



Cathay December 2012

www.cathayradio.org

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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 PST, Frequencies: 146.67MHz -600KHz PL85.4 and 442.70 +5MHz PL 173.8. The repeaters are linked. The CARC Monday night net is the best way to find out the latest club news. All check-ins are welcome.

Message from the President: George Chong, W6BUR

Hello Cathay Amateur Radio Club members and friends;

This December 2012 issue of the CARC newsletter is very special for me. It marks the one year anniversary of the resumption of our CARC newsletter.

Looking back the past year, our club has had a very successful year meeting our initiatives as laid out by the CARC board. Some of our club highlights this past year:

- Restarted up the CARC Newsletter that you are now reading
- Hosted a very well attended CARC Chinese New Year Luncheon
- Conducted a CARC HAM Cram in Chinatown
- Held a introduction radio operations class for the new Chinatown HAMs
- Provide communications support for Chinatown Disaster Drill with NICOS
- Sponsor the Annual CARC Picnic in cooperation with Edison Fong
- Edison Fong hosting several HAM related parties.

HAMs In The News

As we close out this year's newsletter, we have a very special article written by our distinguished CARC member, Bart Lee - K6VK. Bart has provided us with an article on a very important historical figure.

Now that I got your interest, you will have to turn to the next page to read up on Bart's well written and researched article. Thank you Bart Lee – K6VK for your hard work and support of the Cathay Amateur Radio Club.

I am pleased to announce that our very own CARC member, Ronald Quan (KI6AZB) has just published his long awaited book: *"Build Your Own Transistor Radios: A Hobbyist's Guide to High-Performance and Low-Powered Radio Circuits"*.

Ronald's book can be pre-ordered with an expected release date of December 14, 2012 from Amazon:

http://www.amazon.com/Build-Your-Transistor-Radios-High-Performance/dp/0071799702/ref=sr_1_1?s=books&ie=UTF8&qid=1353752289&sr=1-1

Edison Fong's Annual Christmas Party

Edison Fong (WB6/QN) is hosting a Christmas party from 6pm-10pm Saturday, December 15, 2012. The party will be at Ed's house and all CARC members are invited to celebrate the Christmas holidays with his wonderful family. Additional details are provided in this newsletter.

This the holiday season we can come together and celebrate and to appreciate what we have and not what we don't have. It is very fortunate that we have such a CARC

member as Edison and his generosity of hosting his Christmas party. I hope to see many of you at the Christmas party this year.

2012 CARC Veteran's Day Luncheon, Nov 11, 2012

Joe Lee (W6DOB) hosted the CARC Luncheon this year which had about 25 people in attendance.

Below are the pictures taken at the luncheon that was held at the Buffet Fortuna restaurant:



From left to right: Joe Lee (K6DOB) , Gilbert Gin (KJ6HKD) , and Mervyn Lee (Joe Lee's invited guest)



Paul Kitagaki (W6NDA) & Dave Chan (KZ6X)



Mervyn Lee (Joe Lee's friend) and John Tim (W6QNT)



Foreground left to right: Mervyn Lee, John Tim (W6QNT), and partial picture of Connie Halog(KF6WEA)
Background left to right: George Chong (W6BUR), Linda Tom (wife of Bill Tom) , Joe Lee (W6DOB),
and Bill Tom(KN6QD)



George Chong(W6BUR) and most of the luncheon attendees behind him



From left to right: Cy Moy (WB6TCF) and Gilbert Gin (KJ6HKD)



Judy and David Chang(NC6D)



Tony Halog's Mother (Tony Halog - KR6EG) and Kate Griffin (wife of George Griffin -NT6G)



From left to right: Dave Chan (WZ6X) and Albert Bracken (Joe Lee's invited guest)



From left to right: George Chong (W6BUR), Linda and Bill Tom (KN6QD)

Introduction to the Featured Tech Article

This month's Feature Tech Article is about super computers. Super computers are specialized machines designed to do heavy duty mathematical processing.

I can recall back in April 7, 1964 IBM announced the IBM 360 mainframe line up of computers. They were: "State of the Art Machines" back then.

From the website: http://www-03.ibm.com/ibm/history/exhibits/mainframe/mainframe_PP2025.html. The Model 25's main memory comes in four sizes of 16K, 24K, 32K or 48K bytes. A typical System/360 Model 25 will rent for \$5,330 a month, with a purchase price of \$253,000.

You do realize that today's Apple iPhone with 32GB of memory has many more times processing power and capabilities than 1960s IBM 360 mainframe computer.

The IBM 360 mainframe computer took the size of a closet, while the Apple iPhone fits in your pocket. In many ways if the Apple iPhone had existed back in 1964 it would have been considered a super computer. Oh my goodness! How the times they have changed.

