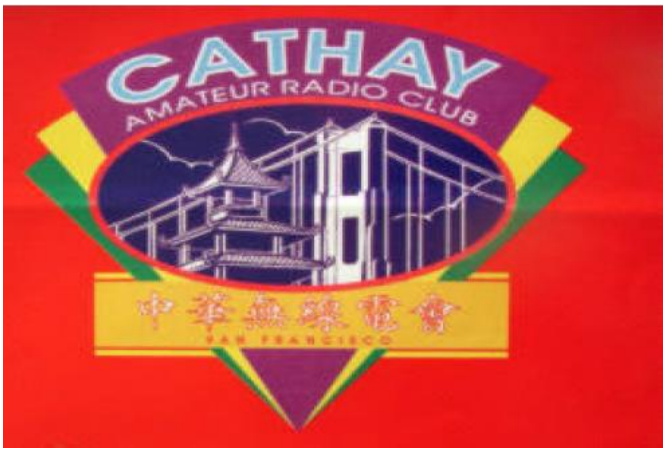

Cathay June 2014

www.cathayradio.org

President: George Chong, W6BUR **email:** *W6BUR@comcast.net*

Vice President North: Leonard Tom, *NX6E* **email:** nx6e@hotmail.com

Vice President South: Bill Fong, *W6BBA* - **email:** w6bba@arrl.net

Secretary/Membership: Rodney Yee, *KJ6DZI* - **email:** rodyee2000@yahoo.com

Editor: Rodney Yee, *KJ6DZI* - **email:** rodyee2000@yahoo.com

Treasurer: Vince Chinn aka Mingie, *W6EE* - **email:** vince@vincechinncpa.com

Web Master: Edison Fong – *WB6IQN* - **email:** edison_fong@hotmail.com

Mission: The Cathay Amateur Radio Club is basically an active social club of Ham Radio Operators and their spouses. We support local community requests for HAM emergency communications. Several of us are trained in CPR/ First Aid and are involved with community disaster preparedness.

Monday Night Net Time: 9 PM Local Time/PST, Frequencies: 146.67MHz -600KHz PL85.4 and 442.70 +5MHz PL 173.8. The repeaters are linked only during the CARC Monday night net.

Update: Link to repeater 442.70 is currently not active until further notice.

The CARC Monday night net is the best way to find out the latest club news.

All check-ins are welcome.

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Message from the President: George Chong, *W6BUR*

Hello CARC Members and Friends;

Yes, it is that time of the year again that you all been anxiously awaiting for, June 28-29 is **Field Day!**

Field Day: We (George and Hetty) are hosting the CARC Field Day and pot luck luncheon at my home in the Oakland Hills at 10am- 2pm Saturday June 28, 2014.

Come and bring some of your favorite food to share – perhaps enough for 8 to 10 servings. Soft drinks, cups, plates, napkins, and utensils will be provided.

Both myself and wife (George - w6bur and Hetty - wb6shu) will be monitoring the CARC VHF repeater, should you get disorientated and require additional directions. My home cannot be seen from the street. We have many new members and those of you who have never been here before, Hetty and I are looking forward to meeting you in person, as a matter of fact we all should eye ball each other again.

Most of you already have the UHF alternate repeater program into your radio's memories. You may recall we install this "channel Two" in the event the regular repeater stops talking, jamming or whatever. The intention: it is our BACK-UP! The frequencies or PL will not be published "word of mouth" or another sure way is to come to our Field Day Pot Luck.

When you hear reference to "channel two" go there NOW!. Please do not ask for the frequency or PL. CARC members have been instructed not to give out the “channel two” frequency over the air. The UHF alternate repeater will also be available to you at all times it is open 24/7. You are welcome to try out “channel two” on your way up here. Don't forget, if you hear nothing on the VHF machine GO TO channel Two!

Both of my VHF antenna and UHF antenna are high gain collinear types that provide between 5 to 6 dB of gain. The antennas will be available for connecting your portable radio or HT if you wish to make some contacts. The antenna feed lines are the standard 50 Ohm - RG8/U Coax with a UHF male connectors. For you folks that wish to connect their HT to my antenna feed line, please bring the appropriate adapter. Should you need a power output check on your HT's, my SWR Bird Model 43 with a 50 Ohm dummy load will be available

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You are also welcome to use my HF transceiver that is dialed into the 40 meters band, frequency 7.223 MHZ, lower side band. The QTH site is at a 1,200 foot elevation – great for transmitting and receiving.

