

TECHNOLOGY

New Android OS gives phones a cleaner look, new features

RECORD WIN FOR SNEDEKER

Pebble Beach marks fall as 2013 champ finishes one-bogey week on way to second title SPORTS



SPORTS

Curry's All-Star game dazzling but Westbrook is named MVP

San Jose Mercury News

BAY AREA NEWS GROUP

2.7 MILLION BAY AREA READERS IN PRINT AND ONLINE

Monday, February 16, 2015

100 \$1.50

24/7 NEWS COVERAGE ON WWW.MERCURYNEWS.COM

STALKING STAR STORMS

A FLARE FOR SOLAR RESEARCH

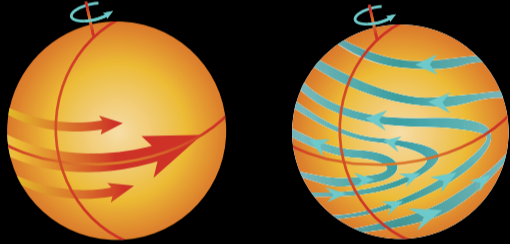
Solar flare

A sudden and violent release of energy and particles from the surface of the sun that could disrupt radio communications and power grids on Earth.

Size comparison: Earth

What causes solar flares?

Scientists do not yet understand what causes solar flares, though they seem to form through disruptions of the sun's natural magnetic field, temperature variations on the sun's surface and the sun's differential rotation.



Differential rotation

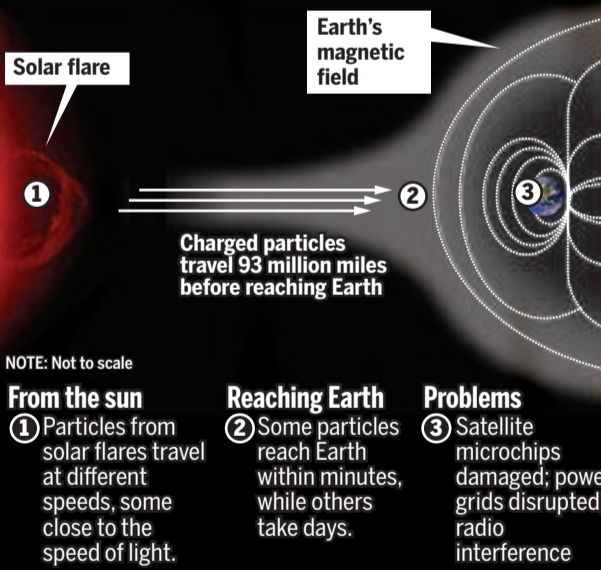
The sun rotates faster at its equator than at its poles.

Magnetic field

The field is twisted as the sun rotates and has multiple magnetic poles.

How solar flares affect Earth

Solar flares eject particles and radiation into outer space. If the Earth is in the path, high-energy particles and radiation can interfere with certain radio communications, endanger astronauts and disrupt or damage satellites.



NOTE: Not to scale

From the sun

1 Particles from solar flares travel at different speeds, some close to the speed of light.

Reaching Earth

2 Some particles reach Earth within minutes, while others take days.

Problems

3 Satellite microchips damaged; power grids disrupted; radio interference

Sources: NOAA, AP, Tribune News Service, Earth Magazine

BAY AREA NEWS GROUP

KEEPING SKIES SAFE

Feds propose rules for drones

Suggestions will start an era of unmanned aircraft doing routine tasks — but no pizza delivery yet

By Joan Lowy Associated Press

WASHINGTON — Drone on, the government says. Just not through the night sky. Or close to an airport.

Long-anticipated rules proposed Sunday will open an era in which small (under 55 pounds) commercial unmanned aircraft perform routine tasks — crop monitoring, aerial photography, inspections of bridges and cell towers and much more.

And when they are in place, they may include a separate category with fewer restrictions for very small drones, likely to be defined as less than 4.4 pounds.