Year End Wrap Up Message:

Many thanks to our wonderful CARC radio net controllers:

- Terry - WB6TA
- Bill - KC6POF
- David - NC6D
- Cecilia – KG6ICM,
- Cy – WB6TCF,
- Nathan - KI6PVO,
- Myself - (George W6BUR).

Please keep your calendar schedules open for the upcoming 2013 Chinese New Year celebrations. We are in the process of planning a CARC luncheon that will take place in the time frame of February 16-24, 2013. As many of you already know, I wish to pass the baton of the CARC presidency to the next generation. **During our upcoming Chinese New Year luncheon, I would like our club membership to nominate and vote on a new CARC President.**

Chat sub s'em to all you CARC members!

- George W6BUR.

Public Service Announcements

Bart Lee – K6VK

Attention all HAM, it is MayDay!!

The California Historical Radio Society (CHRS) and its amateur radio station W6CF is caught up in its landlord's bankruptcy (Inner Cities Broadcasting). This forces CHRS to purchase the Berkeley KRE building and property now or lose it.

UPDATE

THE NEWS WE HAVE BEEN WAITING FOR SINCE JUNE IS HERE. CHRS ENJOYS A LONG STANDING RELATIONSHIP WITH ONE OF THE BIDDERS AND POTENTIAL NEW OWNER OF KVTO. CHRS HAS A ROCK SOLID AGREEMENT WITH THIS BIDDER TO PURCHASE KRE IF THE BID PREVAILS. THIS IS THE CLOSEST WE HAVE BEEN TO OWNING KRE. WE WILL GET THE OK TO PURCHASE KRE BY NOVEMBER 9TH OR SOONER. AS SOON AS WE GET THE OK, WE WILL CALL FOR YOU TO FULFILL YOUR PLEDGES.

TODAY'S UPDATE – November 13th – We started with **\$93,000** in our Museum Fund June 1st, and today we have **241** donations and pledges totaling **\$653,835!** THANK YOU! Our goal is **\$750,000+**. We only have **\$96,165 to go!** Holy Cow, we have already raised nearly three quarters of a million dollars! It's downhill from here. We have done so well, please dig deeper and make this happen! We should be able to raise the rest with your help and support.

THESE EVENTS DO NOT MEAN AN END TO OUR FUNDRAISING BY ANY MEANS. WE ARE AWARE THAT SOME OF YOU MAY NOT BE ABLE TO FULFILL YOUR PLEDGES, SO OTHERS MUST STEP AND PLEDGE FOR THE FIRST TIME OR INCREASE YOUR PLEDGES. WE ALSO HAVE INSURANCE, OPERATING COSTS AND FUTURE EXPANSION PLANS FOR KRE TO CONSIDER. PLEASE PLEDGE NOW. WE HAVE AMAZED THOSE OUTSIDE OF CHRS FOR OUR ABILITY TO REALIZE ALMOST ALL OF OUR GOALS IN A VERY SHORT TIME. WE KNOW THAT YOUR SUPPORT AND THE SUPPORT OF OTHER ORGANIZATIONS HAS BEEN TREMENDOUS. WE WILL BE ABLE TO DO THIS, WITH YOUR HELP.

MANY OF YOU HAVE ASKED TO BE MADE AWARE OF WHEN WE ARE GETTING CLOSE TO OUR GOAL SO YOU COULD INCREASE YOUR PLEDGES. NOW IS THAT TIME. THE PUSH IS ON. SO, PLEASE DIG DEEPER AND REMEMBER THE THOUSANDS OF HOURS OF SWEAT THAT YOUR CHRS BROTHERS AND SISTERS HAVE PUT INTO THIS PROJECT. WE KNOW THERE ARE MANY PEOPLE READING THIS WHO HAVE NOT PLEDGED. WE ARE VERY CLOSE. YOUR PLEDGE WILL MAKE A DIFFERENCE. IF YOU HAVE THOUGHT ABOUT MAKING A PLEDGE, DON'T HESITATE. DO IT NOW AND BE PART OF THIS IMPORTANT

EFFORT.

REMEMBER – You can pledge now, but you need not send any funds until we need them. [CLICK HERE TO PLEDGE.](#)

SUPER DONORS – The list keeps growing. Be part of it! EVERY pledge and donation means a great deal to CHRS. But it is worth noting several pledges / donations that are really helping us to reach our goal:

Jack Bethards	– \$5,000	Bert Buss	– \$5,000
Elmo & Kim Giovanetti	– \$5,000	Chip Lim	– \$5,000
Tom Nelson	– \$25,000	Robert & Reina Swart	– \$5,000
Judy Mears & Bart Lee	– \$10,000	Norm Howard Lehfeldt	– \$15,000
Larry & Joan Drees	– \$16,600	Tom & Julie Bonomo	– \$25,000
George Patterson	– \$25,000	Gilles Vrignaud	– \$25,000
Norman Leal	– \$75,000	Philip Monego	– \$100,000
Scott Robinson	– \$100,000	John Staples	– \$100,000

Organization Donors of note:

The CHRS Central Valley Chapter – \$3750	The Alabama Historical Radio Society – \$1000
The SF Bay Area SBE Chapter 40 – \$1000	The Sacramento SBE Chapter 43 – \$1000
The Mt. Diablo Amateur Radio Club – \$1000	The Delaware Valley Historic Radio Club – \$1000
The Art Deco Society of California – \$500	The Iowa Antique Radio Club and Historical Society – \$500

We are grateful to these fine organizations for their support! And we need more support...