Don't forget to bring your latest HAM gear so we can show it off to each other and compare our gear.

Please contact George W6BUR (W6BUR@comcast.net) and/or Bill Chin (bill.kc6pof@comcast.net) no later than Saturday June 21th, 2014 if you are able to attend. Please email Bill Chin for the address and directions to my home in the Oakland Hills.

If you plan to come to the pot luck, please indicate how many guests, and what you might be bringing – whether a salad, appetizer, main dish, dessert, etc. A separate email invitation to CARC members will be sent out with the address and directions to our house.

Hetty would like very much to see your ladies; the event is not just for you HAM guys as she also wants company too. She has some lovely potted plants that she wishes to give away for you to brighten up your home.

After our Pot Luck lunch, please follow me to another HAM radio site in the Oakland Hills known as ORCA. You will see a real Field Day site in action; it is only ten minutes away.

Public Service Announcements Intro

Last call for our members to participate in this month's Cancer Society Relay Fund Raiser. As many of you know it is a very worthy cause championed by our CARC member Skip Weiss – KG6SCE.

Skip Weiss is requesting licensed HAM communications support during an upcoming Cancer Society Relay Fund Raiser.

For additional information, please read the "Public Service Announcement" section of this newsletter.

Featured Tech Article Intro

This month's Tech Article is something that is always on our mind and that we all never seem to have enough of it nor can we purchase more of it; No I am not talking about MONEY/GOLD…… I am taking about something just as valuable: Time.

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Regardless of our social status and wealth we cannot control “TIME”, however we can measure it with uncanny accuracy.

On April 3, 2014, the U.S. Department of Commerce's National Institute of Standards and Technology (NIST) have announced that official source of time for the entire United States is the new and improved Atomic Clock, the NIST-F2.

The previous atomic clock, NIST-F1 has been in continuous use since December 1999 and operated by NIST in Boulder Colorado.

A decade of research went into making the new NIST-F2 atomic clock accurate to one trillionth of a second each day and making it three times more accurate as the previous atomic clock, the NIST-F1.

In case you are planning to pick up a used NIST-F1 atomic clock from a surplus government equipment auction, you would be out of luck as it will continue to be used alongside the NIST-F2 atomic clock. In case you are wondering there appears to be less than 100 atomic clocks worldwide based upon the list in Wikipedia: http://en.wikipedia.org/wiki/List_of_atomic_clocks.

How the NIST-F1 & NIST-F2 Cesium Fountain Atomic Clock Works

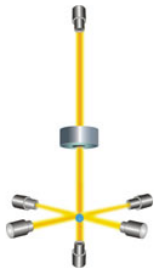

FIGURE 1: A gas of cesium atoms enters the clock's vacuum chamber. Six lasers slow the movement of the atoms, cooling them to near absolute zero and force them into a spherical cloud at the intersection of the laser beams.

FIGURE 2: The ball is tossed upward by two lasers through a cavity filled with microwaves. All of the lasers are then turned off.

FIGURE 3: Gravity pulls the ball of cesium atoms back through the microwave cavity. The microwaves partially alter the atomic states of the cesium atoms.

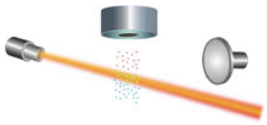

FIGURE 4: Cesium atoms that were altered in the microwave cavity emit light when hit with a laser beam. This fluorescence is measured by a detector (right). The entire process is repeated until the maximum fluorescence of the cesium atoms is determined. This point defines the natural resonance frequency of cesium, which is used to define the second.

The US atomic clocks (NIST-F1 & NIST-F2) use the natural resonance frequency (9,192,631,770 Hz / cycles per second) of the cesium atom for its time keeping

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operations. The atomic clocks are needed for triangulation by the global positioning systems, calibration of other time pieces, computer networks, astronomy, and financial transactions and by many other science disciplines.

The frequency of 9.19263177 GHz / 3.261225572 centimeters wavelength is within the Super High Frequency Band (SHF). The SHF band is just above the Ultra High Frequency (UHF) band.

Super high frequency (or SHF) is the International Telecommunication Union (ITU) designation for radio frequencies the range of 3 GHz and 30 GHz. This band of frequencies is also known as the centimeter band with wavelengths ranging from ten centimeter to one centimeter.

