Welcome to the July 19th, 2017 Edition of THE REVENGE HUMP DAY!

You know, getting old is not for sissies. Just when I thought I had put my eye troubles behind, life threw me a curve ball. I noticed that my vision was starting to deteriorate again about two weeks after my last cataract surgery. Well, I went back to my optometrist and he said that I had developed secondary cataracts in both eyes. Yesterday I went to the surgeon and he has scheduled me for laser surgery on August 25th and September 8. The surgeon said that it was not unusual for this to happen and it really wasn't a big deal to take care of. Just zap it with the laser and it will never come back. Time will tell but it is a bitch not having better eyesight for the next few months. Life is a bitch sometimes.

Jason, Jamie and Bubba Bear are visiting Uncle Bobby in Florida this week. They have been posting pictures of their travels on Facebook and I have really enjoyed it. Wish I could be there with them.

One humorous thing did happen last weekend at Deep South Con in the Carolinas according to Brandy. Evidently the Chattanooga Choo Choo won the Rubble Award at DSC and it was given to Brandy to deliver. Brandy posted a picture on Facebook that show she delivered the 'prize'.

So on that "humorous note", why don't y'all sit back and relax because here's the best in gossip, jokes and science for your reading pleasure!

Uncle Timmy

<G>~<O>~<S>~<S>~<I>~<P>~~~<S>~<T>~<A>~<R>~<T>~<S>~~~<H>~<E>~<R>~<E>~<!>

From: "Tim Bolgeo" tbolgeo@epbfi.com

JODIE WHITTAKER IS DOCTOR WHO'S NEXT DOCTOR

James Whitbrook, July 16, 2017
http://io9.gizmodo.com/jodie-whittaker-is-doctor-whos-next-doctor-1796924974

After months and months of rumors, speculation, and flat out waiting, we finally know who is taking on the TARDIS as the thirteenth Doctor in season 11. Ladies and gents, say hello to your new Time Lord: Jodie Whittaker.

Revealed at the end of today's Men's Final at Wimbledon, Whittaker—the first woman to be cast in the role of The Doctor after years of hints and speculation from fans—will make her first appearance in Doctor Whoduring this year's Christmas special, which will see Peter Capaldi bow out his time on the show in an adventure with the very first Doctor, played by An Adventure in Space and Times's David Bradley. Here's the short clip that premiered to celebrate the announcement, featuring Whittaker's Doctor (perhaps not in her actual costume) finding her key to the TARDIS:

Image: Still via Youtube

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<L>~<I>~<B>~<E>~<R>~<T>~<Y>~<C>~<O>~<N>

DOES ANYONE OUT THERE KNOW WHO THIS LADY IS?

From:

"Karen Boyd" abtales@comcast.net

I have searched high & low, torn the storage, supply container, and my bedroom apart. I cannot fine this lady's info.

She & her husband were set to go to Cuba after Liberty. She's an entertainment attorney I think. I need to get in touch with her, she ordered something from me, & it's been in since I got home. Missed getting it to her at Liberty by 1 day. I want to say her name was Barbara, but I cannot be sure. You know of anyone who's gone to Cuba lately?

If not, maybe you could put out a call in the Revenge:

Calling for an attorney, just returned from Cuba, who's into "Stuart" - the Minnion! Please contact Karen - A.B. Tales at 615-868-3300.

Hopefully they get it (as big fans of Liberty as they are, I'm sure they do). Anyway, thanks for whatever help you can provide. Karen

<L>~<I>~<B>~<E>~<R>~<T>~<Y>~<C>~<O>~<N>

From: "Frank Brayman" afranklin3@gmail.com

LET'S BITCH AT UNCLE TIMMY - a Libertycon Tradition!

I'm a troglodyte, I don't do Facebook. Here's my 2 cents.

Consuite was well run as always. Smoking area actually had chairs this year. Only one problem, they ran out of Moon Pies ;-)

The shuttle worked about as well as could be expected - a suboptimal solution, but the best Brandy could do with what she had. If that's what the future holds, consider changing the name to Commuter-Con.

As I understand it, Brandy doesn't have a hotel yet for next year. The ideal venue would be similar to the Choo-Choo before they decided not to be a hotel any more.

First requirement is enough room for everyone. No second-class citizens who have to stay 6 blocks away.

Second requirement is a social center. The last several years, I've missed seeing people I know were there, because our paths never happened to cross. Ideally, a courtyard with a big patio and a pool, right outside the con suite. Sit there, smoke or not as it suits you without bothering anyone else, and eventually everybody you want to see will pass through. Party rooms within easy staggering distance, for easy access to the consuite without disturbing people who want to sleep.

And it would be nice if the function rooms were in the same ZIP code as the rest of the con.

FRANK, THE HOTEL YOU ARE DESCRIBING DOES NOT EXIST IN THE CHATTANOOGA AREA. I HAVE NEVER SEEN A PERFECT HOTEL FOR A CONVENTION IN ALMOST 40 YEARS. AS A MATTER OF FACE, WILSON 'BOB' TUCKER USED TO JOKE ABOUT

BUILDING THE PERFECT HOTEL AND MOVING IT FROM CITY TO CITY ON ROLLER SKATES. S0, IF YOU WANT TO GO TO CONVENTION, YOU HAVE TO MAKE DO WITH WHAT YOU HAVE AND OPTIMIZE IT'S USE. THAT UNFORTUNATELY IS JUST A FACT OF LIFE IN RUNNING CONVENTIONS. AS FOR SHUTTLE, AFTER GOING TO WORLDCONS FOR OVER 30 YEARS I CAN TELL YOU THAT THE CHOO CHOO MARRIOTT SHUTTLE WORKED PRETTY DARN WELL. IF YOU THROW IN THE ELECTRIC BUS BETWEEN THE CHOO CHOO AND THE MARIOTT, IT WASN'T BAD AT ALL. UT

<T>~<H>~<E>~~~<J>~<O>~<K>~<E>~<S>~~~<S>~<T>~<A>~<R>~<T>~~~<H>~<E>~<R>~<E>

From: "Mike Waldrip" waldripk@gmail.com

THE WEDDING

A father texts his son: "My Dear Son,
Today is a day you will treasure for all the days of your life.
My best love and good wishes.
Your Father."

His Son texts back: "Thanks Dad. But the wedding isn't actually until tomorrow!"

His Father replies: "I know."

<J>~<O>~<K>~<E>~<S>

A Heart Warming Tale

Once upon a time there lived a King who had the most beautiful daughter. But there was a problem. Everything the princess touched would melt.

No matter what:
Metal
Wood
Stone
Anything she touched would melt.

Because of this, men were afraid of her. Nobody would dare marry her.

The King despaired. What could he do to help his daughter?

He consulted his wizards and magicians. One wizard told the King,
'If your daughter touches one thing that does not melt in her hands, she will be cured.'

The King was overjoyed and came up with a plan.

The next day, he held a competition. Any man that could bring his daughter an object that would not melt would marry her and inherit the King's wealth.

THREE YOUNG PRINCES TOOK UP THE CHALLENGE.

The first brought a sword of the finest steel.

But alas, when the Princess touched it, it melted.
The prince went away sadly
The second prince brought diamonds.He thought diamonds are the hardest substance in the world and would not melt but alas, once the Princess touched them, they melted. He too was sent away disappointed.

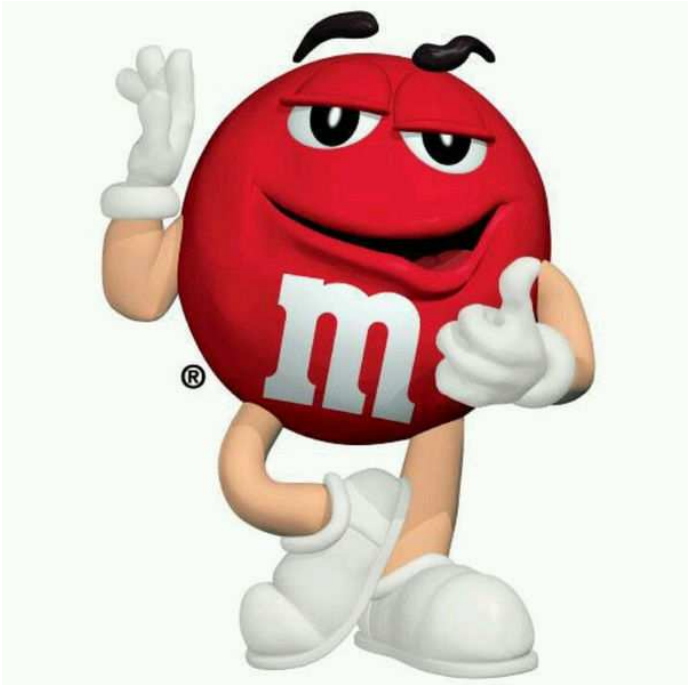
The third prince approached. He told the Princess, 'Put your hand in my pocket and feel what is in there.'

The Princess did as she was told, though she turned red. She felt some thing very hard. She held it in her hand. And it did not melt!!!

The King was overjoyed. Everybody in the kingdom was overjoyed.

And the Prince married the Princess and they both lived happily ever after.

Question: What was in the Prince's pants



<J>~<O>~<K>~<E>~<S>

Cowboy Midget from Texas

There was a midget down in Texas whose testicles hurt and ached almost all the time. The midget went to the doctor and told him about his problem. The doctor told him to drop his pants and he would have a look.

The midget dropped his pants. The doctor stood him up onto the examining table, and started to examine him. The doc put one finger under his left testicle and told the midget to

turn his head and cough, the usual method to check for a hernia.

"Aha!" mumbled the doc and, as he put his finger under the right testicle, he asked the midget to cough again.

"Aha!" said the doctor again, and reached for his surgical scissors. Snip-snip-snip-snip on the right side, then snip-snip-snip-snip on the left side.

The midget was so scared he was afraid to look, but noted with amazement that the snipping did not hurt. The doctor then told the midget to walk around the examining room to see if his testicles still hurt.

The midget was absolutely delighted as he walked around and discovered his testicles were no longer aching.

The doctor said, "How does that feel now?" The midget replied, "Perfect Doc, and I didn't even feel it. What did you do?"

The doctor replied, "I cut two inches off the top of your cowboy boots."

<J>~<O>~<K>~<E>~<S>

Yes, he is Asian and has a great sense of humor!

<J>~<O>~<K>~<E>~<S>
IRONY

Once in a while we just have to stand back in awe of government.

The Food Stamp Program, administered by the U.S. Department of Agriculture, is proud to be distributing the greatest amount of free Meals and Food Stamps ever – 46 million people now receive Food Stamps.

Meanwhile, the National Park Service, administered by the U.S. Department of the Interior, asks us "Please Do Not Feed the Animals." Their stated reason for the policy is because "The animals will grow dependent on handouts and will not learn to take care of themselves."

Thus ends today's lesson in irony.

<J>~<O>~<K>~<E>~<S>

STUNNING SENIOR MOMENT

A very self-important college freshman attending a recent football game took it upon himself to explain to a senior citizen sitting next to him why it was impossible for the older generation to understand his generation.

'You grew up in a different world, actually an almost primitive one,' the student said, loud enough for many of those nearby to hear. 'The young people of today are much more advanced than people your age.

We grew up with television, jet planes, space travel, man walking on the moon and the internet. We have cell phones, nuclear energy, electric and hydrogen cars , computers, automated manufacturing, amazing technologies, ...and,' pausing to take another drink of beer.

The senior took advantage of the break in the student's litany and said, 'You're right, son. We didn't have those things when we were young... so we invented them. Now, you arrogant little s..t, what are YOU doing for the next generation?'

The applause was resounding.