The Federal Aviation Administration released a variety of proposed requirements for commercial opera-

See DRONES, Page 5



NHAT V. MEYER/STAFF

Sebastien Couvidat and Monica Bobra study the sun for Stanford's solar observatories group.

Two Stanford scientists use AI to predict sun's weather, protect Earth

By James Urton jurton@mercurynews.com

Life as a forecaster is not easy. Just ask National Weather Service forecasters who misjudged how a recent winter storm would affect the Big Apple.

Now imagine trying to predict weather activity on a burning sphere 1.3 million times larger than Earth and 93 million miles away. That is the task of space weather forecasters, who watch the sun carefully for solar flare activity, knowing it can garble radio communications, cook satellites and shut off the lights for millions.

Solar flares are difficult to predict. But two Stanford University researchers are combining an artificial intelligence program with NASA's largest-ever collection of solar observations in an approach that may prove to be the

See FLARES, Page 6

PARTS FOR A REVOLUTION

DIY pioneer Radio Shack shutting stores

By Bruce Newman bnewman@mercurynews.com

It was the corner hardware store of the tech revolution, a nerd fountainhead for the do-it-yourselfers who invented Silicon Valley. Eventually, they all needed a 9-pin null modem adapter, a capacitor or a VGA plug to get their startups off the ground, and so they made their way to Radio Shack.

"I remember going up and down the rows at Radio Shack just looking at resistors," said Steve Wozniak, who built the first Apple computer by hand, then co-founded the most successful electronics company in history. "I was a browser with no money at all. I just loved to look at all the electronics parts being sold. It

See SHACK, Page 6

19-YEAR-OLD'S 'NOBLE' DEED AFTER ORGAN REJECTED

First wife, then son, offer life-saving kidney

By Elisabeth Nardi enardi@bayareanews.com WALNUT CREEK — Chris Schroeder's family has given him the gift of life, not once, but twice.

When Schroeder, who has a rare genetic kidney disease, received his wife Sonia's kidney seven years ago, it seemed to be a mira-

cle, given the long odds his Mexican-born spouse would even be a match.

But just five years after that surgery, the 58-year-old Schroeder's body began to reject that kidney, for reasons doctors haven't identified. He faced being put at the end of what figured to be a six-year waiting list for a

donor kidney, and returned to daily dialysis.

It was then that Chris' 19-year-old son, Ezra, said he wanted to be part of a miracle, too. So, eight years after Chris Schroeder received his wife's kidney, he received another from his



JANE TYSKA/STAFF

Ezra, Chris and Sonia Schroeder.

See KIDNEY, Page 6

INDEX table with categories like Ask Amy, Classified, Comics, etc.



WEATHER

Mostly sunny

H: 66-75

L: 41-49

PAGE B10

SUBSCRIBE » 800-870-6397 or www.mercurynews.com/ subscriber-services



MediaNews Group NEWSPAPER

Copyright 2015 San Jose Mercury News

Smart news. Smart readers.

Online, mobile and right here.

MercuryNews.com | All Access. Subscribe today.

Available at iTunes



The Mercury News

Flares

Continued from Page 1

fastest, most reliable means yet of tipping off forecasters to solar storms.

"Forecasting the sun can be difficult," said Stanford researcher Monica Bobra. "It's like predicting the weather on Earth: You can be moderately successful, but then you might miss a major storm."

Bobra and colleague Sebastien Couvidat have studied the sun for years as researchers in Stanford's solar observatories group. Artificial intelligence was new to them, but that wasn't a deterrent.