Table of ITU Radio Bands

Band Number	Symbols	Frequency Range	Wavelength Range†
4	VLF	3 to 30 kHz	10 to 100 km
5	LF	30 to 300 kHz	1 to 10 km
6	MF	300 to 3000 kHz	100 to 1000 m
7	HF	3 to 30 MHz	10 to 100 m
8	VHF	30 to 300 MHz	1 to 10 m
9	UHF	300 to 3000 MHz	10 to 100 cm
10	SHF	3 to 30 GHz	1 to 10 cm
11	EHF	30 to 300 GHz	1 to 10 mm
12	THF	300 to 3000 GHz	0.1 to 1 mm

Now armed with this new knowledge about atomic clocks, please enjoy reading the Tech Article Section for additional information

CARC Final Wrap-up News

Chat sub s'em to all you CARC members! - George W6BUR.

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Public Service Announcements

HAM CRAM / HAM Licensing

For upcoming HAM Licensing locations please refer to:
http://www.arrl.org/find-an-amateur-radio-license-exam-session

Bart Lee – K6VK

LATEST ON California Historical Radio Society (CHRS) BUILDING PURCHASE…

The following statement was read at Radio Day By The Bay and is the latest information we have at this time about CHRS purchase of its future home at 2152 Central Avenue, Alameda – The New CHRS 'Radio Central'

On April 23rd 2014 CHRS took possession of the historic building at 2152 Central Avenue in Alameda CA. It will now be known as CHRS 'Radio Central' and is now the Permanent home of the California Historical Radio Society and its' programs, the Bay Area Radio Hall Of Fame and the Society Of Wireless Pioneers.

CONGRATULATIONS AND HAPPY 40TH BIRTHDAY CHRS! - Our favorite Historical Radio Society has done something that most non-profits only dream about… We have raised enough money to buy a permanent home!

As of today**, OUR CASH TOTAL BUILDING FUND DONATIONS** = $1,053,700, spread across 448 donations! Our $1.15 Million dollar goal lets us buy the building, start necessary repairs and construction and most importantly gives CHRS an emergency fund. We feel that this a wise approach. That is why we still need $96,300 for this drive.

This building is 114 years old and in some areas shows its' age. We have some roofing issues, asbestos issues, minor termite damage and one tiny moldy closet. Don't be scared, this building has great bones and all these problems can be corrected. We have a Boys Room and Girls Room with many more stalls than we will ever need and a bunch of 24″ sinks. We need to turn these rooms into adult ADA bathrooms. It's all doable. It just takes lots of money. Oh yes… We also have to build a Museum.

For additional information see: http://www.californiahistoricalradio.com/

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Auxiliary Communications Service (ACS)

The Auxiliary Communications Service (ACS) was organized by the San Francisco Office of Emergency Services (OES) following the 1989 Loma Prieta Earthquake to support the communications needs of the City and County of San Francisco when responding to emergencies and special events.

The Auxiliary Communications Service holds General Meetings on the third Tuesday of each month at the San Francisco Emergency Operations Center, 1011 Turk Street (between Gough Street and Laguna Street), from 1900 hours to 2100 hours local time. All interested persons are welcome to attend.

The ACS Net begins at 1930 hours (7:30 p.m.) local time each Thursday evening, on the WA6GG repeater at 442.050 MHz, positive offset, tone 127.3 Hz. The purpose of this net is to practice Net Control skills, practice checking in with deployment status in a formal net, and to share information regarding upcoming ACS events. Guests are welcome to check in. ACS Members should perform Net Control duty on a regular basis. On the second Thursday of each month, the net will be conducted on the output frequency of the WA6GG repeater, 442.050 MHz no offset, tone 127.3 Hz, simplex.

For more information, please attend an ACS meeting or check in on a net, or call 415-558-2717.

Upcoming meetings: Tuesday 7pm, June 17, 2014
Tuesday 7pm, July 15, 2014
Tuesday 7pm, Aug 19, 2014

Gilbert Gin (KJ6HKD)

Free Disaster Preparedness Classes In Oakland:
http://www.oaklandnet.com/fire/core/index2.html

CORE is a free training program for individuals, neighborhood groups and community-based organizations in Oakland. The underlying premise is that a major disaster will overwhelm first responders, leaving many citizens on their own for the first 72 hours or longer after the emergency.

