architectural engineering environmental courses. She has presented papers internationally and contributed to grants including Michigan's Vital Signs and 10kW Photovoltaic, EPA's 3P, and NREL's Solar Decathlon. Ms. Means has also organized several statewide and local sustainability and solar energy conferences since 1980.

Ms. Means maintains membership in several professional societies but is particularly active in ASHRAE (formally known as the American Society of Heating, Refrigerating and Air-Conditioning Engineers) and the Engineering Society of Detroit (ESD).

She has served as an active member of ASHRAE since 1985 in several leadership positions locally, regionally and at the Society (international) level. Ms. Means also co-authored and/or edited recent publications with ASHRAE, including a new guideline for Energy Efficiency in Historic Buildings, the 4th and 5th editions of ASHRAE GreenGuide: Design, Construction & Operation of Sustainable Buildings, and a new chapter on Climate Change to be published in the 2021 ASHRAE Fundamentals Handbook. She also was a contributing author to Chapter 36 in the 2008 ASHRAE HVAC Systems and Equipment Handbook .

Ms. Means is past Chair of the ESD Affiliate Council and a past board member of the Michigan Interfaith Power & Light and the Michigan Solar Energy Association.

One of Janice's goals in retirement is to help others—particularly women and minorities—achieve their goals, especially with regard to entering STEM/STEAM fields.

ECCE 2020

IAS 2020

Cloud Assessment Seminar

IEEE SE Michigan Computer & Education Section
Presents
"A Quality Assessment of Cloud-hosted Services"

IEEE Southeastern Michigan Section Computer Society and Education Society are happy to announce, a technical talk on how to use a model based approach to doing a quality assessment of Cloud-hosted Services.

This talk will describe a model-based system identification technique for quality assessment of cloud services. We shall see how the design of a cloud-based system – the algorithmic and workflow processes – can be inferred from service-level quality attributes such as availability, elasticity, and agility. The assessment module involves computational model of the system under test, collection and analysis of quality related service metadata, and system testing and inference techniques. The assessment method will be discussed using a cloud-based content distribution network (CDN) case study.

Speaker bio: Arun Adiththan is a Researcher at General Motors R&D, Warren, MI. In his research on complex software systems verification and validation, he uses methods and tools such as model-based systems engineering, simulation and data analysis. Arun earned his Ph.D. in Computer Science from City University of New York in 2018. He has published more than 25 international conference and journal papers.

At Glance

- **When:**
  Date: July 16th, 2020
  Time: 6:00 – 7:30 PM

- **Where:**
  Online via Webex (to be shared only after you have a confirmed registration)

- **Audience:** All eligible members and potential members (only if slots available)
  *

Sponsored by
IEEE
SE Michigan
Computer Society,
Education Society

Pre-Registration Required!

https://events.vtools.ieee.org/m/234321

ORG UNITS cheat sheet

Section Unit Name or Affinity Group or Chapter Name (Organizational Unit is in parentheses)		
Consultants Network Affinity Group: (CN40035)		
Life Members:		
Young Professionals:		
Women in Engineering:		
Chapter: 01	(SP01)	Signal Processing Society,
	(CAS04)	Circuits and Systems Society and
	(IT12)	Information Theory Society
Chapter: 02	(VT06)	Vehicular Technology Society
Chapter: 03	(AES10)	Aerospace and Electronic Systems Society and
	(COM19)	Communications Society
Chapter: 04 "Trident"	(AP03)	Antennas and Propagation Society,
	(ED15)	Electron Devices Society,
	(MTT17)	Microwave Theory and Techniques Society,
Chapter: 05 "Computer"	(C16)	Computer Society
Chapter: 06	(GRS29)	Geosciences and Remote Sensing Society
Chapter: 07	(PE31)	Power Engineering Society,
	(IA34)	Industrial Applications Society
Chapter: 08 "EMC"	(EMC27)	Electromagnetic Compatibility Society
Chapter: 09	(IE13)	Industrial Electronics Society,
	(PEL35)	Power Electronics Society
Chapter: 10	(TEM14)	Technology and Engineering Management Society
Chapter: 11	(EMB18)	Engineering in Medicine & Biology
Chapter: 12	(CS23)	Control Systems Society
Chapter: 13	(E25)	Education Society
Chapter: 14	(RA24)	Robotics And Automation Society
Chapter: 15	(NPS05)	Nuclear Plasma Sciences Society
Chapter: 16	(CIS11)	Computational Intelligence Society,
	(SMC28)	Systems, Man and Cybernetics Society
Chapter: 17	(NANO42)	Nanotechnology Council