Our \$25,000 Challenge Pledge from Gilles Vrignaud towards our KRE building purchase fund is complete! Thank you Gilles and all who pledged during this challenge. The challenge and matching pledges were worth \$50,000! – Who will step it up and offer a \$50,000 Challenge next?

That is potentially worth \$100,000 and puts us very close to our goal. So, if you have not pledged, do it now! Many people have recently increased the size of their pledges. You can do the same and we would really appreciate it.

All donations to the CHRS are tax deductible and will be for the good cause of preserving the KRE building.

KRE 2012 - after CHRS Restoration



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

Tony – KR6EG

ACS Info

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

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, check in on a net, or call 415-558-2717.
Upcoming meetings: Tuesday 7pm, December 18, 2012 (No meeting, Xmas party instead)
Tuesday 7pm, January 15, 2012
Tuesday 7pm, February 19, 2012

Gilbert – 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.

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

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

HAMs In The News:

Fong Yee, an Early Wireless Expert from Oakland *circa* 1910.

By Bart Lee, K6VK, for the Cathay Amateur Radio Club and the California Historical Radio Society, Copyright Bart Lee, 2011, 2012, all rights reserved.

A century ago in Oakland, in the first decade of the 20th Century, lived a young man by the name of Fong Yee. He had emigrated from China. In about 1910 he constructed and operated both a home wireless station (see photo on next page) and a well -regarded portable radio station for field use. He also designed, built and flew one of the first aircraft on the West Coast (see photo on the next two pages).

According to Internet sources including Wikipedia, after he brought his aircraft design to China, many Chinese, especially on the mainland, saw Fong Yee as “The Father of Chinese Aviation.”

Just as the Wright Brothers and others perfected manned flight around the turn of the 19th Century, Marconi and others perfected the first wireless telegraphy apparatus in the early 1900s. Vacuum tubes, transistors and other key electronic components came much later and in some cases several decades later.

The first wireless radio frequency transmitters sent Morse code signals. They did so by creating a high -voltage high -frequency AC spark across a gap, from an induction coil. This device is known as the spark gap transmitter.

A short spark sent out a dit (dot), a long spark sent out a dah (dash), for the series of Morse code signals to represent letters of the alphabet that would be used to compose the words in the sent message.

The frequency at which the earliest systems would transmit could be affected by altering the length of the antenna, its height, and the amount of wire in the antenna.

These big antennas often acted as “capacity hats” to permit the lead-in to radiate at a lower frequency. Soon inductance and capacitance circuits in the output circuit determined the frequency. Then the length of the antenna was adjusted to the wavelength (frequency) of the output, for resonance and higher output. Generally lower frequencies required longer antennas.

Fong Yee was among the pioneers of the early wireless radio communication systems that used their ingenuity and innovation to overcome the technological obstacles of the day and paved the way for our modern wireless communications systems.

In the below photograph of Fong Yee's wireless station, an induction coil with a spark gap on top of it is seen in the center top. Just above the spark gap are the two leads connecting to an antenna.