If you have questions about the recertification process, you may contact the CORE Coordinator at 510-238-6351 or core@oaklandnet.com.

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Free Disaster Preparedness Classes In San Francisco – NERT Taught by San Francisco Fire Department

RSVP to sffdnert@sfgov.org or call 415-970-2024 to register.
Visit www.sfgov.org/sffdnert to learn more about the training, other locations, and register on line.

Upcoming Special NERT Events.

June

5th: NERT Communications 601: Social Media and NERT, 6:30pm-9:30pm, SFFD DOT*
Register

7th: Leaders Workshop: N is for Neighborhood, Location TBD, 8:30am-12:30pm
Fun focus on NERT Leadership in your neighborhood
Registration not yet open

18th: ICS Forms workshop. All NERT grads welcome. 7:00p-8:30pm, SFFD DOT*
Review each NERT ICS Form. The forms are crucial for safety and accountability.
Register

21st: Staging area drill, 8:30am-12:30pm, SFFD DOT*
Put your neighborhood command center ICS to practice
Register

24th: Prepare to Recover. 6:30pm-9:30pm, SFFD DOT*
In preparedness, you increase your ability to recover. Join us for this new class!
Register

29th: SF PRIDE Parade
Register. The Golden Gate Park Band honors NERT & CERT volunteers, 1:00pm, Golden Gate Park Music Concourse (Band shell). Bring a picnic lunch at noon. It's-It Ice Cream provided by donation from the Rotary Club.

*** SFFD DOT is the Division of Training @ 19th Street/Folsom. (enter through yard on 19th and park along back wall) Division of Training classroom is in the 1-story building directly next to the Fire Station on the corner.**

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San Francisco Police Department: Auxiliary Law Enforcement Response Team (ALERT)

The Auxiliary Law Enforcement Response Team (ALERT) is a citizen disaster preparedness program designed. The ALERT program is for volunteers 16 years of age or older, who live, work, or attend high school in San Francisco.

Graduates of the San Francisco Police Activities League (P.A.L) Law Enforcement Cadet Academy are also eligible to join.

ALERT volunteers will first complete the Fire Department's Neighborhood Emergency Response Team (NERT) (www.sfgov.org/sfnert) training and then graduate into an 8 hour Police Department course specifically designed for ALERT team members.

ALERT members will work closely with full-time and/or Reserve Police Officers in the event they are deployed after a disaster. The Basic ALERT volunteer will have no law enforcement powers other than those available to all citizens.

SFPD ALERT Training

The next ALERT training classes have been scheduled for Saturday, August 9th 2014. The classes will be held at the San Francisco Police Academy, in the parking lot bungalow, from 8am-5pm (one hour lunch break).

IMPORTANT- All participants must complete the background interview process in order to be eligible to attend the ALERT training class.

Eligible ALERT participants may register for a training class by contacting the ALERT Program Coordinator, Mark Hernandez at sfpdalert@sfgov.org, or by telephone at 415-401-4615.

SFPD ALERT Training Drill

All active/trained ALERT members are asked to join us for our next training drill, scheduled for **Saturday, July 12h, 2014**. The drill will be held in the Police Academy (350 Amber Drive) parking lot from 9am-12pm. Details will be emailed to active ALERT members, prior to the date of the exercise. Participation is not required, but strongly encouraged.

PUBLIC INFORMATIONAL MEETING

An informational meeting will be held at the San Francisco Police Academy, located at 350 Amber Drive, Parking lot bungalows, on **Thursday, June 5th, 2014**, at 7pm. All members of the public are welcome. Interested individuals will have their questions about the program answered at the meeting.

For more information on the San Francisco Police Department ALERT Program, email us at sfpdalert@sfgov.org, or call Sergeant Mark Hernandez (SFPD, Ret.), SFPD ALERT Program Coordinator, at (415) 401-4615.