<J>~<O>~<K>~<E>~<S>~~<of>~<the>~~<W>~<E>~<E>~<K>

From: "Randy Bovell" crbovell@epbfi.com

MARINE PRIVATE

A U.S. Marine Colonel was about to start the morning briefing to his staff. While waiting for the coffee machine to finish brewing, the colonel decided to pose a question to all assembled.

He explained that his wife had been a bit frisky the night before and he failed to get his usual amount of sound sleep.

He posed the question of just how much of sex was "work" and how much of it was "pleasure?"

A Major chimed in with 75%-25% in favor of work.

A Captain said it was 50%-50%.

A Lieutenant responded with 25%-75% in favor of pleasure, depending upon his state of inebriation at the time.

There being no consensus, the colonel turned to the Private First Class who was in charge of making the coffee and asked for his opinion?

Without any hesitation, the young Private First Class responded, "Sir, it has to be 100% pleasure."

The colonel was surprised and as you might guess, asked why?

"Well, sir, if there was any work involved, the officers would have me doing it for them."

The room fell silent.

<J>~<O>~<K>~<E>~<S>~~~<of>~<the>~~~<W>~<E>~<E>~<K>

From: "Bob Bolgeo" bbolgeo@aol.com

An oldie but a goodie!!

WINDOWS VS FORD

For all of us who feel only the deepest love and affection for the way computers have enhanced our lives, read on. At a recent computer expo (COMDEX) : Bill Gates reportedly compared the computer industry with the auto industry and stated, "If Ford had kept up with technology like the computer industry has, we would all be driving $25 cars that got 1,000 miles to the gallon."

In response to Bill's comments, Ford issued a press release stating:

If Ford had developed technology like Microsoft, we would all be driving cars with the following characteristics (and I just love this part):

1. For no reason whatsoever, your car would crash.....twice a day.

2.. Every time they repainted the lines in the road, you would have to buy a new car.

3.. Occasionally your car would die on the freeway for no reason. You would have to pull to the side of the road, close all of the windows, shut off the car, restart it, and reopen the windows before you could continue. For some reason you would simply accept this.

4.... Occasionally, executing a maneuver such as a left turn would cause your car to shut down and refuse to restart, in which case you would have to reinstall the engine.

5.... Macintosh would make a car that was powered by the sun, was reliable, five times as fast and twice as easy to drive - but would run on only five percent of the roads.

6..... The oil, water temperature, and alternator warning lights would all be replaced by a single "This Car Has Performed An Illegal Operation" warning light.

7..... The airbag system would ask, "Are you sure?" before deploying.

8..... Occasionally, for no reason whatsoever, your car would lock you out and refuse to let you in until you simultaneously lifted the door handle, turned the key and grabbed hold of the radio antenna.

9..... Every time a new car was introduced car buyers would have to learn how to drive all over again because none of the controls would operate in the same manner as the old car.

10..... You'd have to press the "Start" button to turn the engine off.

PS - I'd like to add that when all else fails, you could call "customer service" in some foreign country and be instructed in some foreign language how to fix your car yourself!

Please share this with your friends who love - but sometimes hate - their computer!

<J>~<O>~<K>~<E>~<S>~~~<of>~<the>~~~<W>~<E>~<E>~<K>

From: "Bob Bolgeo" bbolgeo@aol.com

A Few Chuckles for Us Young Folks!

An elderly lady was standing at the railing of the cruise ship holding her hat tight so that it would not blow away in the wind.

A gentleman approached her and said, "Pardon me, madam.. I do not intend to be forward but did you know that your dress is blowing up in this high wind?"

"Yes, I know," said the lady. "I need both my hands to hold onto this hat."

"But madam, you must know that you are not wearing any panties and your privates are exposed!" said the gentleman in earnest.

The woman looked down, then back up at the man and replied, "Sir, anything you see down there is 75 years old. I just bought this hat yesterday!"

Gotta love older people!

~~~~~~

While Bob was sunbathing naked at the beach at Green Valley , for the sake of civility, and to keep it from getting sunburned, he had a hat over his private parts.

A woman walks past and says, snickering, "If you were a gentleman, you'd lift your hat.

He raised an eyebrow and replied, "Madam, if you were better looking, it would lift itself."

~~~~~~

By the time a man is wise enough to watch his step, he's too old to go anywhere.

~~~~~~

Old age is when you have stopped growing at both ends, and have begun to grow in the middle.