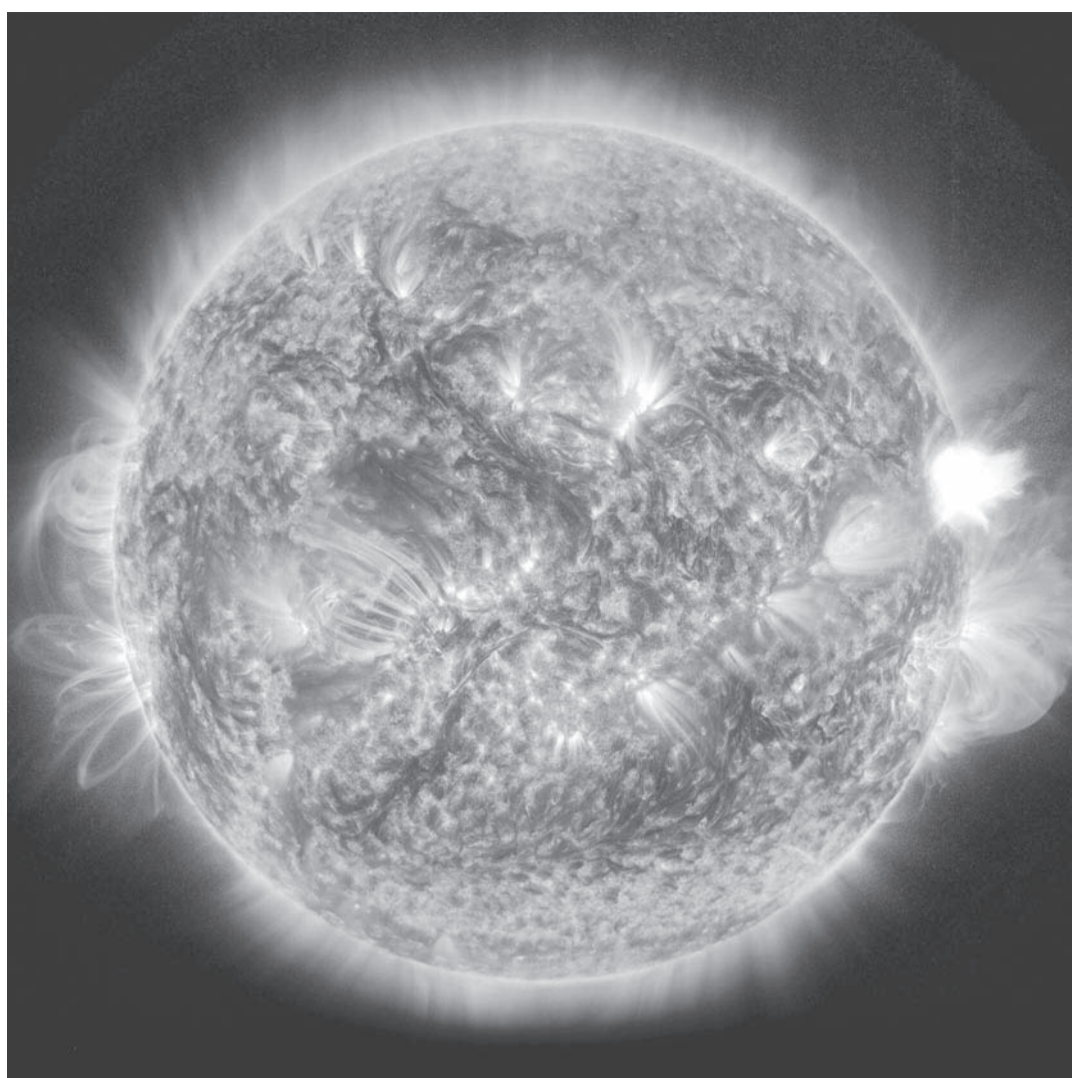
"We realized we could use this really cool technique ... to look at active regions of the sun," Bobra said.

'Videotaping the sun'

Bobra and Couvidat studied solar flares using machine learning, a type of artificial intelligence that uses computer algorithms to analyze data and make predictions. Though other solar researchers have taken a similar approach, Bobra and Couvidat had an advantage: a NASA spacecraft in orbit called the Solar Dynamics Observatory.

"It's basically videotaping the sun," Bobra said. "The Solar Dynamics Observatory takes an image once every several seconds 98 percent of the time since it launched."