For additional information on the web please refer to:
http://sf-police.org/index.aspx?page=4019

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From CARC Member Skip Weiss, KG6SCE

Event: Relay for Life / Daly City - A 24 Hour Cancer Society Relay Fund Raiser

Time: Starting at 10:00 am Sat June 21 and ending at 10:00 am Sun June 22, 2014

Location: Westmoor High School Sport Stadium
131 Westmoor Ave, Daly City, CA 94015
Entrance at corner of Del Prado Dr. & Mariposa Ave

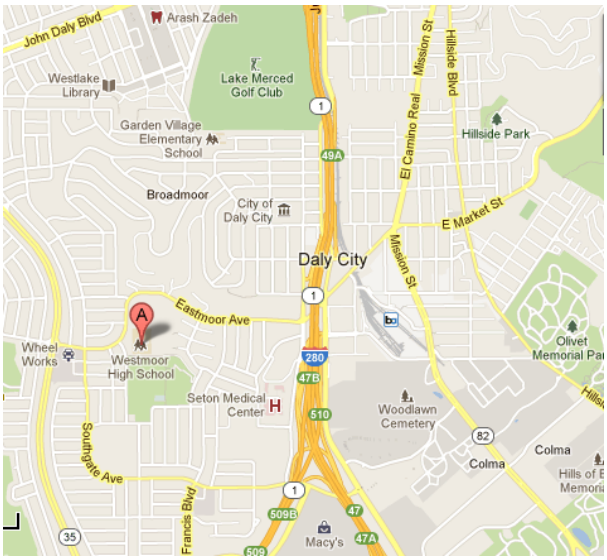
Additional Information:
http://main.acsevents.org/site/TR?sid=128433&type=fr_informational&pg=informational&fr_id=56642

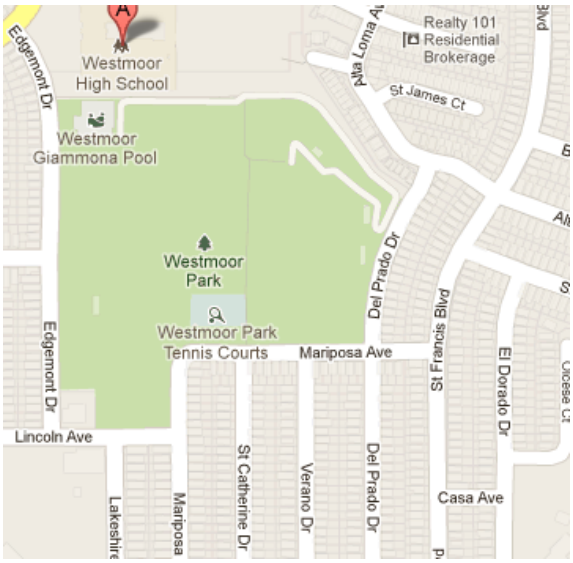
To Sign Up:
http://main.acsevents.org/site/TR/RelayForLife/RFLCY14CA?pg=informational&fr_id=56642&type=fr_informational&sid=189572

HAM volunteers are needed to help with directing cars, public safety and HAM radio communications support.

Please contact Skip Weiss, KG6SCE via email for further details and assignments.
- Email address: "Skip Weiss" calgrizzly@earthlink.net
- Subject Line: Relay for Life/HELP

Skip (KG6SCE) and his VFW are supporting this worthwhile event. Map of Westmoor High School Location is shown below (entrance located at the intersection of Mariposa Avenue & Del Prado Drive):





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The Relay Event is:

- Organized, overnight community fundraising walk
- Teams of people camp out around a track
- Food, games and activities provide entertainment and build camaraderie
- Family friendly environment for the entire community

The scheduled activities are:

Opening Ceremony: 10:00 am Saturday, June 21, 2014

The Opening Ceremony brings everyone together for a high-energy event kickoff to celebrate the lives of those who have battled cancer, to inspire hope by sharing recent accomplishments and progress, and to remind everyone that while we are winning this battle, fighting cancer is a year-round priority.

Survivors & Caregivers Lap: 10:30am Saturday, June 21, 2014

During the Survivors & Caregivers Lap, upbeat music plays as all cancer survivors and caregivers at the event take the first lap around the track cheered on by the other participants who line the track, celebrating their victory over cancer and their fight to end cancer!

Luminaria Ceremony: 9:00pm Saturday, June 21, 2014

The Luminaria Ceremony is a time to remember people we have lost to cancer, to support people who currently have cancer, and to honor people who have fought cancer in the past. The power of this ceremony lies in providing an opportunity for people to work through grief and find hope.

Fight Back: 9:30am (Sunday, June 21, 2014)

The Fight Back Ceremony symbolizes the emotional commitment we each make to the fight against cancer. The action we take represents what we are willing to do for ourselves, for our loved ones, and for our community to fight cancer year-round and to commit to saving lives.