~~~~~~

Old age is having a choice of two temptations and choosing the one that will get you home earlier.

~~~~~~

A man has reached old age when he is cautioned to slow down by his Doctor instead of by the police.

<YOU>~<>~<JUST>~<>~<CAN'T>~<>~<MAKE>~<>~<THIS>~<>~<STUFF>~<>~<UP!>

YOU JUST CAN'T MAKE THIS STUFF UP!

From: "Tim Bolgeo" tbolgeo@epbfi.com

CONGRESSMEN: RUSSIA FUNDS U.S. ANTI-FRACKING GROUPS TO SUPPRESS 'DOMESTIC OIL & GAS'

by THOMAS D. WILLIAMS, PH.D.14 Jul 2017616
http://www.breitbart.com/big-government/2017/07/14/congressmen-russia-funds-u-s-anti-fracking-groups-to-suppress-domestic-oil-gas/

The Russian government has been funding radical environmental groups to "suppress the U.S. domestic oil & gas industry," according to leading Congressional House members.

In a newly released letter to Secretary of the Treasury Steven Mnuchin, the chair of the House Committee on Science, Space and Technology, Lamar Smith (R-TX), and the chair of the Subcommittee on Energy, Randy Weber (R-TX) allege that Russia "is behind the radical statements and vitriol directed at the U.S. fossil fuel sector" and formally request that the

Treasury Department launch an investigation into Russian funding of radical environmental groups.

Getty

Russian financing makes up a significant part of "a concerted effort by foreign entities to funnel millions of dollars through various non-profit entities to influence the U.S. energy market," the congressmen assert in their letter.

They also reference public statements by European officials as well as the U.S. intelligence community declaring that "Russia and its government corporations are funding a covert anti-fracking campaign to suppress the widespread adoption of fracking in Europe and the U.S.—all in an effort to safeguard the influence of the Russian oil and gas sector."

Along with statements from NATO officials, the congressmen also cite Wikileaks revelations suggesting that former Secretary of State Hillary Clinton was well aware of Russian efforts to subvert the U.S. energy sector by financing "phony environmental groups."

> Former Secretary of State and then-presidential candidate Hillary Clinton, with access to intelligence reports, made a private speech in 2014, according to documents from WikiLeaks, which included statements about the struggles of dealing with Russian-backed environmental groups. According to the *Washington Times*, Secretary Clinton said the following: "We [the State Department and the U.S.] were up against Russia pushing oligarchs and others to buy media. We were even up against phony environmental groups, and I'm a big environmentalist, but these were funded by the Russians to stand against any effort, 'Oh that pipeline, that fracking, that whatever will be a problem for you,' and a lot of the money supporting that message was coming from Russia."[4]

Russia funnels a large portion of its funding through a San Francisco-based private foundation called Sea Change, the letter states, which then passes the funds to environmental groups "with the intent to effect political change." To do this, the Russian government is using a shell company in Bermuda called Klein Ltd, which then makes tens of millions of dollars in "anonymous donations" to Sea Change.

In their letter, the congressmen request a federal investigation into the funding of major environmental groups, including the Sierra Club Foundation, League of Conservation Voters Education Fund, and Natural Resources Defense Council, who have all allegedly received Russian money to finance their anti-fracking crusades.

The investigation would seek to find out whether "foreign entities working to influence U.S. policy are in violation of federal statutes pertaining to foreign governments or those lobbying on behalf of domestic and foreign interests," the letter states.

In a press release accompanying the publication of the letter, Congressman Smith declared: "If you connect the dots, it is clear that Russia is funding U.S. environmental groups in an effort to suppress our domestic oil and gas industry, specifically hydraulic fracking."

He said that the Russians have established an elaborate scheme that funnels money through shell companies in Bermuda, which "may violate federal law and certainly distorts the U.S. energy market."

"The American people deserve to know the truth and I am confident Secretary Mnuchin will investigate the allegations," he said.

<YOU>~<>~<JUST>~<>~<CAN'T>~<>~<MAKE>~<>~<THIS>~<>~<STUFF>~<>~<UP!>

YOU JUST CAN'T MAKE THIS STUFF UP!

From: "Jim Woosley" Jimwoosley@aol.com

A GIFT OF A BIBLE

Tweet from Monica Anthony (@meanthony1)

Played most of this short video in church today, very eye opening from atheist, Penn Jillette of Penn & Teller.

https://t.co/EHHfpQDQAA

VERY INSPIRING COMMENTS FROM PENN TELLER.

<?>~<YOU JUST CAN'T MAKE THIS STUFF UP!>~<?>

Subj: More swamp draining

Top officials at New Hampshire veterans hospital removed

Associated Press, Published July 17, 2017
http://www.foxnews.com/us/2017/07/17/top-officials-at-new-hampshire-veterans-hospital-removed.html

BOSTON – Veterans Affairs Secretary David Shulkin has removed two top officials at New Hampshire's only veterans hospital and has ordered a review of the facility amid allegations of "dangerously substandard care."

The Boston Globe reported that 11 physicians and medical employees alleged the Manchester VA Medical Center was endangering patients. They described a fly-infested operating room and surgical instruments that weren't always sterilized.

The Office of the Special Counsel, a federal whistle-blower agency, found "substantial likelihood" the allegations were true and ordered an investigation, which began in January.

Following the newspaper report Sunday, Shulkin removed hospital Director Danielle Ocker and Chief of Staff James Schlosser. He ordered a more thorough review.

A VA spokesman told the newspaper Ocker and Schlosser would be assigned other duties in the interim.

IT'S ABOUT TIME THAT THE VA'S HOUSE WAS CLEANED AND THE VETS TAKEN CARE OF. THIS IS A GREAT FIRST STEP. UT

<?>~<YOU JUST CAN'T MAKE THIS STUFF UP!>~<?>

Top 10 Most American Guns Of All Time

https://gundigest.com/article/gallery-top-10-american-guns-of-all-time

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From: "Tim Bolgeo" tbolgeo@epbfi.com

BUILDING A BATTERY-FREE CELLPHONE

By Amy Nordrum, Posted 7 Jul 2017 | 16:00 GMT
http://spectrum.ieee.org/tech-talk/consumer-electronics/gadgets/building-a-batteryfree-cellphone?utm_source=Tech+Alert&utm_medium=Email&utm_campaign=TechAlert_07-13-17&bt_ee=16YN1y/OlaJkNJ80/o++HnJxglFl5sglGL8Qbv8CMvpQ0zVz2GqtuQmNaEdszad9&bt_ts=1499953969058

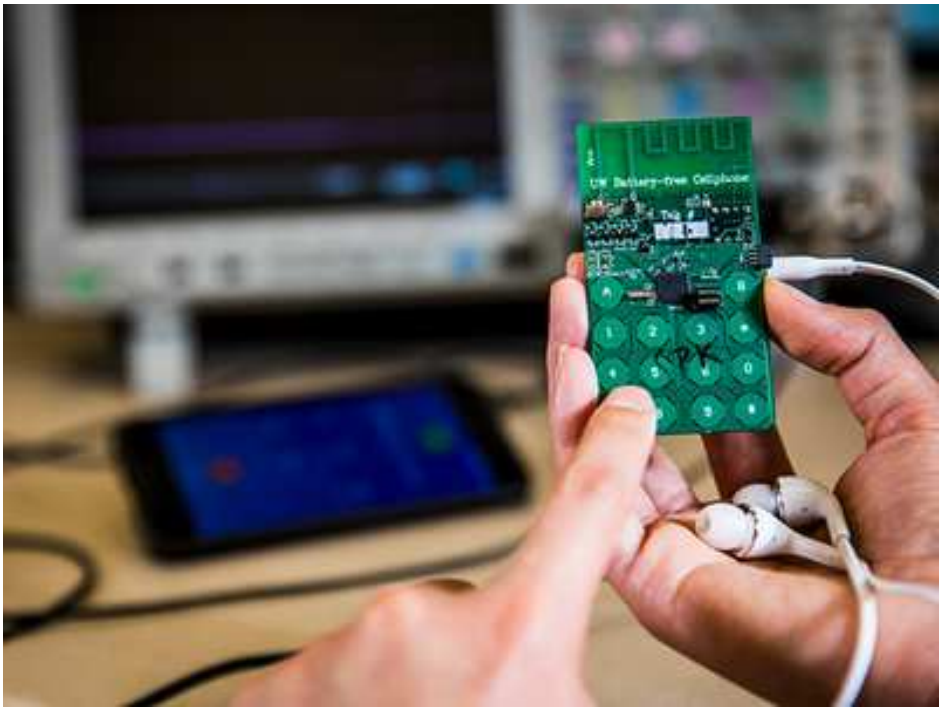

Photo: University of Washington

Batteries can be a real drag. They're expensive and must be constantly recharged. Though some battery-free sensors can passively transmit small amounts of data, most consumer electronics today still rely on bulky batteries to store power.

A team from the University of Washington has built a battery-free cellphone

that can harness power from radiofrequency (RF) waves sent to it from a nearby base station. The phone not only harnesses the power it needs to operate from those waves, but can also place a voice call by modifying and reflecting the same waves back to the base station, through a technique known as backscattering.

The UW team has shown their device (built from off-the-shelf components) can use harvested power to place a call from a distance of 9.4 meters away from a customized base station. They also built a version outfitted with photodiodes that collect ambient light to passively power the device, allowing them to place a call from a distance of 15.2 meters.