No other NASA satellite has collected as much data as the observatory. Since its launch in 2010, it has delivered up to 1.5 terabytes of data — the equivalent of about 750,000 iPhone photos — each day about



This Jan. 12 photo provided by NASA shows the first notable solar flare of the year, as observed from NASA's Solar Dynamics Observatory. The sun emitted a midlevel solar flare, peaking at 8:24 p.m. on Jan. 12. "It's basically videotaping the sun," says Stanford researcher Monica Bobra. "The Solar Dynamics Observatory takes an image once every several seconds 98 percent of the time since it launched."

ASSOCIATED PRESS/
NASA

the sun's surface, magnetic field and atmosphere. This includes information on the sun's burps, bulges and flares as well as its more quiet periods.

To "teach" their machine-learning algorithm about solar flares, Bobra and Couvidat fed it data on more than 1,000 regions of the sun's surface, including whether those regions eventually flared.

"The 'learning' took a couple of minutes," Couvidat said. "It's basically instantaneous."

To see if their algorithm really had "learned" anything about solar flares, they showed it other active regions on the sun and asked it to predict whether those regions would flare.

Bobra and Couvidat's algorithm was fast and accurate at predicting the most severe solar flares. When their algorithm predicted a region would stay quiet, it was right 87 percent of the time. Before that, the most recent artificial intelligence approach had delivered correct predictions only 67 per-

cent of the time.

Bobra and Couvidat's more accurate approach is welcome news to Robert Rutledge, who heads the forecasting office at the Space Weather Prediction Center in Boulder, Colorado.

"These guys are spot on," he said. "They're doing what we think are the next most likely steps for predicting solar flares."

Rutledge and his colleagues watch the sun 24 hours a day, 365 days a year. When a solar flare oc-

curs, they measure its size and strength — and ascertain whether it will affect Earth. Solar flares emanate volleys of charged particles, and occasionally bits of the sun's atmosphere, into outer space. If Earth is in the path, they can also predict damage and issue warnings.

"Sometimes when we get an eruption, we don't get much lead time," Rutledge said. Some particles reach Earth within minutes, while others take days.

Strong solar flares

often disrupt certain radio signals, including the types used by transoceanic flights, though they have backup communications. The strongest solar flares also emit radiation that can put astronauts at risk and damage satellite memory and control systems. For those of us on the ground, solar flares can disrupt Earth's own natural magnetic field and overwhelm electricity grids.

Plenty of surprises

Scientists first made this connection in 1859, when particles from a particularly mighty solar flare struck Earth and knocked out telegraph systems across Europe and North America. A similar flare in 2012 missed Earth, but about a half dozen solar flares in the 20th century disrupted electricity and communications, including a 1989 blackout across Quebec that lasted more than 11 hours.

"The sun is full of surprises," Rutledge said.

Bobra and Couvidat credit the glut of data from the Solar Dynamics Observatory for their algorithm's accuracy in predicting solar flares. They plan to incorporate even more satellite observations in the future, including data on the sun's turbulent atmosphere.

With our lives dictated more and more by satellite connections and proximity to an electrical outlet, these solar forecasters have billions counting on them.

"We want to protect our astronauts," Bobra said. "We want to protect our satellites. We want to protect Earth."

Contact James Urton at 408-278-3415. Follow him at [Twitter.com/jamesurton](https://twitter.com/jamesurton).

Kidney

Continued from Page 1

son.

"He told me, 'I would like to give you a kidney, Dad,' and I cried," said Chris Schroeder, adding that he never tried to talk his son out of it. "It chokes me up even now. It's such a noble thing for anybody to do, but for a kid?"

Although Ezra Schroeder was considered very young to be a donor — and was, in fact, told to take extra time weighing the decision to give a kidney — he said it wasn't a hard call, given who was going to get it.

"I wouldn't donate my kidney to anyone just to donate it," said Ezra, a student at Diablo Valley College. Father and son had surgeries in December.