Closing Ceremony: 10:00am (Sunday, June 21, 2014)

The Closing Ceremony is a time to remember the lives of those lost and to Celebrate that each of us has committed, through our participation in a Relay

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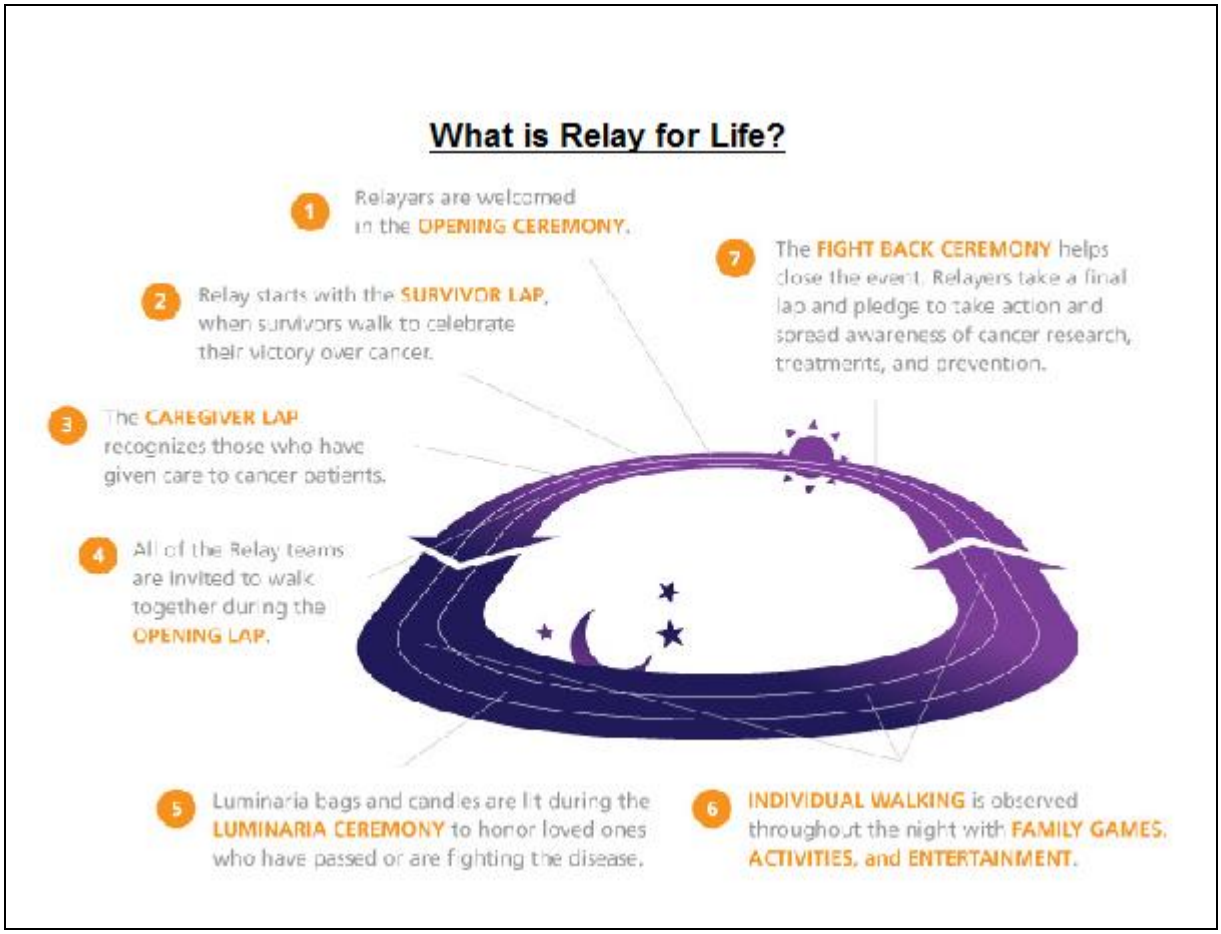
event, to fight back against this disease over the next year.



