

Ode to Happiness for Sunday March 21 2021

NASA to Host Briefing to Preview First Mars Helicopter Flights



In this illustration, NASA's Ingenuity Mars Helicopter stands on the Red Planet's surface as NASA's Perseverance rover rolls away. Ingenuity arrived at Mars on Feb. 18, 2021, attached to the belly of NASA's Mars 2020 Perseverance rover.

Image Credit: NASA/JPL-Caltech Full Image Details

Members of the projects will lay out the steps necessary before the helicopter attempts its historic test flights.

NASA will hold a virtual media briefing at 1:30 p.m. EDT (10:30 a.m. PDT) Tuesday, March 23, to discuss upcoming activities for the agency's Ingenuity Mars helicopter. The teams operating Ingenuity and NASA's Mars 2020 Perseverance rover have chosen the flight zone where the helicopter will attempt the first powered, controlled flights on another planet.

The briefing will air live on NASA Television, the NASA app, and the agency's website and will livestream on multiple agency social media platforms, including the YouTube and Facebook channels for NASA's Jet Propulsion Laboratory in Southern California.

[If you don't currently receive NASA Television, you might want to check your available channels. While it is a bit amateurish compared to most channels, it is terrific if you're interested in our air & space programs.]

Briefing participants include:

Lori Glaze, director of NASA's Planetary Science Division, NASA Headquarters
Bobby Braun, director for planetary science, JPL
J. (Bob) Balaram, Ingenuity chief engineer, JPL
Håvard Grip, Ingenuity chief pilot, JPL

Farah Alibay, Perseverance integration lead for Ingenuity, JPL

Members of the media and the public also may ask questions on social media during the briefing using #MarsHelicopter.

Ingenuity's test flights are expected to begin no earlier than the first week of April. The exact timing of the first flight will remain fluid as engineers work out details on the timeline for deployments and vehicle positioning of Perseverance and Ingenuity. Photos showing some of the progress are available on Perseverance's raw images website.

Perseverance – with Ingenuity attached to its belly – landed in Jezero Crater Feb. 18. Ingenuity is a technology demonstration with a limited test flight duration of up to 31 days (30 Mars days, or sols). The rover will deploy the helicopter and provide environmental monitoring and imaging support. It also hosts Ingenuity's base station, enabling communication with mission controllers on Earth.

=====

The Antikythera Mechanism, the World's First Computer?

By Ben Turner – Live Science Staff Writer



*An 'exploded' view of the Antikythera mechanism.
(Image credit: Tony Freeth/UCL)*

Scientists may have finally made a complete digital model for the Cosmos panel of a 2,000-year-old mechanical device called the Antikythera mechanism that's believed to be the world's first computer.

First discovered in a Roman-era shipwreck by Greek sponge divers in 1900, the fragments of a shoebox-size contraption, once filled with gears and used to predict the movements of heavenly bodies, has both baffled and amazed generations of researchers ever since.

The discovered fragments made up just one-third of a larger device: a highly-sophisticated hand-powered gearbox capable of accurately predicting the motions of the five planets known to the ancient Greeks, as well as the sun, the phases of the moon and the solar and lunar eclipses — displaying them all relative to the timings of ancient events such as the Olympic Games.

Yet despite years of painstaking research and debate, scientists were never able to fully replicate the mechanism that drove the astonishing device, or the calculations used in its design, from the battered and corroded brass fragments discovered in the wreck.

But now researchers at University College London say they have fully recreated the design of the device, from the ancient calculations used to create it, and are now putting together their own contraption to see if their design works.

"Our work reveals the Antikythera Mechanism as a beautiful conception, translated by superb engineering into a device of genius," the researchers wrote on March 12 in the open-access journal *Scientific Reports*. "It challenges all our preconceptions about the technological capabilities of the ancient Greeks."

This is the largest piece of the 2,100-year-old Antikythera Mechanism, which is on display at the National Archaeological Museum in Athens, Greece.



*This is the largest piece of the 2,100-year-old Antikythera Mechanism, which is on display at the National Archaeological Museum in Athens, Greece.
(Image credit: National Archaeological Museum, Athens, Greece)*

Why recreate Antikythera?