"It's my dad, and if I was given the chance to help him, why wouldn't I do it?"

A potential obstacle was the nature of Chris Schroeder's illness. He has polycystic kidney disorder, which is hereditary. Cysts form on the kidneys, causing them to become enlarged. His mother had a kidney transplant when she was 67, and other family members have also dealt with the disease and died as an indirect result from it, Chris Schroeder said. His own kidneys, he said, ended up looking "like Swiss cheese."

Son 'very good match'

The Schroeder family had to find out whether Ezra had the same genetic kidney disease. Numerous blood tests, and a special genetic test whose results could be analyzed by only one lab in the country, determined Ezra Schroeder did not have any of the genetic markers. Even after Ezra was deemed "a very good match" for kidney donation, his dad said, he had to be interviewed by UC San Francisco Medical Center doctors, given his age. Then Ezra was told to ponder his decision for another 90 days.

Ezra Schroeder said he was impatient watching his dad on the exhaustive dialysis regimen. But waiting turned out to be a benefit, with his and his dad's surgeries done on the first day of his winter break from school in December.

Ezra was 12 when his father's kidneys failed the first time — something he said he doesn't really remember much about. At 50, Chris Schroeder started on dialysis, eight hours a day, and went on the national



COURTESY OF CHRIS SCHROEDER

Chris Schroeder, left, who has a rare genetic kidney disease, received a kidney from his son, Ezra, 19.

registry to wait for a donor.

Sonia Schroeder learned she had the same blood type as her husband, then took more tests, ultimately discovering she was a decent match for her husband as a kidney donor. Chris had tried to talk her out of getting tested, believing the odds of her being a match were a "million to one," and that it was a waste of time.

But Sonia was ready. "I love my husband, and if I have a spare part that I can give him, why not?"

After a whirlwind eight days getting their legal affairs in order — because they would both be under anesthesia at the same time — the couple had successful surgeries. The donated kidney was placed in Chris' body, but his nonfunctional old ones weren't removed until the December 2014 transplant.

After that first transplant, Chris was soon back at work as a purchasing agent with the city of Milpitas.

But after five years or so, Chris Schroeder's body started rejecting his wife's kidney. Dr. Flavio Vincenti, a kidney transplant specialist at UCSF Medical Center who treated Chris Schroeder last year, said that rejection was "somewhat uncommon," and had been complicated by a new problem, the rare disease "Clq nephropathy" attacking his remaining kidney.

More than 100,000

people are on the national donor list awaiting a kidney transplant, and 12 people die each day while waiting for a lifesaving transplant, according to the National Kidney Foundation. While 83 percent of transplanted kidneys are still working after three years, the kidney foundation reports that more than 20 percent of kidney transplants each year are re-transplants.

Time to bounce back

Ezra Schroeder doesn't quite understand why people are so amazed by his kidney donation to his father.

"My mom is fine with one kidney," he said. "I saw that she was fine and ... the woman who gave my grandma a kidney is still an active person, so I had two good examples."

It has taken Ezra a little longer than he expected to bounce back from the surgery. He has missed playing basketball and weightlifting but should resume his normal routine in a few weeks.

"There are no restrictions, but with one kidney, there is always a very small risk of injury due to blunt trauma," Vincenti said. Sonia says she is not worried about problems with the newest donated kidney.

"I tell Chris, 'You are an old car with a new engine, you may have needed some bodywork, but you are going to last a lot longer,'" she said.

Shack

Continued from Page 1

was actually a part of my education."

Now, Radio Shack is engaged in a do-it-yourself death dance, on Tuesday closing the first wave of 1,784 stores that will shut their doors by the end of the month. The electronics chain declared bankruptcy Feb. 5, following years of declining sales, and will sell its remaining 1,750 stores to Sprint, the wireless carrier. Radio Shack's heyday was the mid-1970s, when the sale of citizens band radios accounted for 30 percent of revenues. But its real resonance resided in the raw materials the stores provided to every aspiring computer geek, gamer and audiophile. Long before Maker Faire, Radio Shack was to DIY for.