Section Unit Name or Affinity Group or Chapter Name (Organizational Unit is in parentheses)	
University Of Detroit-Mercy:	(STB00531)
Michigan State University:	(STB01111)
University Of Michigan-Ann Arbor:	(STB01121)
Wayne State University:	(STB02251)
Lawrence Technological University:	(STB03921)
Oakland University:	(STB06741)
Eastern Michigan University:	(STB11091)
University of Michigan-Dearborn:	(STB94911)

Curated & Formatted By

Sharan Kalwani,
Wavelengths,
2017 ~ 2020

Non-IEEE Events

We try to publish IEEE events in several places to ensure that everyone who may want to attend has all the available relevant information. **NOTE: The IEEE SE Michigan section website is changing to its new home, kindly make a note of it! The new home is located at http://r4.ieee.org/sem/.** The old links will continue to work for some time, but will be changing permanently in the near future.

SEM e-Wavelengths:
www.e-wavelengths.org
This is our 'Active' event listing site where everyone should look first to see what events are scheduled for our Section in the near future.

SEM Web Calendar:
http://r4.ieee.org/sem/
Select "SEM Calendar" button in the top row of the website.

SEM Web Meetings:
http://r4.ieee.org/sem/
Select "SEM Meeting List" button in the left-hand column.

vTools Meetings:
http://sites.ieee.org/vtools/
Select "Schedule a Meeting" button in the left-hand column of buttons.

Other IEEE Local Meetings:
http://www.e-wavelengths.org/

Other Happenings

Here are some of the non-IEEE events that may be of interest to you or someone you know. Let us know if you have a special interest in a field that encourages technical study and learning, and wish to share opportunities for participation with members of the section.

Send details to: wavelengths@ieee-sem.org

- -

Michigan Institute for Plasma Science and Engineering: Seminars for the 2018-2019 academic year: http://mipse.umich.edu/seminars.php

Model RC Aircraft
http://www.skymasters.org/

Model Rocketry
http://team1.org/

Astronomy
http://www.go-astronomy.com/astro-clubs-state.php?State=MI

Experimental Aircraft Association
https://www.eaa.org/en/eaa/eaa-chapters/find-an-eaa-chapter

Robots
http://www.therobotgarage.com/about-us.html

Science Fiction Conventions
https://2019.penguicon.org/

http://www.confusionsf.org/

Mad Science
http://www.madscience.org/

ESD PE Review Class
https://www.esd.org/programs/pe/

Maker Faire:
https://swm.makerfaire.com/

Executive Committee

The SEM Executive Committee is the primary coordination unit for Southeastern Michigan (SEM) IEEE operations. The basic organization chart below shows the 2019 arrangement of communications links designed to provide inter-unit coordination and collaboration.

The SEM Executive Committee meets in a teleconference each month on either the first Wednesday or first Thursday at noon. The specific meeting days, times, phone or WebEx numbers and log in codes are published on the IEEE SEM Website calendar: **http://r4.ieee.org/sem/** Click on the "Calendar" button in the top banner on the first page of the web site.

If you wish to attend, or just monitor the discussions, please contact Christopher Johnson, the section secretary at: **cgjohnson@ieee.org** and request to be placed on the distribution list for a monthly copy of the agenda and minutes.

More meeting details are available on the next page of this newsletter.

Other Meetings:
About half of our members maintain memberships in one or more of the IEEE technical societies, which automatically makes them members of the local chapter which is affiliated with that society. As a result, they should receive notices of the local chapter meetings each month.

However, members of the section may have multiple technical interests and would like to have meeting information of other chapters. In order to communicate the meeting dates of all the chapters, affinity groups etc., to our members to facilitate their attendance, leaders of the groups are requested to send meeting information to our webmasters for posting on section's calendar.

More detailed information on meetings may be found through the IEEE SEM Website: **http://r4.ieee.org/sem/** and clicking on the **SEM meetings list** button near the bottom of the left-hand banner.

Automatic e-mail notification of web updates may be received using the "**Email Notifications**" button at the top of the **SEM Tools/Links** side banner.