To place or receive a call, the entire device consumes just 2 to 3 microwatts of power. The group's design supports only voice calls—there's no data plan—but its creators say it would still prove quite useful in certain circumstances.

"Imagine a scenario where your phone died but you could at least have enough power to make a 9-1-1 call," says Vamsi Talla, who built the phone while a post-doc in electrical engineering at the University of Washington. "That could be a lifesaver."

Many of today's passive sensors transmit data only occasionally–perhaps every minute or so—due to power constraints. Or, in the case of RFID tags, some passive sensors must be very close to a reader to harness enough power to transmit a message.

In a conference paper published earlier this month, Talla, who now serves as chief technology officer of Jeeva Wireless, and his colleagues call their design "a major leap" toward the creation of battery-free devices. Ultimately, they want to build devices that can constantly transmit or receive data and voice calls over long distances without batteries.

"Now we're showing the world that a battery-free device doesn't have to be a sensor, but it can be a whole system where in real-time, you can actually do something useful," Talla says.

Raj Rajkumar, a professor in electrical engineering at Carnegie Mellon University, says the research is "another interesting step in the evolution of wireless power transmission." He also noted that follow-up studies would need to evaluate the safety of transmitting power to mobile devices in this way.

For now, the UW device only works with customized base stations within close range of the user. Being near a base station may not always be possible for users who need to place an urgent call. But Talla says this could change with the anticipated rollout of 5G networks, in which providers are expected to dramatically increase the density of base stations—at least in cities.

He also expects to achieve greater distances at other frequencies. In their initial tests, the base station broadcast a single tone on the 915 megahertz frequency band to the device.

To place a call, the battery-free phone uses an electret microphone to generate an analog signal. An electret microphone contains a diaphragm with a fixed electrostatic charge. Within the microphone, the diaphragm forms a capacitor with a metal plate. When a person speaks, mechanical vibrations from their voice cause the diaphragm to change shape

relative to the metal plate. This affects the capacitance of the device and generates a small voltage.

The microphone connects to an antenna through a RF switch. The voltage from the microphone travels to the antenna, where it directly alters the amplitude of the single tone embedded in the RF wave. The altered signal is then reflected back to the base station using backscattering techniques. These methods reduce the phone's power consumption by three or four orders of magnitude compared to a traditional radio.

The phone's design was inspired in part by the Great Seal Bug, a passive surveillance device planted in the desk of the U.S. Ambassador to Moscow by Russian authorities in the late 1940s. The UW phone is also half-duplex, which means a user can either listen or talk, but can't do both at the same time. A microcontroller manages the RF switch, connecting the microphone to the antenna when a user presses a button to talk, and connecting the earphones when the user wants to listen.

To minimize power consumption, the team moved much of the processing that would typically be performed on a phone to their customized base station. Smartphones today contain components that convert analog sound to digital signals before transmission, and other components that convert the digital signals received from a base station to analog sound.

In the UW system, the base station performs these conversions and connects to the nationwide cellular network, forwarding calls or sending signals it receives back to the user. Talla says the group will continue to refine the technology through a licensing agreement with Jeeva Wireless.

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OVER 99% OF AVAILABLE SOLAR SPECTRUM CAPTURED WITH NEW 44.5% EFFICIENT SOLAR CELL

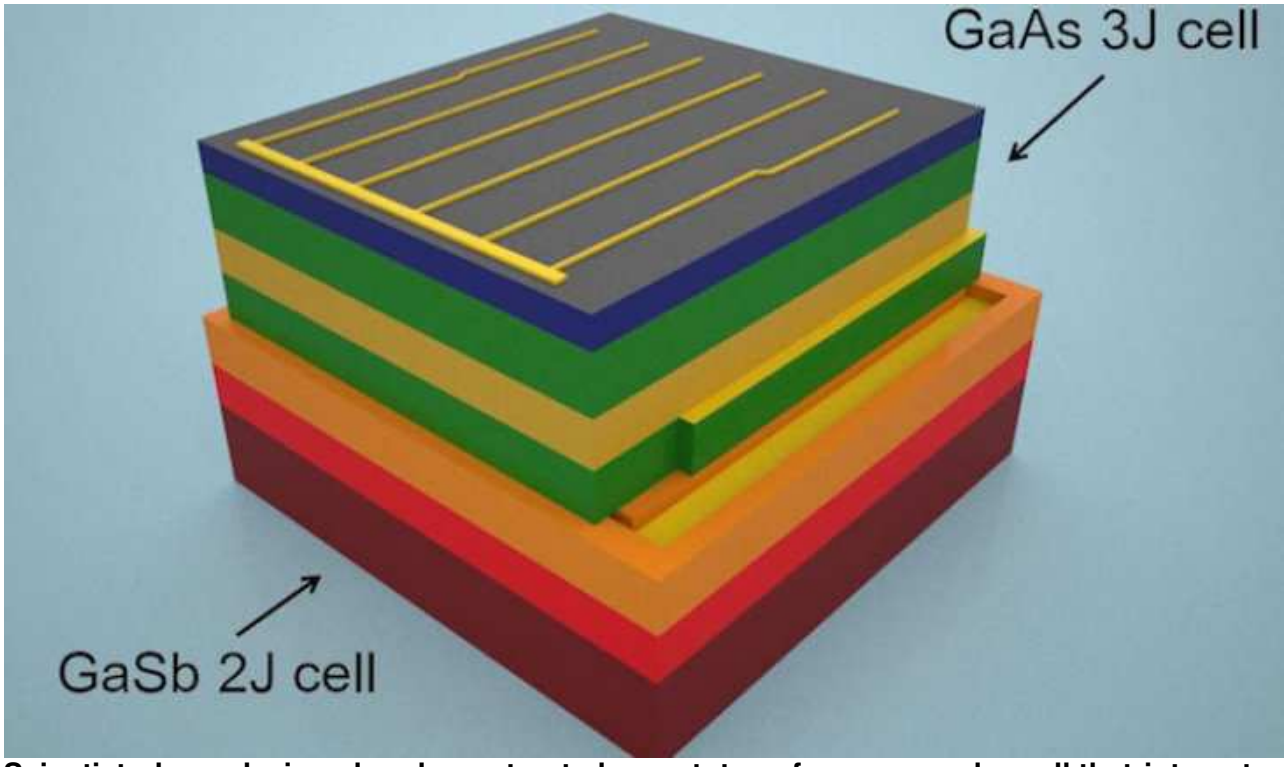
brian wang | July 12, 2017 |
https://www.nextbigfuture.com/2017/07/over-99-of-available-solar-spectrum-captured-with-new-44-5-efficient-solar-cell.html

The approach is different from the solar panels one might commonly see on rooftops or in fields. The new device uses concentrator photovoltaic (CPV) panels that employ lenses to concentrate sunlight onto tiny, micro-scale solar cells. Because of their small size—less than one millimeter square—solar cells utilizing more sophisticated materials can be developed cost effectively.

The stacked cell acts almost like a sieve for sunlight, with the specialized materials in each layer absorbing the energy of a specific set of wavelengths. By the time the light is funneled through the stack, just under half of the available energy has been converted into electricity. By comparison, the most common solar cell today converts only a quarter of the available energy into electricity.

"Around 99 percent of the power contained in direct sunlight reaching the surface of Earth falls between wavelengths of 250 nm and 2500 nm, but conventional materials for high-

efficiency multi-junction solar cells cannot capture this entire spectral range," said Matthew Lumb, lead author of the study and a research scientist at the GW School of Engineering and Applied Science. "Our new device is able to unlock the energy stored in the long-wavelength photons, which are lost in conventional solar cells, and therefore provides a pathway to realizing the ultimate multi-junction solar cell."



Scientists have designed and constructed a prototype for a new solar cell that integrates multiple cells stacked into a single device capable of capturing nearly all of the energy in the solar spectrum. The new design converts direct sunlight to electricity with 44.5 percent efficiency, giving it the potential to become the most efficient solar cell in the world.

This approach has two novel aspects.

it uses a family of materials based on gallium antimonide (GaSb) substrates, which are usually found in applications for infra-red lasers and photodetectors. The novel GaSb-based solar cells are assembled into a stacked structure along with high efficiency solar cells grown on conventional substrates that capture shorter wavelength solar photons.

2. the stacking procedure uses a technique known as transfer-printing, which enables three dimensional assembly of these tiny devices with a high degree of precision.

This particular solar cell is very expensive, however researchers believe it was important to show the upper limit of what is possible in terms of efficiency. Despite the current costs of the materials involved, the technique used to create the cells shows much promise. Eventually a similar product may be brought to market, enabled by cost reductions from very high solar concentration levels and technology to recycle the expensive growth substrates.

ABSTRACT

In this work, a multijunction solar cell is developed on a GaSb substrate that can efficiently convert the long-wavelength photons typically lost in a multijunction solar cell into electricity. A combination of modeling and experimental device development is used to optimize the performance of a dual junction GaSb/InGaAsSb concentrator solar cell. Using transfer printing, a commercially available GaAs-based triple junction cell is stacked mechanically with the GaSb-based materials to create a four-terminal, five junction cell with a spectral response range covering the region containing over 99% of the available direct-beam power from the Sun reaching the surface of the Earth. The cell is assembled in a mini-module with a geometric concentration ratio of 744 suns on a two-axis tracking system and demonstrated a combined module efficiency of 41.2%, measured outdoors in Durham, NC. Taking into account the measured transmission of the optics gives an implied cell efficiency of 44.5%.