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Featured Tech Article:

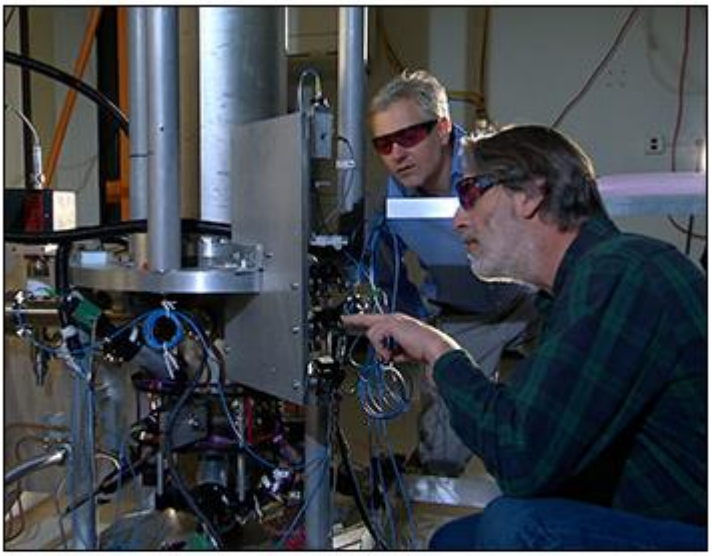
NIST Launches a New U.S. Time Standard: NIST-F2 Atomic Clock

http://www.nist.gov/pml/div688/nist-f2-atomic-clock-040314.cfm

Contact: Laura Ost
303-497-4880
NIST-F2 Atomic Clock News Briefing: Opening Statement by Tom O'Brian

April 3, 2014

BOULDER, Colo. -- The U.S. Department of Commerce's National Institute of Standards and Technology (NIST) has officially launched a new atomic clock, called NIST-F2, to serve as a new U.S. civilian time and frequency standard, along with the current NIST-F1 standard.



NIST physicists Steve Jefferts (foreground) and Tom Heavner with the NIST-F2 "cesium fountain" atomic clock, a new civilian time standard for the United States.

Credit: NIST

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NIST-F2 would neither gain nor lose one second in about 300 million years, making it about three times as accurate as NIST-F1, which has served as the standard since 1999. Both clocks use a "fountain" of cesium atoms to determine the exact length of a second.

NIST scientists recently reported the first official performance data for NIST-F2,* which has been under development for a decade, to the International Bureau of Weights and Measures (BIPM), located near Paris, France. That agency collates data from atomic clocks around the world to produce Coordinated Universal Time (UTC), the international standard of time. According to BIPM data, NIST-F2 is now the world's most accurate time standard.**

NIST-F2 is the latest in a series of cesium-based atomic clocks developed by NIST since the 1950s. In its role as the U.S. measurement authority, NIST strives to advance atomic timekeeping, which is part of the basic infrastructure of modern society.

Many everyday technologies, such as cellular telephones, Global Positioning System (GPS) satellite receivers, and the electric power grid, rely on the high accuracy of atomic clocks. Historically, improved timekeeping has consistently led to technology improvements and innovation.

"If we've learned anything in the last 60 years of building atomic clocks, we've learned that every time we build a better clock, somebody comes up with a use for it that you couldn't have foreseen," says NIST physicist Steven Jefferts, lead designer of NIST-F2.

For now, NIST plans to simultaneously operate both NIST-F1 and NIST-F2. Long-term comparisons of the two clocks will help NIST scientists continue to improve both clocks as they serve as U.S. standards for civilian time. The U.S. Naval Observatory maintains military time standards.

Both NIST-F1 and NIST-F2 measure the frequency of a particular transition in the cesium atom—which is 9,192,631,770 vibrations per second, and is used to define the second, the international (SI) unit of time.

The key operational difference is that F1 operates near room temperature (about 27 ºC or 80 ºF) whereas the atoms in F2 are shielded within a much colder environment (at minus 193 ºC, or minus 316 ºF). This cooling dramatically lowers the background radiation and thus reduces some of the very small measurement errors that must be corrected in NIST-F1. (See backgrounder on clock operation and accompanying animation of NIST-F2.)

Primary standards such as NIST-F1 and NIST-F2 are operated for periods of a few weeks several times each year to calibrate NIST timescales, collections of stable

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commercial clocks such as hydrogen masers used to keep time and establish the official time of day. NIST clocks also contribute to UTC.

Technically, both F1 and F2 are frequency standards, meaning they are used to measure the size of the SI second and calibrate the "ticks" of other clocks. (Time and frequency are inversely related.)

NIST provides a broad range of timing and synchronization measurement services to meet a wide variety of customer needs. NIST official time is used to time-stamp hundreds of billions of dollars in U.S. financial transactions each working day, for example.