Christopher Johnson - SEM Secretary

Download the **complete SEM Organization Chart**, in PDF format, from our Website at: http://r4.ieee.org/sem/
Click on "About SEM" Tab and "Current Officers" *(NOTE: this is now password protected)*
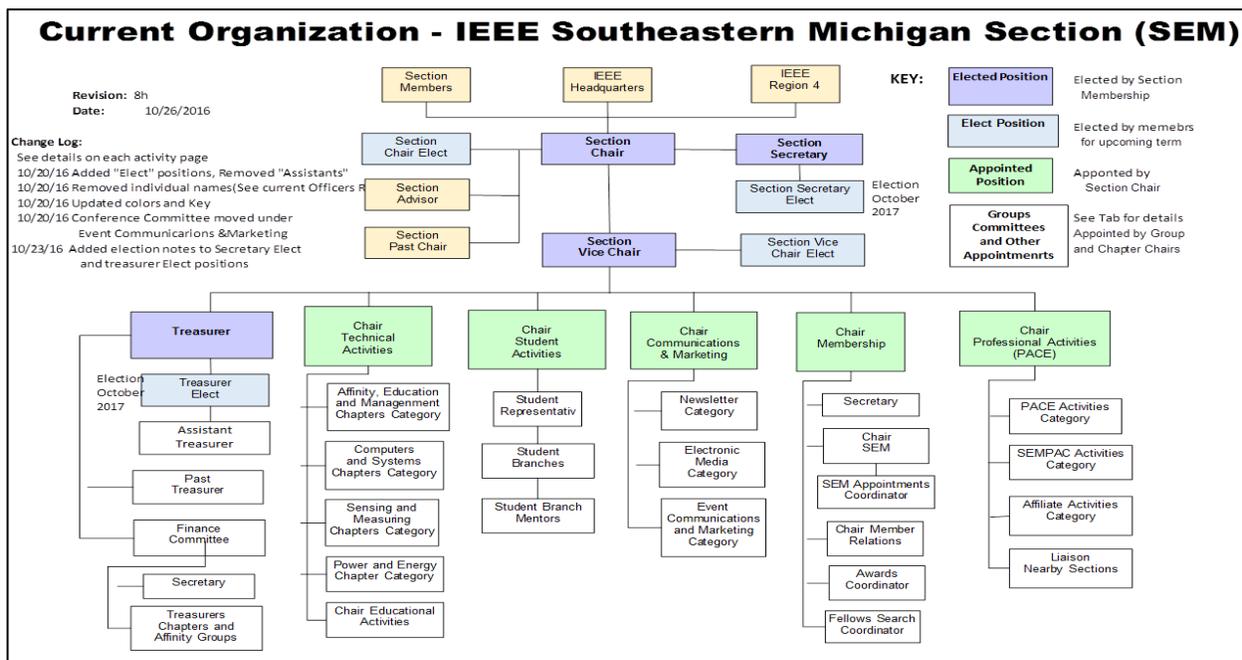
ExCom Meeting Schedule

Below is the 2020 schedule for the Section ExCom meetings with links to add the events to your calendar. It is important that at least one person from each Chapter/Affinity Group attends each scheduled ExCom meeting. Information on each Face-to-Face (in-person) Meeting will be sent out once the venue is confirmed.

Please mark your calendars for the 2020 meetings. Or, link your personal calendar to the SEM Web calendar.

Section Administrative Committee (ExCom) Meeting Schedule for 2020:

Note: All IEEE Members are welcome at any IEEE meeting, at any time but please register so we can be sure to accommodate you. This month's meeting is highlighted in **Bold**.

Teleconference, Wednesday July 8 **https://events.vtools.ieee.org/m/216970**

Teleconference, Thursday August 6 **https://events.vtools.ieee.org/m/216755**

Teleconference, Wednesday September 2 **https://events.vtools.ieee.org/m/216756**

FACE TO FACE, Thursday October 7 **https://events.vtools.ieee.org/m/216971**

Teleconference, Wednesday November 4 **https://events.vtools.ieee.org/m/216759**

Teleconference, Thursday December 2 **https://events.vtools.ieee.org/m/216760**

Chris Johnson
SEM Secretary
cgjohnson@ieee.org

Editor's Corner

Previous editions in this series may be found on the IEEE SEM website at: http://r4.ieee.org/sem/. Click on the "Wavelengths" button in the top row of selections.

Comments and suggestions may be sent to the editorial team at wavelengths@ieee-sem.org
OR
sharan.kalwani@ieee.org
nilesh.dudhaia@ieee.org
k.williams@ieee.org
cgjohnson@ieee.org

We rely on our officers and members to provide the 'copy' that we finally present to readers of the newsletter. The **Wavelengths Focus Plan and Personal Profiles** plan shown in the matrix below is presented to ensure coverage of section activities and events.

We try to complete the newsletter layout a week before the first of the month to allow time for review and corrections. If you have an article or notice, please submit it two weeks before the first of the month or earlier if possible.

The plan below relies on the contributions of our members and officers, so please do not be shy. If you have something that should be shared with the rest of the section, we want to give you that opportunity.

Editors:

We are always looking for members interested in helping to edit the newsletter. The process is always more fun with more people to share the duties. Having more participants and contributors also helps us keep the newsletter interesting.