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IMPROVED ARTIFICIAL SPIDER SILK CREATED

brian wang | July 12, 2017 |
https://www.nextbigfuture.com/2017/07/improved-artificial-spider-silk-created.html#more-134505

Researchers have made improved artificial spider silk, and it is 'spun' from a material that is 98% water.

The fibers, which resemble miniature bungee cords as they can absorb large amounts of energy, are sustainable, non-toxic and can be made at room temperature.

This new method not only improves upon earlier methods of making synthetic spider silk, since it does not require high energy procedures or extensive use of harmful solvents, but it could substantially improve methods of making synthetic fibers of all kinds, since other types of synthetic fibers also rely on high-energy, toxic methods.

The fibers are pulled from the hydrogel, forming long, extremely thin threads – a few millionths of a meter in diameter. After roughly 30 seconds, the water evaporates, leaving a fiber which is both strong and stretchy.

"Although our fibers are not as strong as the strongest spider silks, they can support stresses in the range of 100 to 150 megapascals, which is similar to other synthetic and natural silks," said Shah. "However, our fibers are non-toxic and far less energy-intensive to make."

SIGNIFICANCE

Fiber materials have great impact on our daily lives, with their use ranging from textiles to functional reinforcements in composites. Although the manufacturing process of manmade fibers is potentially limited by extensive energy consumption, spiders can readily spin silk fibers at room temperature. Here, we report a class of material that is based on a self-assembled hydrogel constructed with dynamic host–guest cross-links between functional polymers. Supramolecular fibers can be drawn from this hydrogel at room temperature. The supramolecular fiber exhibits better tensile and damping properties than conventional regenerated fibers, such as viscose, artificial silks, and hair. Our approach offers a sustainable alternative to current fiber manufacturing strategies.

ABSTRACT

Inspired by biological systems, we report a supramolecular polymer–colloidal hydrogel (SPCH) composed of 98 wt % water that can be readily drawn into uniform (?6-?m thick) "supramolecular fibers" at room temperature. Functionalized polymer-grafted silica nanoparticles, a semicrystalline hydroxyethyl cellulose derivative, and cucurbit[8]uril undergo aqueous self-assembly at multiple length scales to form the SPCH facilitated by host–guest interactions at the molecular level and nanofibril formation at colloidal-length scale. The fibers exhibit a unique combination of stiffness and high damping capacity (60–70%), the latter exceeding that of even biological silks and cellulose-based viscose rayon. The remarkable damping performance of the hierarchically structured fibers is proposed to arise from the complex combination and interactions of "hard" and "soft" phases within the SPCH and its constituents. SPCH represents a class of hybrid supramolecular composites, opening a window into fiber technology through low-energy manufacturing.

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THE NEW CROP OF LOW-COST ISR OR ATTACK AIRCRAFT

Jul 12, 2017, Tony Osborne and Jen DiMascio | Aviation Week & Space Technology
http://aviationweek.com/defense/new-crop-low-cost-isr-or-attack-aircraft?NL=AW-05&Issue=AW-05_20170714_AW-

05_561&sfvc4enews=42&cl=article_2&utm_rid=CPEN1000001477803&utm_campaign=10915&utm_medium=email&elq2=f4ab8c9d4d3741bc890ddadd57fdc0e9

Agricultural aircraft have made their own impact in counterinsurgency operations over the years. In Colombia and Central America, the crop sprayers have been used for just that, directly targeting drug crops with chemicals.

Increasingly, agricultural aircraft such as the Air Tractor AT-802, Thrush 710P and Thrush 510G are taking on a greater role as low-cost, long-endurance platforms kitted out with surveillance systems and a wide range of precision-guided weaponry. Platform integrators are touting the difference in cost compared with other light fighters and business-jet derivatives as they target customers in Africa, Eastern Europe, the Middle East and elsewhere for border security, light strike and surveillance missions.

AIR TRACTOR AT-802U

Air Tractor, which builds the AT-802 firefighting platform, already produces its own in-house intelligence, surveillance and reconnaissance (ISR) strike platform, and the company has displayed the aircraft at a number of international air shows. But solid sales remain elusive. Marketed as the Aerial Escort Aircraft, Air Tractor did offer the aircraft to Lebanon in 2015.

Air Tractor says the AT-802U provides 6-8 wing hardpoints for weapons, as well as three fuselage hardpoints; dedicated gun stations are located on the inner wing hardpoints. Ammunition for guns mounted here is fed from a magazine mounted in the nose, just forward of the cockpit. The company was also studying the development of a steerable 30-mm cannon for fitment on the centerline.

Air Tractor advertises that the AT-802 is combat-proven in counterdrug operations run by the U.S. State Department. The department's Air Wing aircraft have taken 200 bullet strikes, yet the fleet has maintained a 100% safety record with no loss of life or injury, according to the company's literature.

L3 TECHNOLOGIES LONGSWORD

L3's Longsword uses the AT-802 platform but has maximized it for extended range and payload. To increase the range, L3 converted the agricultural aircraft's bays for carrying pesticides or fire retardants into self-healing fuel tanks.

As an ISR platform, the aircraft can fly for up to 10 hr. at up to 22,500 ft. In that capacity, the Longsword carries the L3 Wescam MX-15D high-definition electro-optical infrared sensor, an L3 ForceX Widow MMS mission software system, the Thales Scorpion helmet-mounted display and a full-motion video display. It can defend itself with an armored cockpit, the AN/AAR-47 infrared warning receiver and an AN/ALE-47 electronic warfare countermeasures dispenser system.

If firepower is needed, the aircraft can be outfitted as a bomb truck, carrying Hellfire missiles to Gatling guns, Mk. 82 bombs and M260 rocket launchers on up to 11 hardpoints. Even with a full load of weapons, it can operate for longer than 6 hr., company officials say, adding that other light fighters may fly faster or higher, but they do not carry more payload

or stay on station as long."Think of this more like an Apache with very long legs," says Joseph Siniscalchi, an L3 senior vice president for business development.

L3's Longsword has plenty of wing space to cover precision munitions, with 11 hardpoints that can carry guns, guided and unguided bombs as well as rockets and missiles. Credit: L3 Technologies

In January, the U.S. State Department approved the potential sale of up to 14 of the aircraft to Kenya, but the transaction has been challenged. The late Ron Howard, as CEO of Iomax, had argued that its counterinsurgency aircraft, Archangel, was unfairly overlooked by the African nation. In an interview not long before his untimely death, Howard suggested that Kenya was being sold an uncertified and still-developmental platform.

The Longsword is certified for the ISR mission, and L3 is working with the U.S. Air Force Seek Eagle office to certify some weapons. Kenya has also asked L-3 for weather radar and communications systems, but Siniscalchi says the country would have to cover the cost of certifying the add-ons.