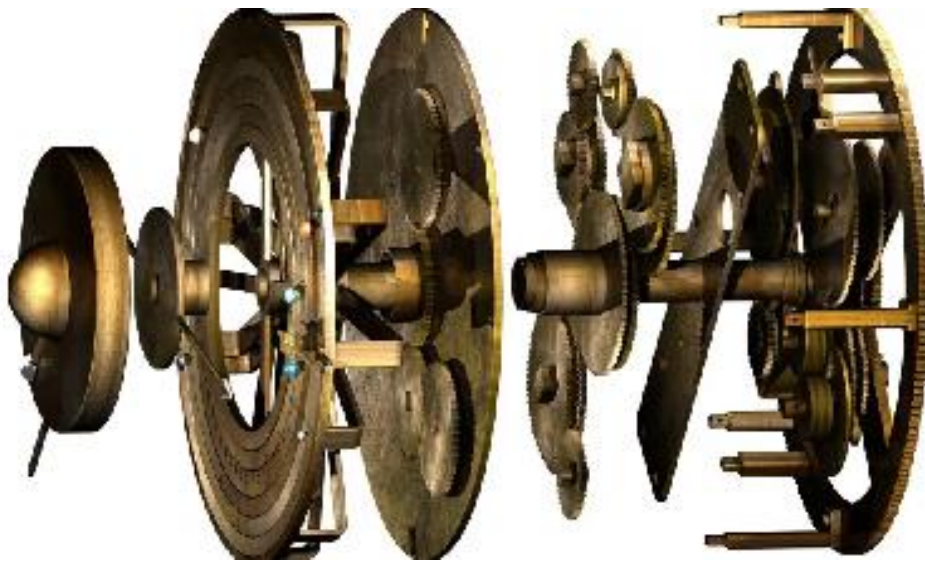
The researchers wanted to recreate the device because of all the mystery surrounding it, as a way to possibly get to the bottom of so many questions. In addition, nobody had ever created a model of the so-called Cosmos that reconciled with all of the physical evidence.

"The distance between this device's complexity and others made at the same time is infinite," co-author Adam Wojcik, a materials scientist at UCL, told Live Science. "Frankly, there is nothing like it that has ever been found. It's out of this world."

The intricate gears that made up the device's mechanism are of a scale you could expect to find in a grandfather clock, but the only other gears discovered from around the same period are the much larger ones that went into things like ballistas, or large crossbows, and catapults.

This sophistication brings up a lot of questions about the manufacturing process that could have made such a uniquely intricate contraption, as well as why it was discovered as the only known device of its kind on an ancient sunken ship off the island of Antikythera.

"What is it doing on that ship? We only found one-third; where are the other two [thirds]? Have they corroded away? Did it ever work?" Wojcik said. "These are questions that we can only really answer through experimental archaeology. It's like answering how they built Stonehenge, let's get 200 people with some rope and a big stone and try to pull it across Salisbury Plain. That's a bit like what we're trying to do here."



*Each gear in the mechanism charts the movement of a heavenly body.
(Image credit: Tony Freeth/UCL)*

Making the first computer

To create the model, the researchers drew on all of the past research on the device, including that of Michael Wright, a former curator at the Science Museum in London,

who had previously constructed a working replica. Using inscriptions found on the mechanism and a mathematical model of how the planets moved that was first devised by the ancient Greek philosopher Parmenides, they were able to create a computer model for a mechanism of overlapping gears that fit inside a just barely 1-inch-deep (2.5 centimeters) compartment.

Their model recreates each gear and rotating dial to show how the planets, the sun and the moon move across the Zodiac (the ancient map of the stars) on the front face and the phases of the moon and eclipses on the back. It replicates the now-outdated ancient Greek assumption that all of the heavens revolved around the Earth.

Now that the computer model has been made, the researchers want to make physical versions, first using modern techniques so they can check that the device works, and then employing the techniques that could have been used by the ancient Greeks.

"There's no evidence that the ancient Greeks were able to build something like this. It really is a mystery," said Wojcik. "The only way to test if they could is to try to build it the ancient Greek way."