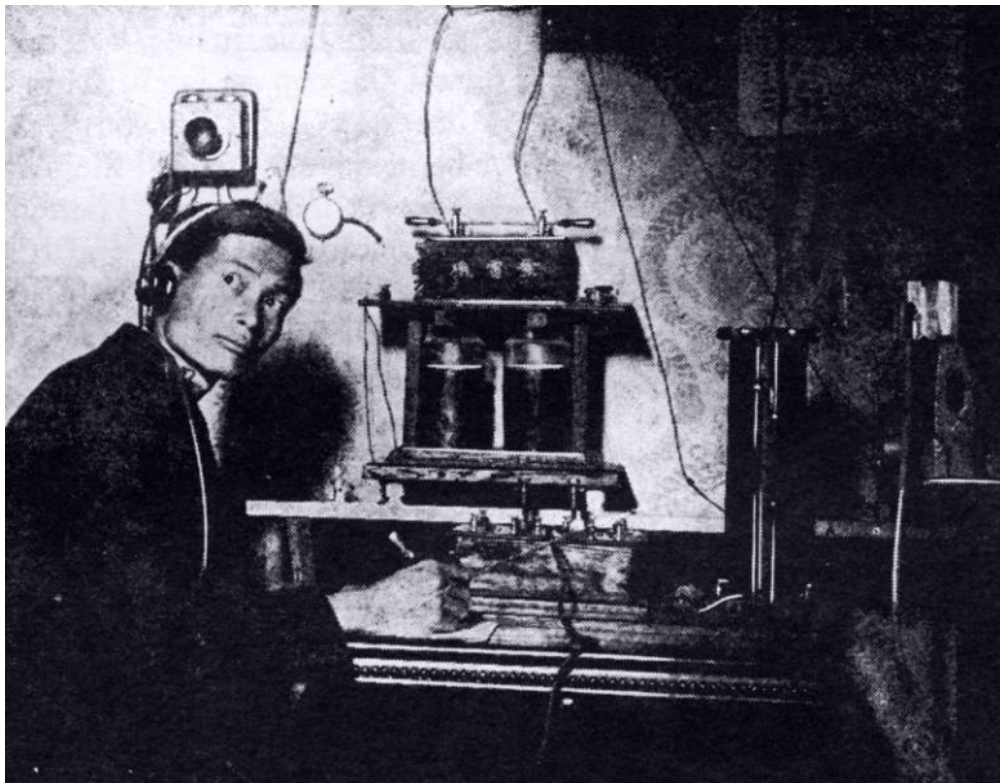
The two cylinders below that are Leyden Jars, large capacitors used to build up the strength of the spark.

By his right hand is a receiver, probably a crystal set with a galena or carborundum detector. He wears earphones to listen to the signals.

To the right of the receiver is a large vertical tuning coil with two sliding taps to vary the inductance. This suggests low frequency operation.

Generally these stations operated at one megahertz (1 MHz) or below, in the present AM broadcast band. The international marine distress frequency was 500 KHz.

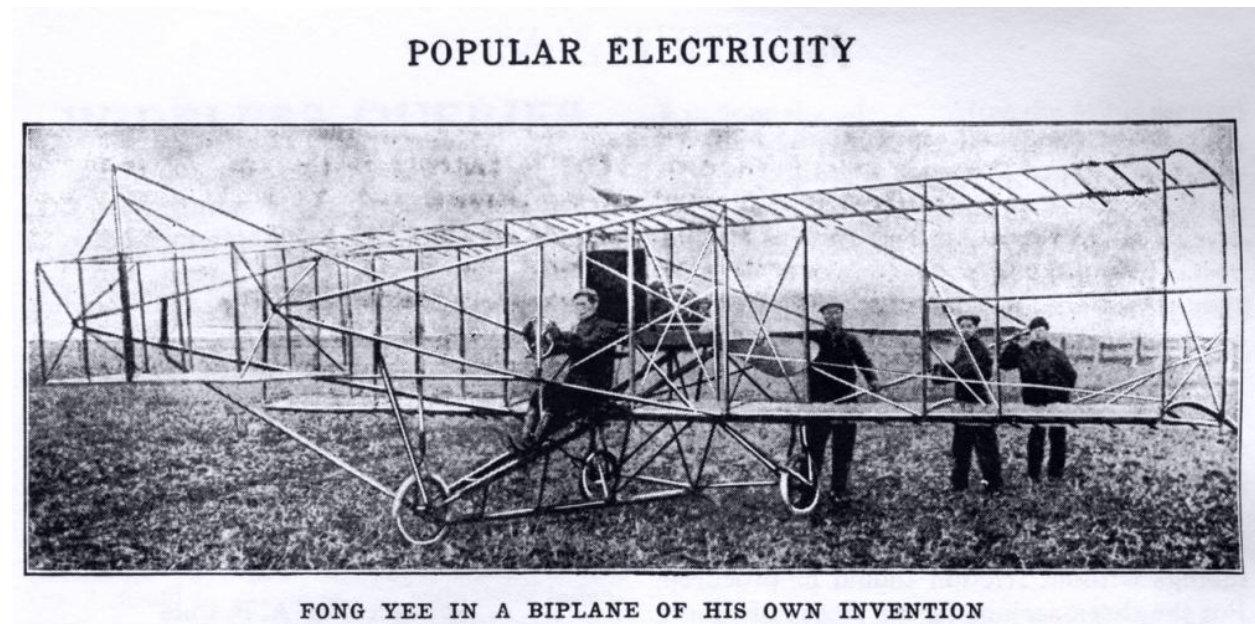
Fong Yee's station was considered both compact and state of the art in its day.



Fong Yee photo June 1911

Fong Yee had constructed and improved upon the Wright's biplane and taught himself how to fly. On September 22, 1909, Fong Yee was the first Chinese man to fly in America and he made the news headlines of the day.

He could be seen flying his biplane over the East Bay. (See photo of his plane below).