For now, Kenya has asked to extend its current letter of agreement through the middle of September, Siniscalchi says. At that point, the two governments could decide to extend the deal, or Kenya could search for another aircraft.

Patrick Penland, vice president for transport programs, is adamant that the Air Force did not select the Longsword. "The Kenyans chose the AT-802 Longsword. That was based on having come to Waco, Texas," where L3's platform integration office is based, Penland says. "Their deputy chief of air force came and saw the ISR configuration."

IOMAX ARCHANGEL

Perhaps the biggest success story has been the development of the Iomax Archangel in association with the United Arab Emirates (UAE). The Archangel's success in Yemen and, on a less high-profile scale, in Libya has certainly increased the public and industry perception of the agricultural aircraft as an alternative platform to the numerous trainers-turned light attack turboprops that have sold well in Africa, Latin America and the Asia-Pacific region.

North Carolina-based Iomax's association with the UAE began in 2009 when the Middle Eastern nation opted for a Border Patrol Aircraft (BPA) based on the standard Air Tractor AT-802 crop sprayer. Iomax delivered a podded electro-optical camera and added hardpoints to the wings in expectation of the fitment of weapons. In 2011, a further 14 were ordered.

However, to realize the full potential of the aircraft, in 2012 Iomax changed suppliers to Thrush, because Air Tractor was at the time unwilling to make the structural modifications to the aircraft that Iomax needed.

As Aviation Week reported (AW&ST April 17-30, p. 40), when test pilot Joe Edwards flew the Pratt & Whitney Canada PT6A-67F-powered Archangel, the pilot's cockpit was moved forward 48 in. to improve visibility over the nose, while the mission operator's position occupies the real estate where the pilot would have sat.

Inside, the aircraft is equipped with a CMC avionics suite that in the front cockpit features three multifunction displays and a centrally fitted head-up display. The rear cockpit contains two multifunction displays and a single 17-in. large-area display that feeds the image from the electro-optical camera. Other design features include a five-blade propeller that helps reduce the noise of the aircraft when operating at altitudes of around 15,000 ft.

Iomax has already carried out an extensive program of weapons integration work for both the AT-802 and the Archangel. Weapons regularly fitted to the UAE aircraft include Roketsan Cirit lightweight missiles—reportedly highly effective against moving targets—the GBU-58 Paveway II 250-lb. laser-guided bomb and the Hellfire missile. The aircraft have also recently been upgraded to use the Raytheon Talon laser-guided rocket.

The original batch of AT-802-derived BPAs have now been largely been replaced with Archangels; the AT-802s have been handed to other regional air forces—at least six were gifted to Jordan while 12 are now with the Egyptian Air Force. Iomax told Aviation Week in February that negotiations were underway to sell a further 12 Archangels to the UAE to allow the formation of a second squadron. The company is also working on development of a Block 2 version featuring a number of avionics, performance and weapon upgrades. The installation of a lightweight Martin-Baker ejection seat has also been discussed.

LASA T-Bird

Bulgaria's Light Armed Surveillance Aircraft Engineering's (LASA) T-Bird made an unannounced debut at the recent Paris Air Show. As the only non-U.S. company now offering a light-attack capability on an agricultural aircraft, it seems the company has enjoyed some limited success. Its prototype T-Bird is already in operation in Africa,

apparently working for a private contractor on ISR duties, according to company executives.

The Bulgarian company Light Armed Surveillance Aircraft Engineering has already sold its T-Bird aircraft, based on the Thrush 510G, in Africa. Credit: LASA

The T-Bird is being touted as being a "unique combination" of a high-payload light aircraft with an "advanced Western technology ISR suite," and a "proven, powerful ex-Warsaw Pact" counterinsurgency package.

LASA has developed the T-Bird in a way that skirts U.S. International Traffic in Arms Regulations. The company is using the Thrush 510G airframe that is powered by the General Electric H80 turboprop. Underneath the fuselage is an Airborne Technologies of Austria-developed pod that carries both an electro-optical camera and a data link for data transfer. The cockpit has been modified with night-vision-goggle-compatible digital instrumentation provided by Aspen Avionics and Getac-made rugged tablets that allow the rear crewman to use the electro-optical camera. Ballistic protection for the engine and cockpit has also been fitted.

The wing-structure has been modified for three hardpoints, and so far the company has carried out integration of Russian-made weapons only. At Paris, the aircraft carried pairs of distinctive UB16/32 and UB16/57 Russian-made unguided rocket launchers and a pair of UPK23/250 gun pods.

LASA says the aircraft costs several times less to operate than other surveillance platforms such as a Beechcraft King Air or derivative and "tens of times" less compared to specialist strike aircraft and helicopters.

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PODCAST: A PEEK INSIDE THE FUTURE OF AEROSPACE PROPULSION

Jul 12, 2017Guy Norris and Graham Warwick | Aviation Week & Space Technology
http://aviationweek.com/commercializing-space/peek-inside-future-aerospace-propulsion?NL=AW-05&Issue=AW-05_20170714_AW-05_561&sfvc4enews=42&cl=article_3&utm_rid=CPEN1000001477803&utm_campaign=10915&utm_medium=email&elq2=f4ab8c9d4d3741bc890ddadd57fdc0e9

It's not just rocket scientists gathering at the American Institute of Aeronautics and Astronautics' annual Propulsion & Energy conference, held this year in Atlanta. This is a mecca for turbine engineers, hypersonics researchers and, in a new development, those energized by the emerging field of electrified aircraft propulsion. Aviation Week technology writers Guy Norris and Graham Warwick discuss the thrusts of this year's conference.

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HOW A ONE-MAN TEAM FROM CALIFORNIA WON NASA'S SPACE ROBOTICS CHALLENGE

By Evan Ackerman, Posted 11 Jul 2017 | 15:30 GMT
http://spectrum.ieee.org/automaton/robotics/robotics-software/coordinated-robotics-winner-nasa-space-robotics-challenge

Image: NASA SRCIn NASA's Space Robotics Challenge, participants had to command a virtual Valkyrie robot to perform a series of repair tasks in a simulated Mars base hit by a dust storm.

NASA's Space Robotics Challenge (SRC) took place last month, full of virtual Valkyries wandering around a virtual Mars base trying to fix virtual stuff. Anyone was allowed to participate, and since the virtual nature of the competition means there was no need for big expensive robots that mostly didn't fall over, anyone actually could (and did) participate. Of the 93 teams initially signed up to compete, NASA selected 20 finalist teams based on their performance completing some tasks in the Gazebo 3D robot simulator, and each of those finalists had to program a Valkyrie humanoid to complete a repair mission on a simulated Mars base.

The winner of the SRC was team Coordinated Robotics, which also was the only team to manage a perfect run with 100 percent task completion, taking home the US $125,000 top prize plus a $50,000 "perfect run" bonus. "Team" may be a little bit of a misnomer, though, since Coordinated Robotics consists entirely of one dude: Kevin Knoedler. We spoke with Kevin about his epic win, and also checked in with Nate Koenig from Open Robotics, which leads the development of Gazebo and helped organize the SRC, to get more info on the competition, along with footage of all the best outtakes.