Heads Up

We are contemplating making the submissions of articles and events for the Wavelengths, a little easier and a little more inviting. Ideas are of course welcome and to this end, we are toying with setting up a little "newsletter portal". Stay tuned for some news on that end!

Join the Team:

If you feel you might like to join the team, or would like to train with us, please contact one of us at: wavelengths@ieee-sem.org OR any one of the following:

sharan.kalwani@ieee.org
nilesh.dudhaia@ieee.org
k.williams@ieee.org
cgjohnson@ieee.org

Wavelengths Annual Publication Plan for Articles

Month	AG's	Ch's	Ch's	SB's	Special Notice	Reporting Events	Monthly Focus	Awards
Jan		1		OU	Future Cities Judges	Election Results	Resolutions	
Feb	Cons	2		MSU	Science Fair Judges	Officer's Welcome	Surviving Winter	Future Cities
Mar		3	13	EMU	Spring Conf. Flyer	Spring Conference	Spring Conference	Science Fair
Apr		4		U/M-D	National Engrs Wk.	Future Cities	Chapter Focus	ESD - GOLD
May	Life	5	14		Outstanding Eng Awd	Science Fair	Elections - Prep	New Fellows
Jun		6			IEEE-USA Apmts.	ESD Banquett	Leadership Skills	SEM Awards
Jul		7	15		Nominations Call	MD-Webcasts	Students Issues	Region 4
Aug	WIE	8			MGA - Apmts.	Tech-Webinars	Womens Issues	
Sep		9	16	LTU	Region 4 Apmts.	Engineers Day	Professional Skills	
Oct		10		U/M-AA	Fall Conf. Flyer		Fall Conference	
Nov	YP	11	17	WSU	ELECTIONS!		Humanitarian	
Dec		12		U/D-M	IEEE-Com Apmts.	Fall Conference	Happy Holidays	

Wavelengths Annual Publication Plan for Personal Profiles

Month	Profiles	Profiles	Committees
Jan	Chair	New Officers	
Feb	V-Chair	Secretary	Communications
Mar	Treasurer	Sect-Adviser	Conference
Apr	Stud-Rep		Education
May		Sr Officers	Executive
Jun			Finance
Jul			Membership
Aug			Nominations
Sep			PACE Activities
Oct			Student Activities
Nov			Technical Activities
Dec		Editor-WL	

Web & Social Sites

SEM Website
http://r4.ieee.org/sem/

Each of the sites below may be accessed through the SEM Website:

Section Website Event Calendar
(Select the "SEM Calendar" button - top row.)

SEM Facebook Page
(Select the " f " button under the top row.)

SEM LinkedIn Page
(Select the " in " button under the top row.)

SEM Officers:
For a complete listing of all - Section - Standing Committee - Affinity Group - Chapter and Student Branch Officers, see the SEM Officers Roster on the SEM web page under the "About SEM" button and select "Current Officers."

Section Officers

Section Chair
David Mindham

Section Secretary
Chris Johnson

Section Vice-Chair
Sharan Kalwani

Section Treasurer
Michael Folian

Standing Committees:

Section Adviser
Don Bramlett

Chair Communications & Marketing

Chair Educational Activities
Christopher Guirlanda

Chair Finance
Nevrus Kaja

Chair Membership Development
Sharan Kalwani

Chair Nominations & Appointments
Kimball Williams

Chair Professional Activities (PACE)
Sharan Kalwani

Chair Student Activities
Mel Chi

Student Representative

Chair Technical Activities
Jeffery Mosley

Wavelengths Editor
Sharan Kalwani

IEEE Southeastern Michigan

Electrical and Electronic Engineers Creating Our Future

Visit Us on the Web at:
http://r4.ieee.org/sem

My code never has bugs It just develops random unexpected features.

Leadership Meetings

SEM Executive Committee Monthly Teleconferences:
- 1st Wednesday or Thursday of Each Month @ Noon
- Check the Section Web Calendar at:
  http://r4.ieee.org/sem/sem-calendar/
  (Select the "SEM Calendar" button in the top row.)

SEM Executive Committee Face-to-Face Meetings:
- Once every Qtr. Find the location, and Registration at:
  https://meetings.vtools.ieee.org/main

SEM Standing Committee Meetings:
SEM Affinity Group Meetings:
SEM Technical Society/Chapter Meetings:
SEM University Student Branch Meetings:
- Meeting schedules are announced on SEM Calendar
  http://r4.ieee.org/sem/
  (Select the "SEM Calendar" button in the top row.)

- Registration for all at:
- **https://meetings.vtools.ieee.org/main**