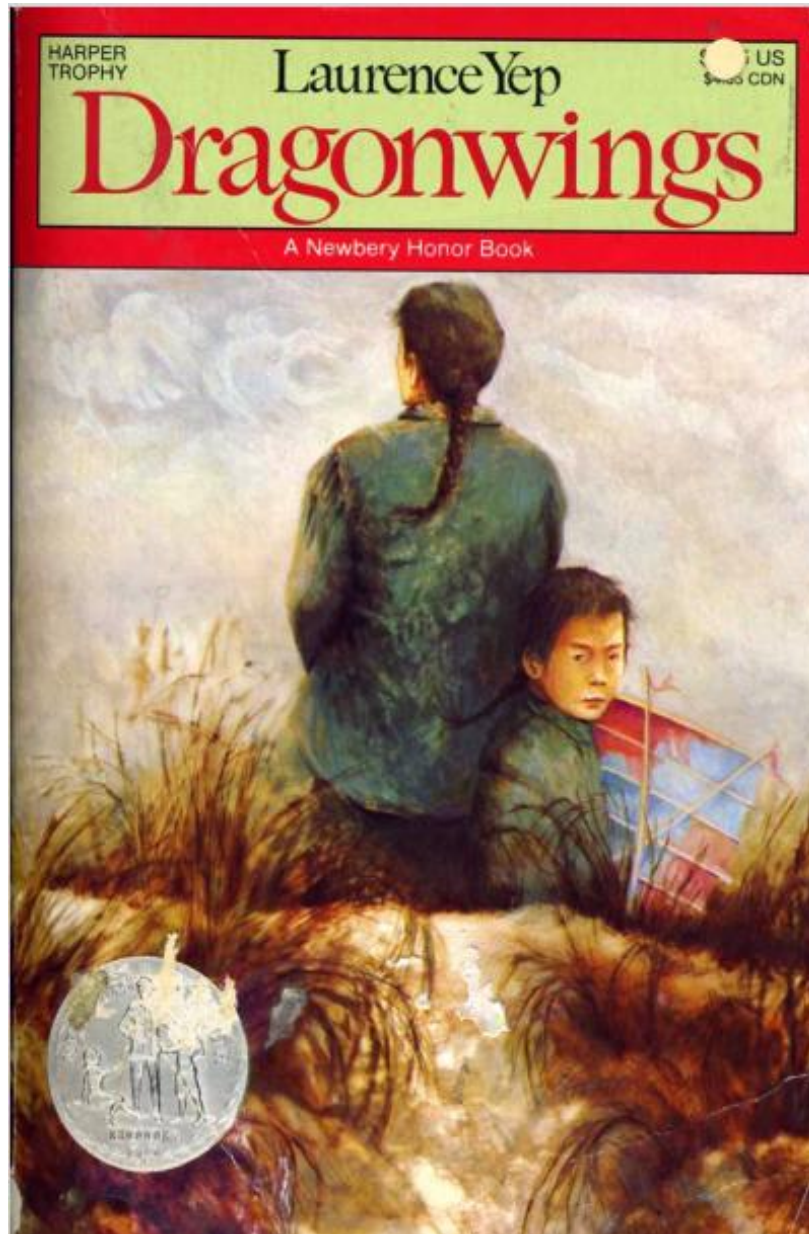


Above: Fong Yee biplane June 1911

Principals in China called him back to China in 1911 for technical guidance, at the time of the Sun Yat Sen revolution. See *Fong Yee, the Wireless Expert*, *Popular Electricity* (Vol. IV, No. 2), June 1911, reprinted as *High Power Wireless Equipment* (Lindsay Publications, Bradley, IL, 1988) at 94, from which the information about Fong Yee above derives.

Fong Yee's exploits gave rise to the legend of "Dragonwings" in the Bay Area Chinese community. To this day there are recollections in the Oakland Chinese community of an aviator and radioman of long ago, according to George Chong of the Cathay Amateur Radio Club.

A local author wrote a book about Fong Yee exploits: Laurence Yep, *Dragonwings* (Harper Collins, New York, 1975).



Fong Yee *Dragonwings* Cover

Mr. Yep also wrote a play of the same title: *Dragonwings*. The Berkeley Repertory Theater performed it to good reviews in 1992.

A photo from the performance appears below.



Photo by Gary Reyes for the San Francisco Chronicle, Dec. 17, 1992, page C3.

Fong Yee's name in English is also reported on the Internet as Fong Joe Guey, Feng Ru, Fong Yue and variants.

At the young age of 29, Fong Yee died in a crash while flying his airplane in China.

In China, Fong Yee is widely considered "The Father of Chinese Aviation."

In regards to the development of early wireless communication, below is the text except of the 1911 article in *Popular Electricity* cited above.

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FONG YEE, WIRELESS EXPERT

An interesting sign of the times, connected with the awakening of China, especially in military matters, is the departure of Fong Yee, aviator and wireless expert, from San Francisco to Peking.