The SRC was very similar to the VRC (the qualifier for the DARPA Robotics Challenge), in that all of the teams competed by running their code in a Gazebo virtual environment. "The tasks themselves were somewhat inspired by The Martian," Open Robotics CTO Nate Koenig told us. "Valkyrie is on Mars, preparing the way for human settlement, and a dust storm comes." Post dust storm, Val has to align a communications dish, repair a solar array, and locate and fix a leak in the habitat. Here are some highlights from the competition:

"The competition overall went pretty smoothly," says Koenig. "A unique aspect of the SRC, as opposed to the VRC, is that we were emphasizing sequential completion of tasks. You get more points for completing more tasks in order without having Valkyrie fall or require a reset, so the more reliable you are in terms of walking and manipulating, the better you'll do."

As with the DRC, the time limits on the tasks were set such that teams were heavily encouraged to use as much autonomy as possible. And it sounds like most of them did; only a few timed out. Making things even more challenging were severe restrictions on bandwidth coupled with latency designed to emulate (to some extent) what it would be like trying to teleoperate a robot somewhere out in space, as Koenig explains:

"Network latency and bandwidth limitations were more severe than the VRC. We wanted to simulate something closer to what you might experience with a round trip delay to Mars, but that would have been too extreme, so we toned it down to a maximum of 20 seconds delay. Some of the tasks had bandwidth limits of 380 bits/second, and if you look at those numbers, that essentially kills TCP.

People had to get creative, and we did see some unique things: one person ran an IRC server and client to pass information, and some other people used just straight text-based console messages, getting no visualized data, which was pretty awesome: It was like reading The Matrix. One team [Team Xion] ran completely autonomously: They just deployed their code and hit go, and they were able to complete a lot of the tasks, which was impressive.

Koenig said he and his colleagues weren't expecting any of the teams to complete all of the tasks in sequence. "But Kevin proved us wrong," he added. "And he was the only team that was able to perform that feat."

Kevin is, of course, Kevin Knoedler, who is the entirety of Team Coordinated Robotics. As Nate pointed out, Kevin managed to complete all of the Space Robotics Challenge flawlessly in a row, which is pretty amazing. We spoke with Kevin over email to learn more about how he pulled it off.

Q: IEEE Spectrum: What's your background, and what made you decide to enter the SRC by yourself?

Kevin Knoedler: After graduating from MIT I worked as an engineer and engineering manager at Teradyne. I left in 2007 to be a stay-at-home dad. Both during my time at Teradyne and in my current role as a stay-at-home dad, I have continued to be involved in various contests—Robot Wars, Battlebots, the three DARPA autonomous vehicle grand challenges, and the DRC. The SRC looked challenging and fun, so I signed up to compete in it.

I was busy coaching two soccer teams when the qualification round started (fall 2016), and I knew I would be busy coaching track and Odyssey of the Mind when the finals started (early 2017). It is usually key to contribute and coordinate with teams early in the project cycle. Since I would be busy with other things during those key times, I decided to do it alone to avoid frustration for myself and any team I worked with. Working with teams is generally a better choice as more people have more creative ideas. I have worked with teams on all of the previous contests.

During my time at Teradyne and in my current role as a stay-at-home dad, I have continued to be involved in various contests . . . It is usually key to contribute and coordinate with teams early in the project cycle. Since I would be busy with other things, I decided to do it alone.

Q: How much autonomy did your strategy rely on?

I approached the design for the contest assuming I would always have the maximum time delay, so the robot needed to do shorter tasks on its own. Even without the design work, the up to 20-second delay was not a major problem given that the allowed time was in the hours. My perception code was not as reliable and accurate as I would like, so I focused on the robot doing the planning and execution. It was mostly supervised autonomy with human perception help.

Q: You sent us a video of one of your runs [below]. Can you take us through it?

The video is a short third-person view of the robot completing the three tasks. The first is turning handles to align the antenna. The second task shows the robot removing a solar panel from the trailer, placing it on a table, and plugging in a cable. The final task is climbing the stairs, opening the habitat door, using a tool to locate the leak, and then another tool to fix the leak. One of the fun parts for me was when the robot would find the leak. There was a lot of area to be covered, some of which was partially obstructed, which made it exciting to actually find the leak each run.

The leak was found by the robot doing sweeps up and down and using torso rotation to minimize the amount of walking necessary. As the robot looked for the leak it kept track of the search area as either un-searched, clear, or leaky. That information was displayed to the operator via an interactive marker in Rviz [a 3D visualition tool for ROS] to make it easy to see what had been searched, and when the leak was found, easy to visualize.

Q: What was the trickiest part for you?

I would say the most challenging part was the manipulation and use of tools. Getting a good grasp on the tool and then having the robot use the tools as an extension of the robot were hard to do consistently. I created a scenario in Gazebo where the robot started right at the tools with nothing else around. That allowed testing of picking up the tools from various starting positions and putting them down over and over.

An interesting story from the contest: Sometimes real hardware gets stuck and has to be pushed to get it moving again, and the simulated [Valkyrie robot] in Gazebo also had this behavior. [Open Robotics called that an "interesting emergent behavior" that wasn't programmed in deliberately.] It was possible for the robot's thumb to get stuck and no longer respond to commands. That happened to me during the contest on my third run. But, much like in real life, I was able to push the thumb against the table to get it unstuck and moving again to be able to complete the tasks.

Q: What kinds of things are easier in simulation than they are in real life?

The main thing that makes simulation easier is the hardware reliability—the simulation hardware doesn't break like real hardware frequently does. You can also try riskier experiments.

Everything is easier in simulation. It is not dramatically easier, but you can solve 90 percent of the problems in simulation. … The main thing that makes simulation easier is the hardware reliability—the simulation hardware doesn't break like real hardware frequently does. You can also try riskier experiments. A falling humanoid robot in Gazebo does not cost $100,000 to repair and cause a multi-week delay. The other big advantage to simulation is that one person can run one or multiple tests simultaneously. With a real robot it generally takes multiple people to run a single test.

Q: If NASA put a real Valkyrie inside of a physical mock-up of a Mars base and asked you to complete the same set of tasks, how do you think you'd do?