"I like to tinker, and Radio Shack was my childhood resource," said Nolan Bushnell, who co-founded Atari in 1972. "It was the only place that you could buy a resistor." Or a new switch for your old coffee percolator, a signal splitter for your Sony Betamax or a 50-foot cord for your headphones.

Online competition

But as someone recently posted on Boingboing.net, "It's not like, 'I need a new RJ-11 to 3.5mm phone recording splitter because my bird bit through the old one' is a reasonable business" model. The online marketplace that Radio Shack helped create by selling modems, routers and all manner of couplers now undercuts it with razor-thin overhead. When Julie Chulick of San Jose pulled up at the Radio Shack on Blossom Hill Road last week, her shopping list seemed to sum up what had sealed the retailer's fate.

"I'm looking to find an

old fashioned flip phone because I don't want an iPhone," she said. "I thought I would see if they still have them because they used to carry them." She conceded it had been a while since she'd visited one of the chain's stores, and most of her previous visits had been for her husband, who liked to fly remote-controlled model planes. "I would go in with a little note saying this is what he needs," Chulick recalled. She said the stores were "more a guy thing." Another customer at the store, named Alex, lamented, "The old way of doing business is gone."

When new ways of doing business come along now they are called "disruptive," and maybe Radio Shack's problem was that it never disrupted anything. When Wozniak was in college, during the 1971-72 school year, he developed a phone hacking device called a blue box that he and Steve Jobs sold. It relied on diodes Woz bought at the Shack, so when he and Jobs created their first computer, the Apple I, they went back to their old supplier. "We started calling Radio Shack to see if they wanted to buy it and give us some royalties," Woz said by phone from Dubai, where he was lecturing on the secrets of his success. "They said they only paid 5 percent royalties on a design. We thought we had something big, so 5 percent royalties kind of turned us off."

But by the time he and Jobs released the Apple II in 1977, Radio Shack — which by then had been bought by the Tandy Corporation, producer of a line of do-it-yourself leather clothing — released the TRS-80, a personal computer with such primitive skills it became known as the Trash 80. "What the Trash 80 did was popularize the idea that com-

puter technology — the parts that make computers — actually had a value worth selling in a store," Wozniak said. "There were only three companies that jumped in to making computers right away — Apple, Commodore and Radio Shack." Making and marketing its own computers in stores made Radio Shack a distant forerunner of Apple Stores' multibillion dollar retail operation.

Lost opportunity

Radio Shack also missed a chance to sell Atari's wildly popular computer game, Pong, when one of its buyers attempted to use the chain's clout to lowball Bushnell at a consumer electronics show in 1975. "He says, 'Now look, sonny, I'm going to tell you how it's going to be,'" Bushnell recalled. Atari was wholesaling the games for about \$50, and Sears was selling them for \$70. "He says, 'You're going to sell them to me for 30 bucks, and not a penny more.'" When Bushnell protested that he would lose money on the deal, Radio Shack's man stormed out.

"Universally in Silicon Valley at that time, Radio Shack was hated," Bushnell said. "When they were hot, they were arrogant. A lot of people don't understand that ethics and humanity are a good business strategy."

If he was taking any pleasure in this reversal of fortune, Bushnell didn't show it. "There are going to be a lot of do-it-yourselfers in small town America who are going to be slowed down by this," he said, "because now, instead of going down to Radio Shack, they're going to have to send away for parts."

The future will just have to wait.

Contact Bruce Newman at 408-920-5004. Follow him at [Twitter.com/BruceNewmanTwit](https://twitter.com/BruceNewmanTwit).



Signs on a Radio Shack store on Morrill Avenue in San Jose announce its closing and a liquidation sale. The electronics chain will close 1,784 stores by the end of the month.

LIPO CHING/STAFF