NIST time is also disseminated to industry and the public through the Internet Time Service, which as of early 2014 received about 8 billion automated requests per day to synchronize clocks in computers and network devices; and NIST radio broadcasts, which update an estimated 50 million watches and other clocks daily.

At the request of the Italian standards organization, NIST fabricated many duplicate components for a second version of NIST-F2, known as IT-CsF2 to be operated by Istituto Nazionale di Ricerca Metrologica (INRIM), NIST's counterpart in Turin, Italy. Two co-authors from Italy contributed to the new report on NIST-F2.

The cesium clock era officially dates back to 1967, when the second was defined based on vibrations of the cesium atom. Cesium clocks have improved substantially since that time and are likely to improve a bit more. But clocks that operate at microwave frequencies such as those based on cesium or other atoms are likely approaching their ultimate performance limits because of the relatively low frequencies of microwaves.

In the future, better performance will likely be achieved with clocks based on atoms that switch energy levels at much higher frequencies in or near the visible part of the electromagnetic spectrum. These optical atomic clocks divide time into smaller units and could lead to time standards more than 100 times more accurate than today's cesium standards. Higher frequency is one of a variety of factors that enables improved precision and accuracy.

**T.P. Heavner, E.A. Donley, F. Levi, G. Costanzo, T.E. Parker, J.H. Shirley, N. Ashby, S.E. Barlow and S.R. Jefferts. First Accuracy Evaluation of NIST-F2. Metrologia. Forthcoming. See http://iopscience.iop.org/0026-1394/page/Forthcoming%20articles.*

***These data are reported monthly in BIPM's Circular T, available online at http://www.bipm.org/jsp/en/TimeFtp.jsp?TypePub=publication#nohref. NIST-F2 is scheduled to be listed for the first time in the March 2014 edition. The value of interest is*

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Type B (systematic) uncertainty.

The National Institute of Standards and Technology (NIST) is an agency of the U.S. Department of Commerce.

Date created: April 2, 2014 | Last updated: April 3, 2014

Tech Article - Additional Bonus Information:

Background: How NIST-F2 Works

http://www.nist.gov/pml/div688/how-nist-f2-works.cfm

Date created: April 2, 2014 | Last updated: April 3, 2014

NIST-F1 and NIST-F2 are called fountain clocks because the cesium atoms are tossed in the air and fall back down inside a vertical tube during a key routine repeated thousands of times an hour.

A gas of cesium atoms is introduced into the clock's vacuum chamber and six infrared laser beams gently push about 10 million atoms into a ball. In this process, the lasers cool the atoms to temperatures near absolute zero and slow them down significantly, to enable precise measurements of their natural vibrations.

Two vertical laser beams produced by the six lasers are used to gently toss the atom balls upward through the flight chamber (the "fountain" action), and then all of the lasers are turned off. This little push is just enough to loft the ball about 1.3 meters high through a microwave-filled cavity. Gravity brings the ball back down through the microwave cavity.

During the trip, some atomic states of the atoms are altered, while others remain the same, as they interact with a microwave signal from a maser. When the trip is finished, another laser is pointed at the atoms. Some atoms—those whose energy states were altered by the microwave signal—emit light, or fluorescence. The resulting photons, the tiny packets of light emitted, are measured by a detector.

This process is repeated while the microwave signal in the cavity is tuned to different frequencies. Eventually, a microwave frequency is found that alters the states of most of the cesium atoms. This frequency is the natural resonance frequency of the cesium atom (9,192,631,770 Hz), or the frequency used to define the second.

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NIST-F2 was designed using lessons learned from NIST-F1. The key advance is that the vertical flight tube is now chilled inside a container of liquid nitrogen, at minus 193 ºC, or minus 316 ºF. This cycled cooling dramatically lowers the background radiation and thus reduces some of the very small measurement errors that must be corrected in NIST-F1.

NIST-F2 also has other novel features. Some critical components shrink by 1 centimeter in length each time the clock is cycled to very cold temperatures, so the clock design allows for shrinking and expanding. In addition, the system of six laser beams used to cool the cesium atoms is arranged in a new way. Additional design enhancements to NIST-F2 are planned for the future.

Tech Article – 2nd Additional Bonus Information:

Please refer to link: http://www.4physics.com/phy_demo/at_clock/at_clock.htm

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