The robot should be able to complete the tasks after some initial testing to identify and fix differences between simulation and hardware. I had a layered approach where I could fall back to lower level control if the primary method did not succeed. There always seem to be enough differences between simulation and real hardware that some adaptations are needed for success. But, given some testing and adaptations, I do think it would be a success!

Q: After participating in the DRC and now the SRC, how do you feel about the potential for humanoid robots to be realistically useful in disaster areas or planetary exploration?

After the DRC and SRC we are getting closer to be able to use humanoid robots in disaster areas on earth and for planetary exploration. The main challenges I see on earth are making the hardware robust, handling falls, and being able to do manipulation in difficult situations (crawling, obstructed or constricted working environments, situations requiring an arm for support, etc.). In space there are the same challenges plus the distances require giving the robot more perception and autonomy.

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From: Stephanie Osborn

MONSTER SOLAR MINIMUM APPROACHING?

Guest Blogger / 3 days ago July 11, 2017
Monster minimum or short solar cycle?

Guest essay by David Archibald

This recent post was on the fact that the Sun's EUV emissions had fallen to solar minimum-like levels well ahead of solar minimum. The implication was that the Solar Cycle 24/25 minimum was either going to be very deep and prolonged, or that Solar Cycle 24 would be very short, which in turn would be strange for a weak cycle.

The indicator of the EUV flux is the Lyman alpha index. To recap, this chart shows the index over the last three cycles, starting from solar minimum:

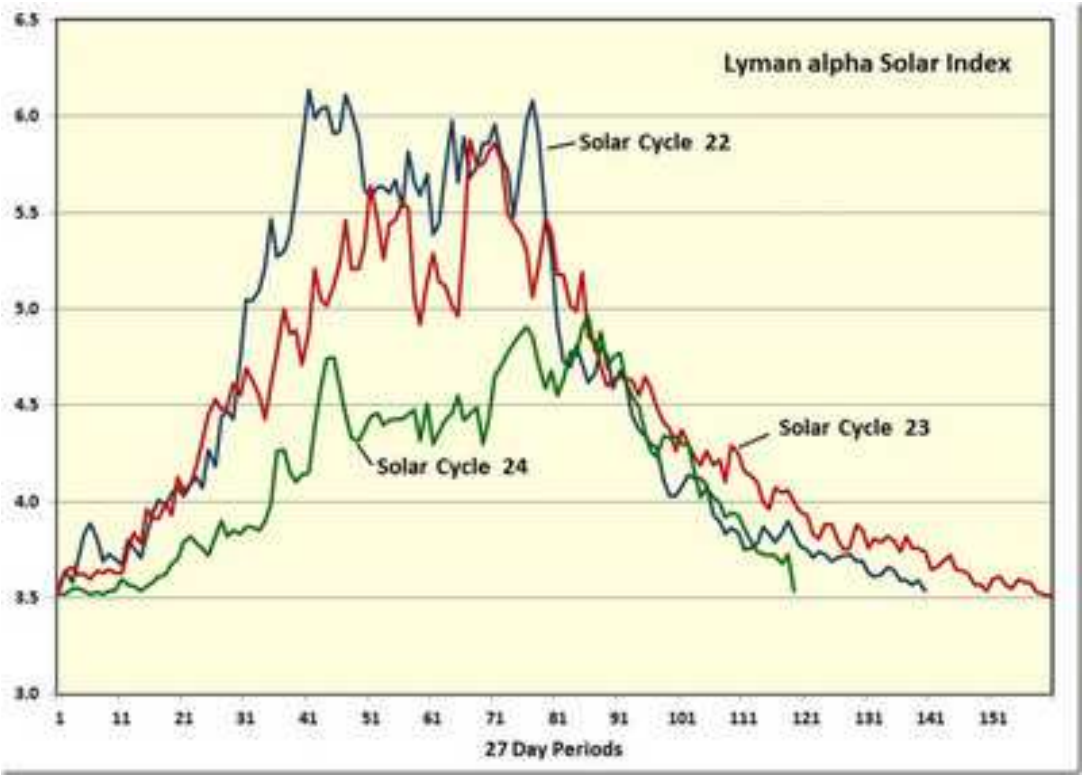

Figure 1: Lyman alpha index Solar Cycles 22,23,24

Figure 1 shows that Solar Cycle 24 has reached solar minimum-like levels three years ahead of minimum, if Solar Cycle was going to be 12 years long. What happens at solar minimum is that the proportion of EUV as part of Total Solar Irradiance falls. For the 23/24 minimum, the extent of the fall was a surprise, with the density of the thermosphere shrinking 30%. The following figure plots up the ratio of the F10.7 flux, less its activity floor at 64, and the Lyman alpha index, less a presumed average floor of activity of 3.5:

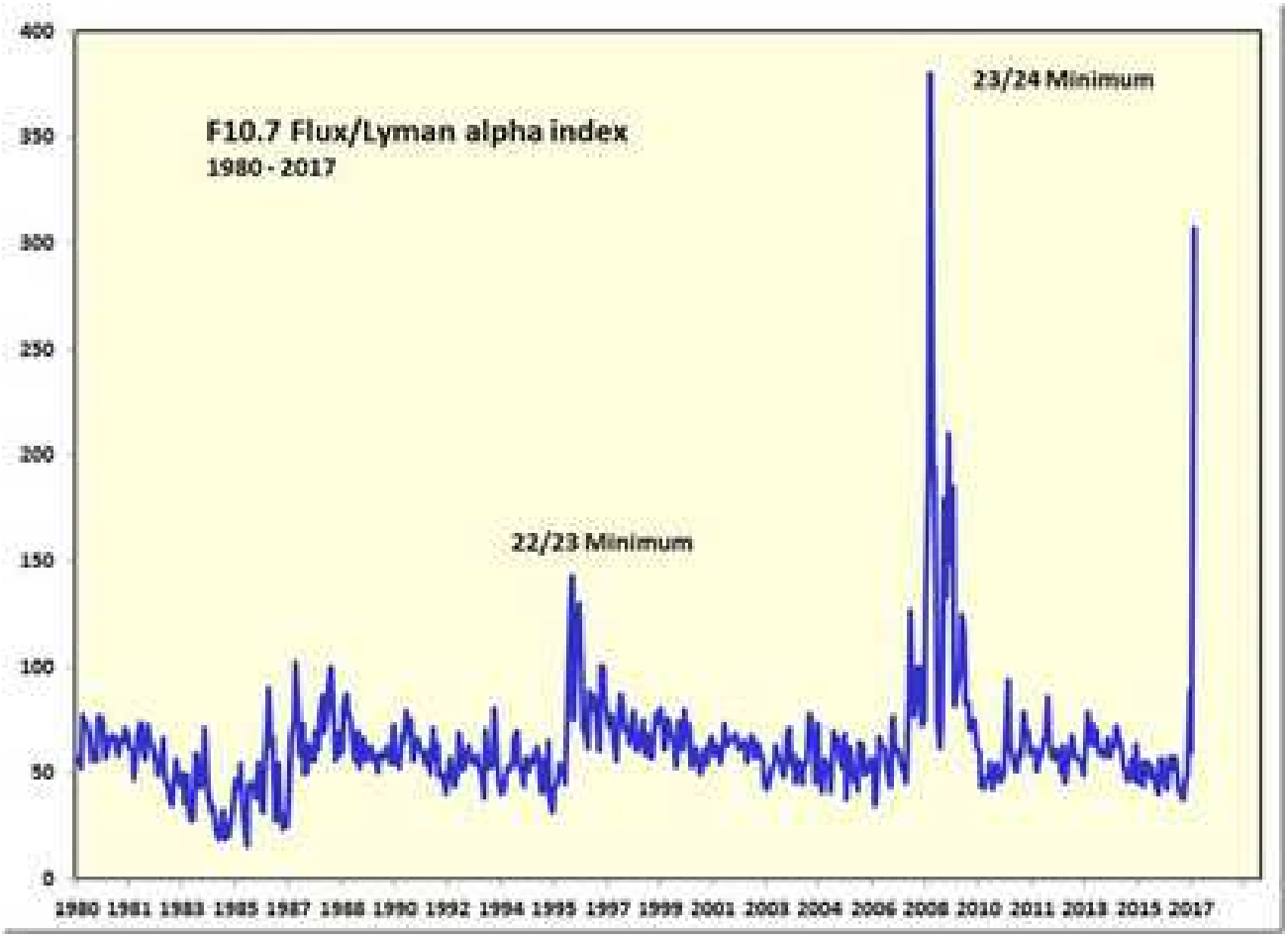

Figure 2: F10.7 Flux/Lyman alpha ratio 1980 – 2017

The peak associated with the 23/24 minimum that surprised atmospheric researchers is quite evident. Also evident is a smaller peak associated with the 22/23 minimum. Nothing much seemed to happen prior to that. How that plots up with the F10.7 flux, and thus the solar cycles, is shown in the following figure:

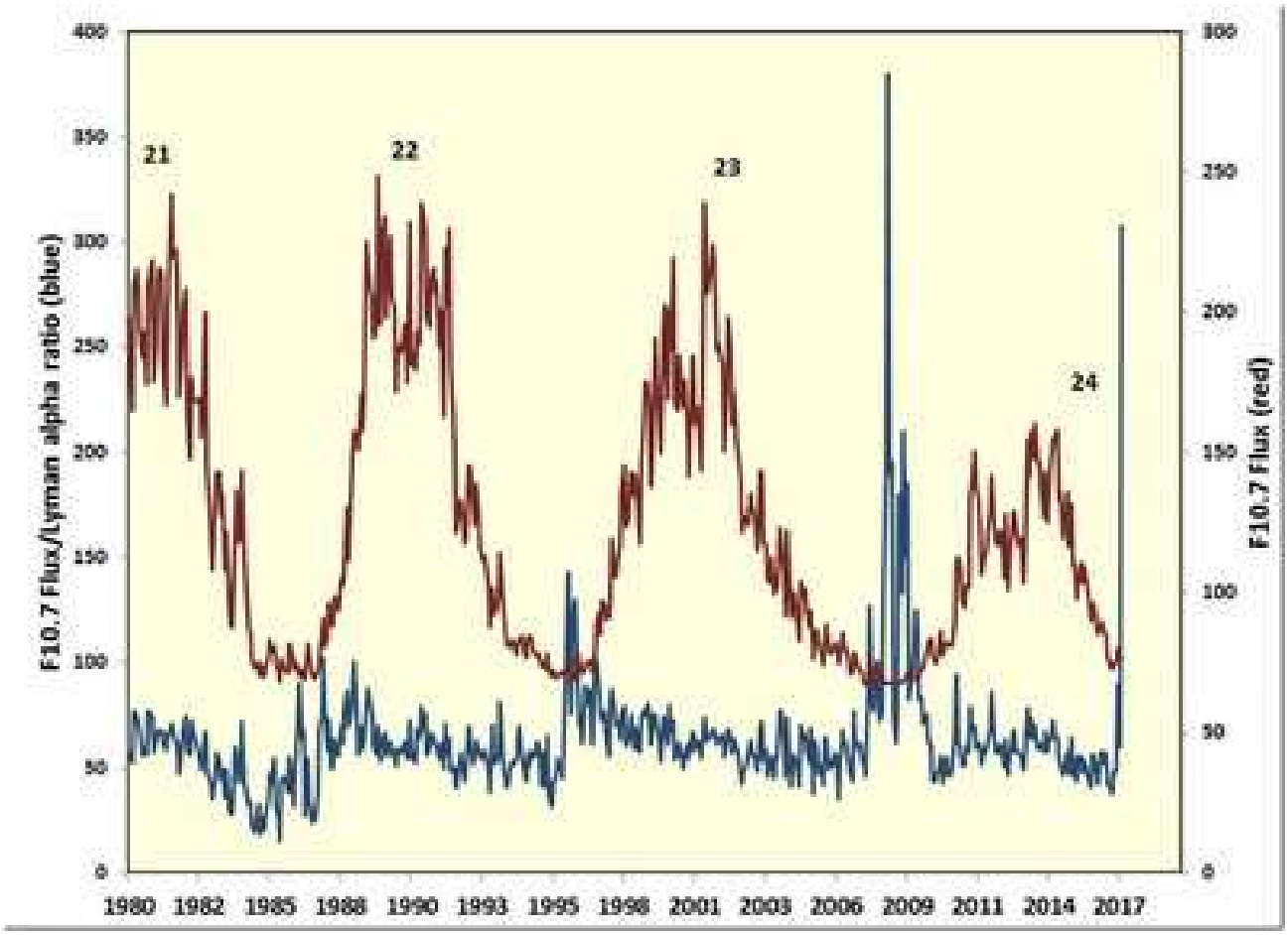

Figure 3: F10.7 Flux/Lyman alpha ratio 1980 – 2017

As Figure 1 showed, the departure of the Lyman alpha index to minimum-like levels seemed early. But just how early is it if everything else is normal? That is shown in the following graphic:

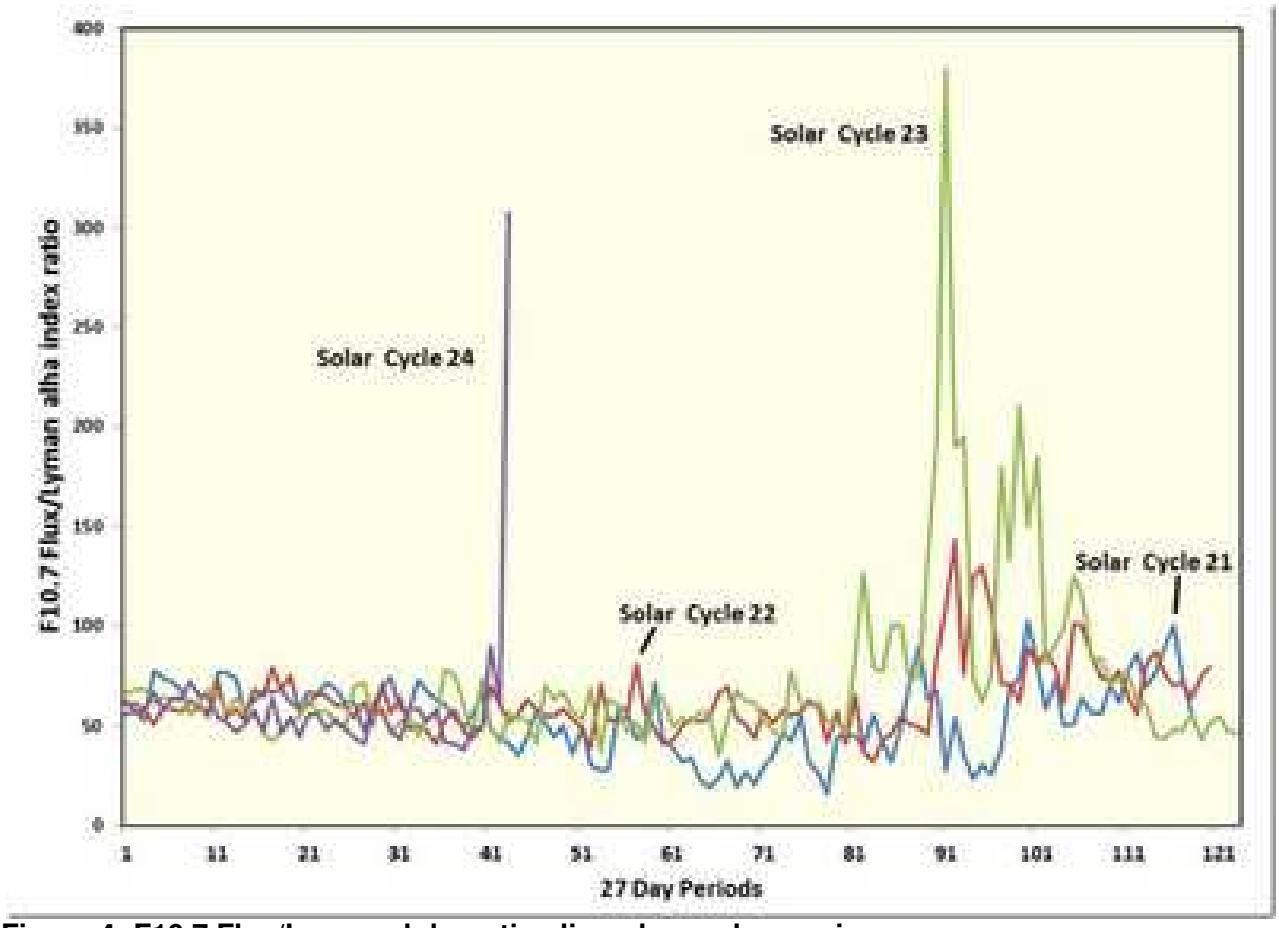

Figure 4: F10.7 Flux/Lyman alpha ratio aligned on solar maximum

Figure 4 aligns the F10.7 Flux./Lyman alpha ratio on solar maximum for solar cycles 21 to 24 to two years beyond solar minimum, with the maxima being:
Solar Cycle 21 December 1979
Solar Cycle 22 November 1989
Solar Cycle 23 November 2001
Solar Cycle 24 April 2014

Based on the normal cycle tail from solar maximum, Solar Cycle 24 might have another three and a half years to go. So what is going to be: a monstrous minimum with a shrunken thermosphere and all the climatic effects associated with that, or a strangely short cycle?

We know when a solar cycle is over when the heliospheric current sheet flattens. The current state of the heliospheric current sheet is shown in the following figure:

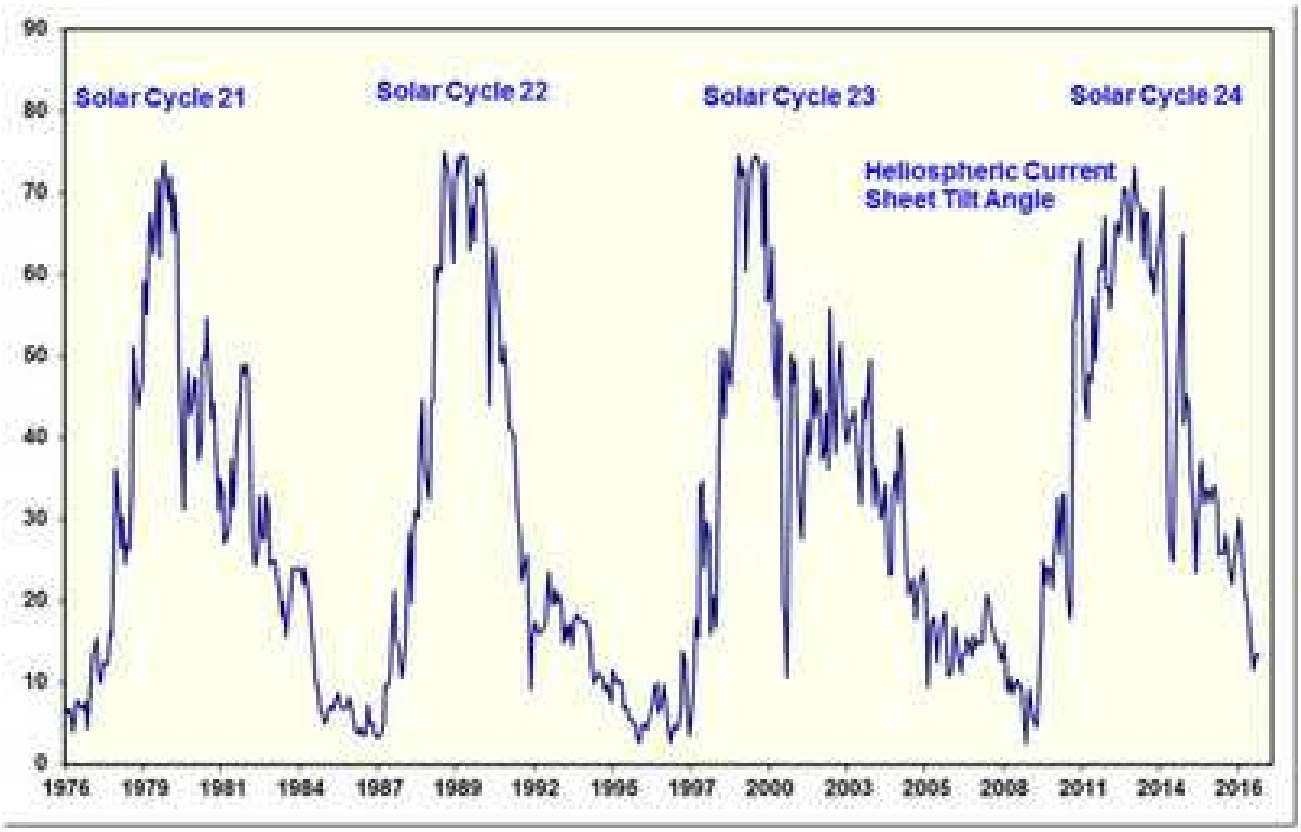

Figure 5: Heliospheric Current Sheet Tilt Angle 1976 – 2017

The heliospheric current sheet tilt angle is 10° off the apparent floor of 3° but, based on the prior solar cycles, could still take a few years to get there. If Solar Cycle 24 does turn out to be short, then there is one person who predicted that: Ed Fix. Ed Fix, a retired B52 pilot in Ohio, sent me his planet-based solar model in 2009. He was inspired to created the model because the oscillation of the solar cycle reminded him of the ideal spring in mechanics. This is how the model plots up (red) and the historic sunspot record in green:

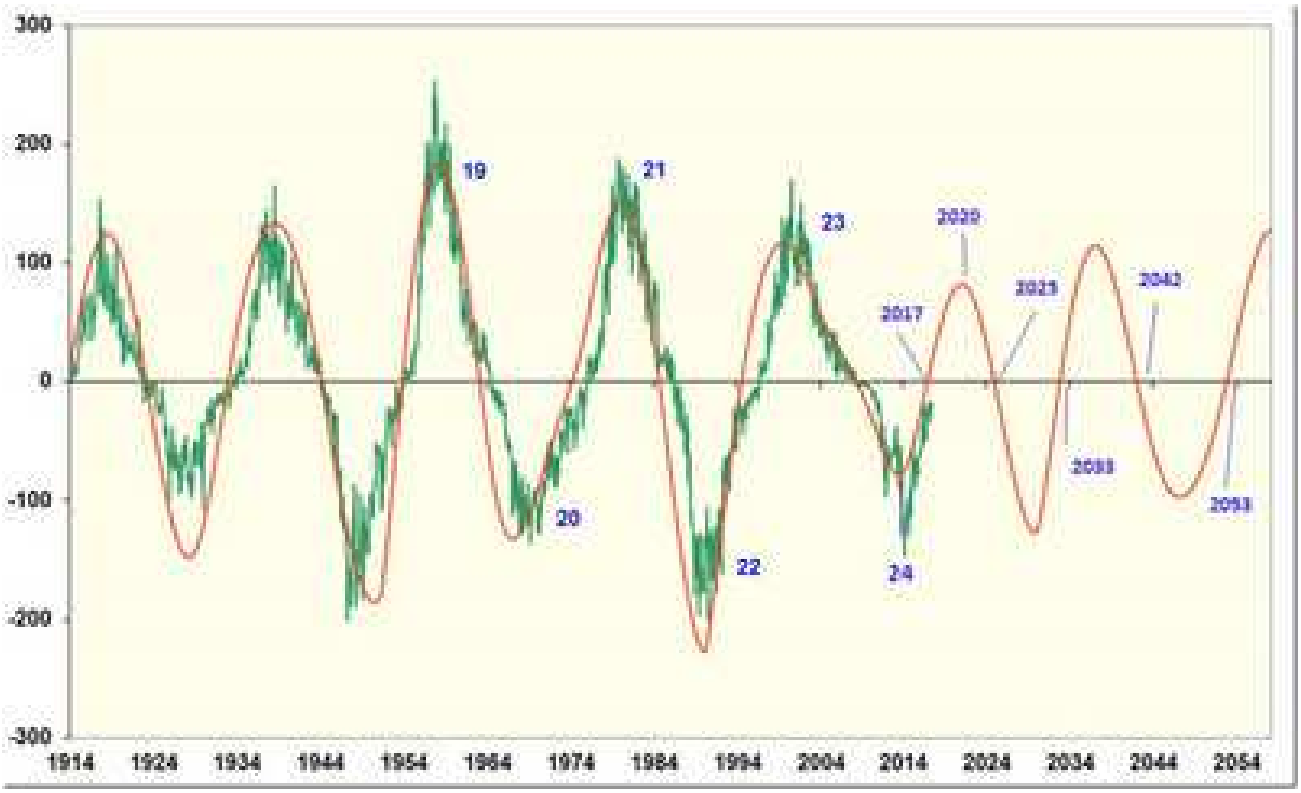

Figure 6: Ed Fix's solar activity model

The model has the Solar Cycle 24/25 minimum in 2017. Solar Cycle 25 is predicted to be weak and short also. If events of the next year or so prove Ed Fix's model to be correct, then it will be as significant as the results of any of the expeditions to observe solar phenomena over the last three centuries, but we get to watch in real time.

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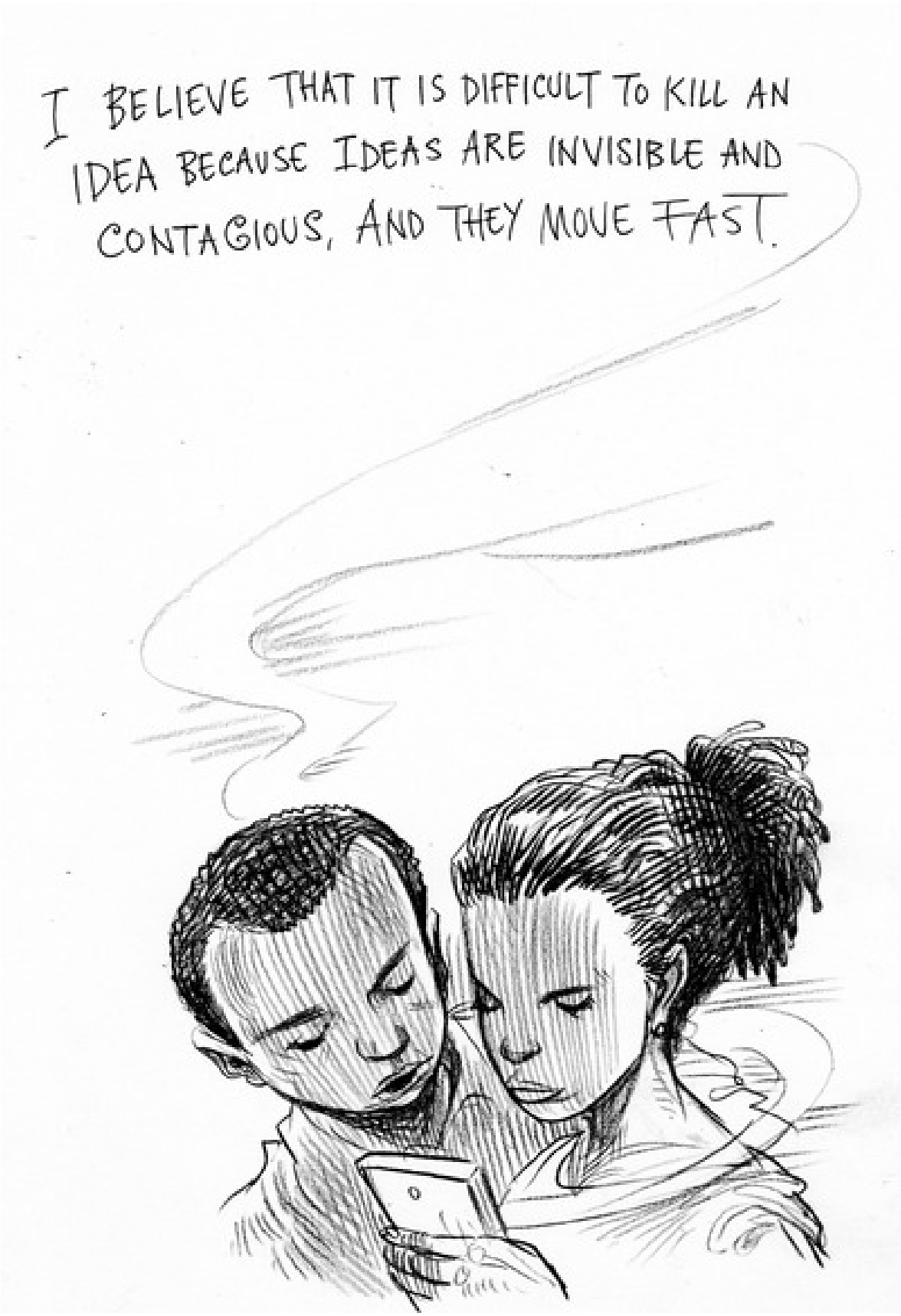
ABSOLUTELY & TOTALLY POLITICALLY INCORRECT & AS FAR TO THE CENTER AS YOU CAN GO!

From: "Chris Cowan" cowanc1028@earthlink.net

CC: This is definitely one for the Revenge - under "politically incorrect [sadly nowadays] and as far to the center as you can get!" I got it from my friend Tamar. But since Neil is a Brit, "First Amendment" isn't really accurate here...

Neil Gaiman posted some classic first amendment ideas.

http://neil-gaiman.tumblr.com/post/162477696296/chrisriddellblog-credo-by-neil-gaiman


I BELIEVE THAT IT IS DIFFICULT TO KILL AN IDEA BECAUSE IDEAS ARE INVISIBLE AND CONTAGIOUS, AND THEY MOVE FAST.


I BELIEVE THAT YOU CAN SET YOUR OWN IDEAS AGAINST IDEAS YOU DISLIKE. THAT YOU SHOULD BE FREE TO ARGUE, EXPLAIN, CLARIFY, DEBATE, OFFEND, INSULT, RAGE, MOCK, SING, DRAMATISE AND DENY.

I DO NOT BELIEVE THAT BURNING, MURDERING, EXPLODING PEOPLE, SMASHING THEIR HEADS WITH ROCKS (TO LET THE BAD IDEAS OUT), DROWNING THEM OR EVEN DEFEATING THEM WILL WORK TO CONTAIN IDEAS YOU DO NOT LIKE.


IDEAS SPRING UP WHERE YOU DO NOT EXPECT THEM, LIKE WEEDS, AND ARE AS DIFFICULT TO CONTROL.
I BELIEVE THAT REPRESSING IDEAS SPREADS IDEAS.

I BELIEVE THAT PEOPLE AND BOOKS AND NEWSPAPERS ARE CONTAINERS FOR IDEAS, BUT THAT BURNING PEOPLE WHO HOLD THE IDEAS WILL BE AS UNSUCCESSFUL AS FIREBOMBING THE NEWSPAPER ARCHIVES. IT IS ALREADY TOO LATE.

IT IS ALWAYS TOO LATE.

THE IDEAS ARE ALREADY OUT, HIDING BEHIND PEOPLE'S EYES, WAITING IN THEIR THOUGHTS.

THEY CAN BE WHISPERED.

THEY CAN BE WRITTEN ON WALLS IN THE DEAD OF NIGHT.

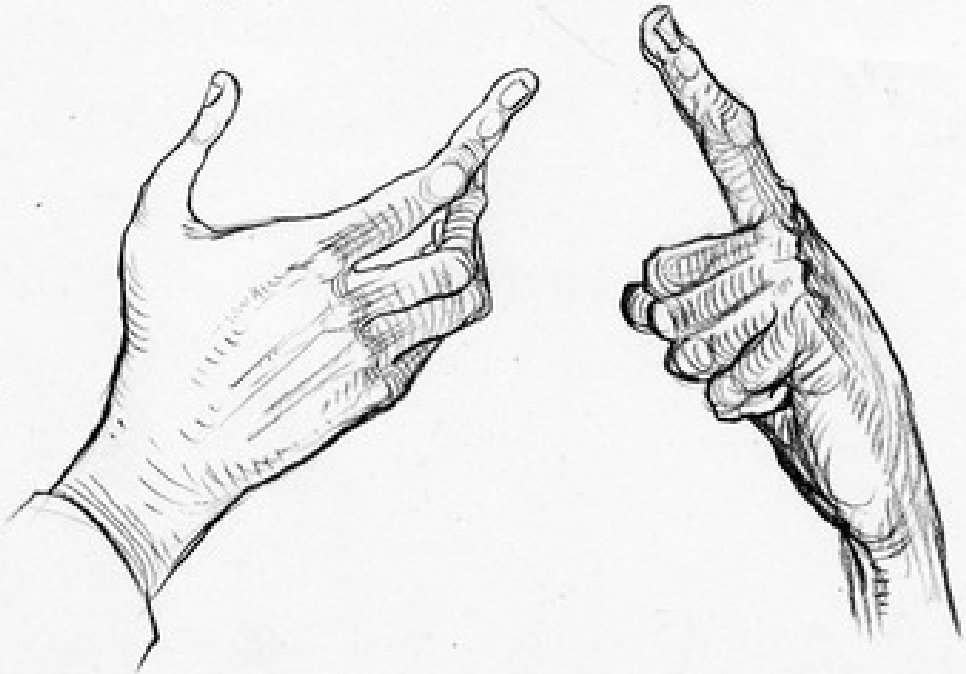
THEY CAN BE DRAWN.

I BELIEVE THAT IDEAS DO NOT HAVE TO BE CORRECT TO EXIST.
I BELIEVE YOU HAVE EVERY RIGHT TO BE PERFECTLY CERTAIN THAT IMAGES OF GOD OR PROPHET OR HUMAN THAT YOU REVERE ARE SACRED, AND UNDEFILABLE,
JUST AS I HAVE THE RIGHT TO BE CERTAIN OF THE SACREDNESS OF SPEECH, AND OF THE SANCTITY OF THE RIGHT TO MOCK, COMMENT, TO ARGUE AND TO UTTER.

I BELIEVE I HAVE THE RIGHT TO THINK AND SAY THE WRONG THINGS.

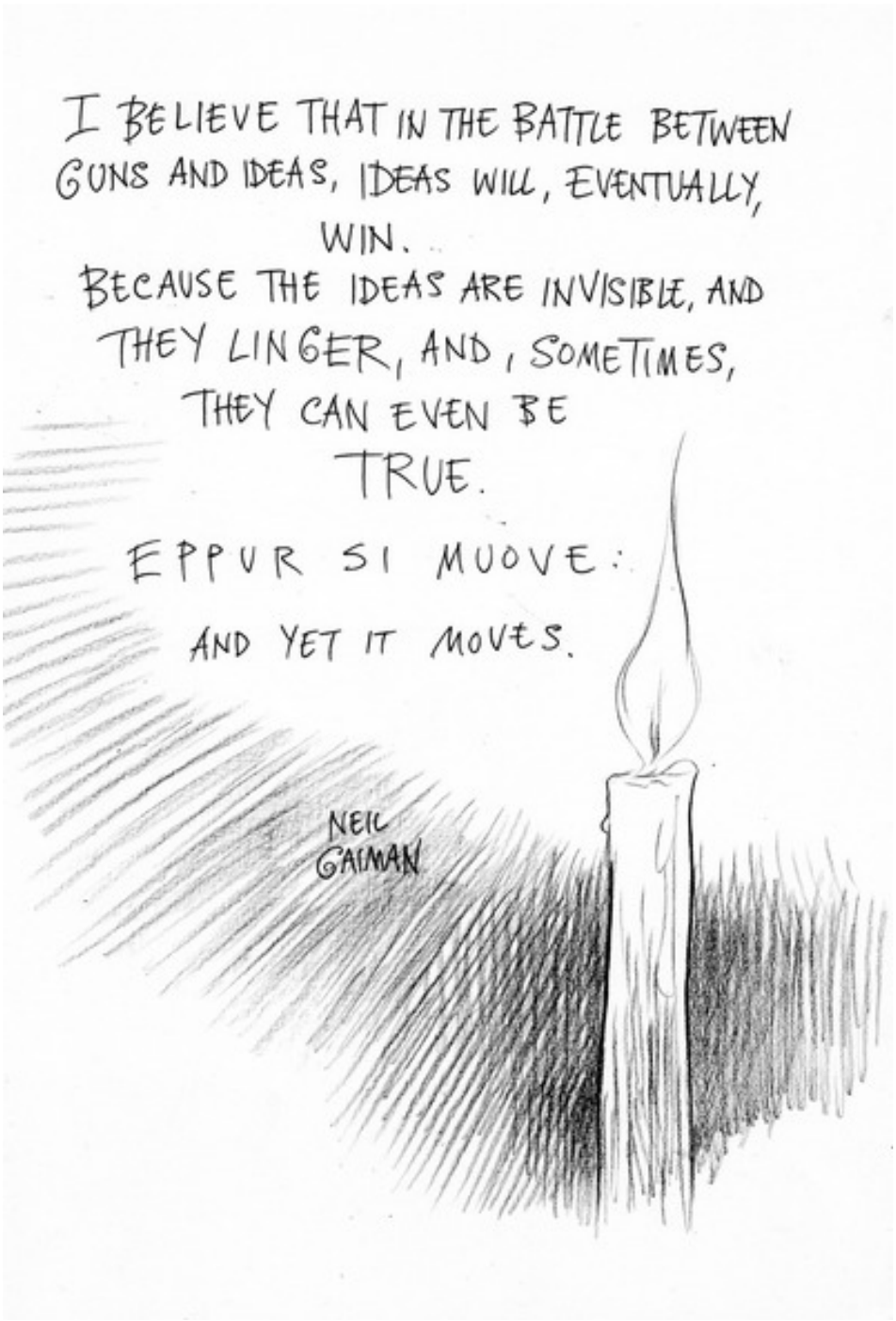
I BELIEVE YOUR REMEDY FOR THAT SHOULD BE TO ARGUE WITH ME OR TO IGNORE ME.

AND THAT I SHOULD HAVE THE SAME REMEDY FOR THE WRONG THINGS THAT I BELIEVE YOU THINK.



I BELIEVE THAT YOU HAVE THE ABSOLUTE RIGHT TO THINK THINGS THAT I FIND OFFENSIVE, STUPID, PREPOSTEROUS OR DANGEROUS, AND THAT YOU HAVE THE RIGHT TO SPEAK, WRITE OR DISTRIBUTE THESE THINGS, AND THAT I DO NOT HAVE THE RIGHT TO KILL YOU, MAIM YOU, HURT YOU OR TAKE AWAY YOUR LIBERTY OR PROPERTY BECAUSE I FIND YOUR IDEAS THREATENING OR INSULTING OR DOWNRIGHT DISGUSTING.

YOU PROBABLY THINK SOME OF MY IDEAS ARE PRETTY VILE TOO.



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