Fong Yee has been summoned by the Imperial government to demonstrate his improved biplanes before the officers of the Chinese army, and his flying machine, which is said to be an improvement on the Curtis model, will probably be utilized in that country.

Fong Yee is also the discoverer of a wireless telegraph apparatus for field use, which is said to excel in compactness and efficiency. This instrument he perfected in his laboratory at Oakland, near San Francisco, where for the past three years he has labored incessantly and has aroused the wonders of many American experts who have seen his wireless apparatus in actions.

During the recent aviation tournaments in Los Angeles and San Francisco, Fong Yee was a contestant for honors and made some remarkable flights. Previously he had demonstrated his improved biplane in a number of successful cross-country trips from Oakland, where the machine was built.

Not long ago Fong Yee quite unexpectedly received an offer from the Chinese government to instruct army officers in the mysteries of aviation and wireless telegraphy. It is also believed that Prince Tsai Suin, head of the Celestial army, has made the young San Francisco inventor a flattering offer to remain in China, superintend the manufacture of the apparatus he has invented and restrict the secret of their construction to China.

If the Fong Yee biplane and wireless apparatus are successfully demonstrated at a series of army maneuvers soon to be held near Peking, Fong Yee's fortune is made and China may take certain precedence in two important branches of military science.

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Resources:

1. http://en.wikipedia.org/wiki/Fung_Joe_Guey
2. Bart Lee, Wireless Comes of Age on the West Coast, 24 Antique Wireless Association Review 241, 245ff (2011)
3. <http://californiahistoricalradio.com/CHRSPix/BartWestCoastWirelessAsPublished.pdf>
4. http://en.wikipedia.org/wiki/Spark-gap_transmitter
5. http://www.airspacemag.com/history-of-flight/The_Father_of_Chinese_Aviation.html

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Thanks to Rodney Yee and George Chong of the Cathay Amateur Radio Club for editorial assistance. Correspondence is invited: KV6LEE@Gmail.com. 73 de Bart, K6VK ##

Bonus Commentary from Author Bart Lee:

An interest in radio and in aviation has long been complimentary, from the earliest days of both. Young men could pursue both interests on their own terms. They could challenge themselves with these new technologies. They could thus open new pathways for themselves.

Fong Yee is a good example. He did not need either the interest or the support of the wider community to motivate himself and to effect his technical and larger success.

Edison Fong's Annual Christmas Party – Saturday, December 15 6-10 PM

Format: Potluck – bring your favorite dish.

Door Prize - One Baofeng UV3 and one Baofeng UV5

Where: 1163 Quince Ave. Sunnyvale, CA -

Best directions given on www.googlemaps.com Call if you get lost: 408-245-8210

We (Edison and Sharadon) will once again host the Christmas Party this year. Last year we had over 80 people with kids, friends, neighbors, all kinds of ham friends. There will be all kinds of dishes from traditional Christmas, to Chinese, Korean, Italian, barbeque, you name it. Desserts are always plentiful. Who knows who would be there? Last year we had the Mayor of Sunnyvale and several famous people from the electronics industry. This is also a great party to update your professional networking if you are looking for a job.

All licensed hams will receive one ticket for the door prize- no charge. That will make you eligible for one of two prizes. The first prize is the BaoFeng UV5 – 200 channels, 5 watts, drop in LiOn charger and battery, full CTCSS encode/decode, dual band VHF/UHF. Also has a built in LED flashlight and touch tone pad. The second prize is the Baofeng UV3. It's the little brother of the UV5. Same features except that it has no touch tone pad and is 2 watts. The advantage is that it is about ½ the size and weight.

Kids are welcome and bring your friends.



Featured Tech Article:

Faster than 50 million laptops -- the race to go exascale

<http://www.cnn.com/2012/03/29/tech/super-computer-exa-flop/index.html>

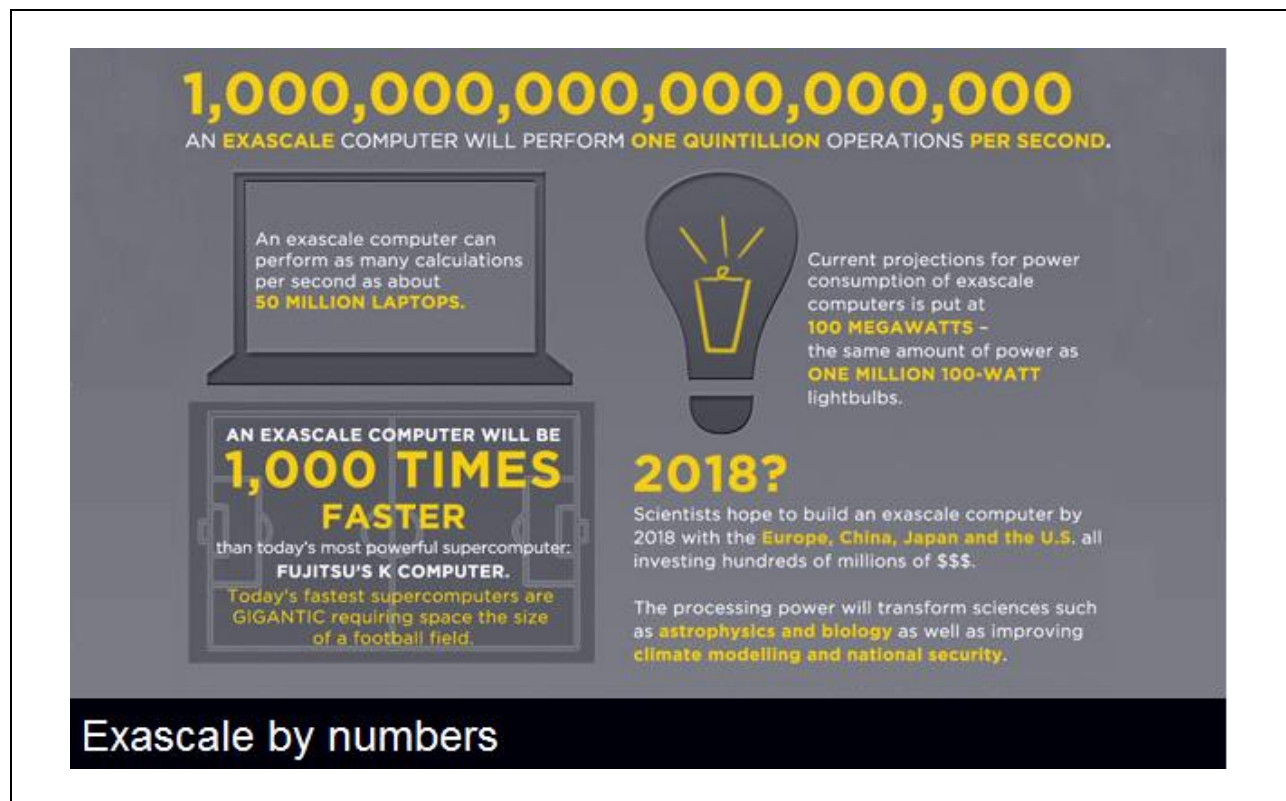
By **Matthew Knight**, CNN

March 29, 2012

(CNN) -- A new era in computing that will see machines perform at least 1,000 times faster than today's most powerful supercomputers is almost upon us.

By the end of the decade, exaFLOP computers are predicted to go online heralding a new chapter in scientific discovery.

The United States, China, Japan, the European Union and Russia are all investing millions of dollars in supercomputer research. In February, the EU announced it was doubling investment in research to €1.2 billion (\$1.6 billion).



What is an exaFLOP?

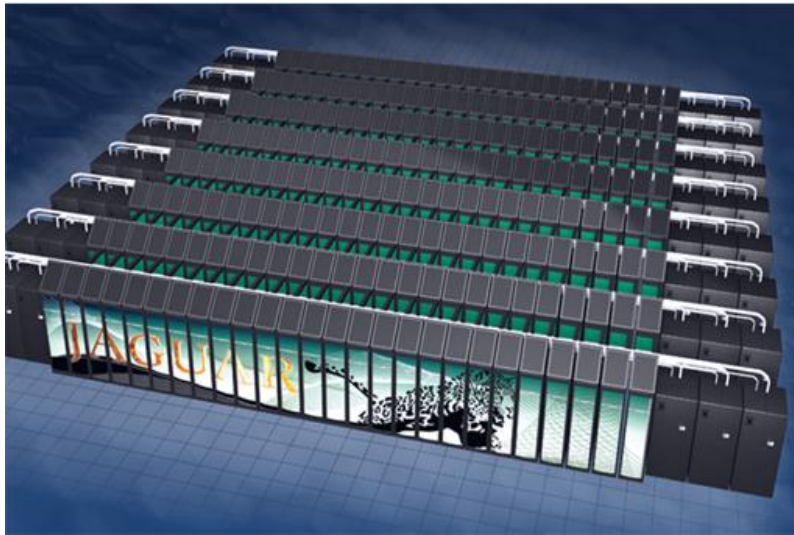
Computer scientists measure a supercomputer's performance in FLOPS, an acronym for Floating Point Operations per Second, while "exa" is a metric prefix which stands for quintillion (or a billion billion). An exascale computer could perform approximately as many operations per second as 50 million laptops.

"It is the next frontier for high-performance computing," says Dimitrios Nikolopoulos, professor at the [School of Electronics](#) at the UK's Queen's University of Belfast.

How fast are today's supercomputers?

Today, the fastest supercomputers operate at the petaFLOP level says Nikolopoulos, performing in excess of one quadrillion (or a million billion) operations per second.

The first computer to break through the petaFLOP barrier was IBM's Roadrunner in 2008. But its reign as the fastest computer in the world didn't last long, with the Cray Jaguar installed at [Oak Ridge National Laboratory](#) in the United States becoming the quickest with a performance of 1.75 petaFLOPS in 2009.



The Cray Jaguar supercomputer can perform more than a million billion operations per second. It takes up more than 5,000 square feet at Oak Ridge National Laboratory located at 1 Bethel Valley Rd, Oak Ridge, TN USA 37831. In 2009 it held the title of the fastest computer in the world.

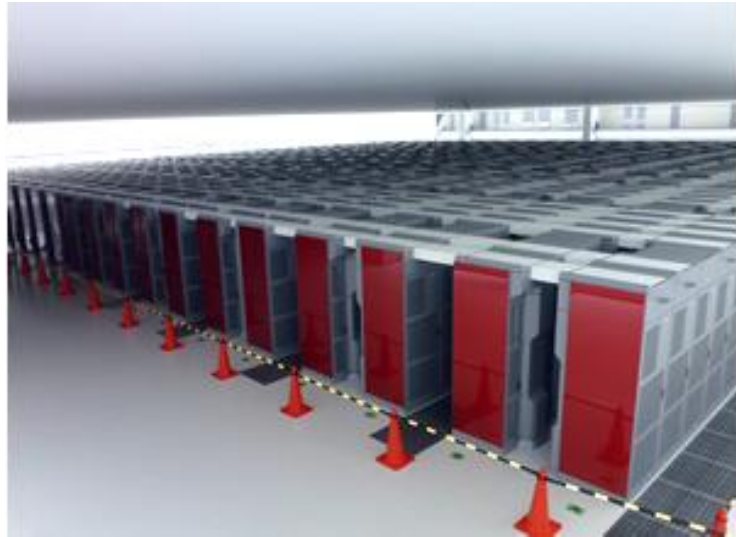
A computer upgrade is slated for 2013 that will transform it from the Cray XT5 system into the Cray XK6 system. It will provide a peak speed between 10 and 20 petaflops. The updated computer system will be renamed Titan and will have 299,008 processor cores and 600 terabytes of memory.

Today, the crown is held by is Japan's K Computer developed by Fujitsu, according to [TOP500](#) -- a project that tracks trends in high-performance computing.

The machine, installed at the [RIKEN Advanced Institute for Computational Science](#), in Kobe, Japan, currently operates at over 10 petaFLOPS. It is more than three times faster than its nearest rival, [China's](#) NUDT YH MPP computer (2.57 petaflops).



The world's fastest supercomputer is now Japan's K Computer. Above is one of its 864 cabinets.



The K Computer, installed at the REIKEN Advance Institute for Computational Science, in Kobe Japan. The K computer system as currently configured has 864 cabinets equipped with a current total of 88,128 CPUs.

For a list of the top fastest 100 computers in the world, please view the following link:
<http://www.top500.org/list/2011/11/100>

How big are they?

"The kind of space that you need is similar to that of a football field. You're talking about many, many lanes of computer racks and thousands of processors," says Nikolopoulos.

The K Computer contains a mind-boggling 88,128 computer processors and is made up of 864 refrigerator-sized cabinets.

Physically, exascale computing won't get any bigger, says Nikolopoulos, and might even get a little smaller. But the amount of processors will rise substantially to anywhere between one million and 100 million.

What are the challenges of reaching exascale?

Nikolopoulos says "severe technology barriers" remain, the most important being power. "Power consumption of supercomputers in general is not sustainable," he says.

"The current projections suggest that power consumption of exascale computers will be 100 megawatts. It's impossible to build a suitable facility and have enough power."

Historically, a computer's processor has used the most power (around 40-50% of the total) Nikolopoulos says, but memory is rapidly catching it up.

"Changing materials and also the architecture of processors and memories is critical to exascale's success," he says.

"We are beginning to understand the challenges of exascale in terms of hardware, software and applications. We are at the stage where we can make mental projections and set up directions for research."

What benefits could exascale computing bring?

It will enable discovery in many areas of science, says Nikolopoulos. "Aerospace engineering, astrophysics, biology, climate modeling and national security all have applications with extreme computing requirements," Nikolopoulos said.

Bill Cabbage, public information officer at Oak Ridge National Laboratory, says exascale will attempt to tackle very serious challenges in energy supply and sustainability.

"These are very difficult problems and will require the development of new forward-thinking technologies to deal with them," Cabbage said.

"We are bringing all our resources to bear on these problems," he added. Social sciences could also profit, says Nikolopoulos.

"More and more people are interested in understanding the behaviors of societies as a whole. These require simulations -- how people interact, communicate, how they move. That will require exascale computing," he said.