"And there's also a lot of debate about who it was for and who built it. A lot of people say it was Archimedes," Wojcik said. "He lived around the same time it was constructed, and no one else had the same level of engineering ability that he did. It was also a Roman shipwreck." Archimedes was killed by Romans during the Siege of Syracuse, after the weapons he invented failed to prevent them from capturing the city.

Mysteries also remain as to whether the ancient Greeks used similar techniques to make other, yet-to-be-discovered, devices or whether copies of the Antikythera mechanism are waiting to be found.

"It's a bit like having a TARDIS appear in the Stone Age," said Wojcik, referring to Doctor Who's time-traveling spacecraft.

Originally published on Live Science.

=====

UVM Scientists Stunned To Discover Plants Beneath Mile-Deep Greenland Ice

uLong-lost ice core provides direct evidence that giant ice sheet melted off within the last million years and is highly vulnerable to a warming climate, PNAS study shows



Most of Greenland is covered with ice today. But a new study shows that within the last million years it melted off and became covered with green tundra, perhaps like this view of eastern Greenland, near the ocean. The research provides strong evidence that Greenland is more sensitive to climate change than previously understood—and at risk of irreversibly melting. (Photo: Joshua Brown)

In 1966, US Army scientists drilled down through nearly a mile of ice in northwestern Greenland—and pulled up a fifteen-foot-long tube of dirt from the bottom. Then this frozen sediment was lost in a freezer for decades. It was accidentally rediscovered in 2017.

In 2019, University of Vermont scientist Andrew Christ looked at it through his microscope—and couldn't believe what he was seeing: twigs and leaves instead of just sand and rock. That suggested that the ice was gone in the recent geologic past—and that a vegetated landscape, perhaps a boreal forest, stood where a mile-deep ice sheet as big as Alaska stands today.

Over the last year, Christ and an international team of scientists—led by Paul Bierman at UVM, Joerg Schaefer at Columbia University and Dorthe Dahl-Jensen at the University of Copenhagen—have studied these one-of-a-kind fossil plants and sediment from the bottom of Greenland. Their results show that most, or all, of Greenland must have been ice-free within the last million years, perhaps even the last few hundred-thousand years.

“Ice sheets typically pulverize and destroy everything in their path,” says Christ, “but what we discovered was delicate plant structures—perfectly preserved. They're fossils, but they look like they died yesterday. It's a time capsule of what used to live on Greenland that we wouldn't be able to find anywhere else.”

The discovery helps confirm a new and troubling understanding that the Greenland ice has melted off entirely during recent warm periods in Earth's history—periods like the one we are now creating with human-caused climate change.

Understanding the Greenland Ice Sheet in the past is critical for predicting how it will respond to climate warming in the future and how quickly it will melt. Since some twenty feet of sea-level rise is tied up in Greenland's ice, every coastal city in the world is at risk. The new study provides the strongest evidence yet that Greenland is more fragile and sensitive to climate change than previously understood—and at grave risk of irreversibly melting off.

"This is not a twenty-generation problem," says Paul Bierman, a geoscientist at UVM in the College of Arts & Sciences, Rubenstein School of Environment & Natural Resources, and fellow in the Gund Institute for Environment. "This is an urgent problem for the next 50 years."

The new research was published March 15 in the Proceedings of the National Academy of Sciences.

Beneath The Ice

The material for the new PNAS study came from Camp Century, a Cold War military base dug inside the ice sheet far above the Arctic Circle in the 1960s. The real purpose of the camp was a super-secret effort, called Project Iceworm, to hide 600 nuclear missiles under the ice close to the Soviet Union. As cover, the Army presented the camp as a polar science station.

The military mission failed, but the science team did complete important research, including drilling a 4560-foot-deep ice core. The Camp Century scientists were focused on the ice itself—part of the burgeoning effort at the time to understand the deep history of Earth's ice ages. They, apparently, took less interest in a bit of dirt gathered from beneath the ice core. Then, in a truly cinematic set of strange plot twists, the ice core was moved from an Army freezer to the University of Buffalo in the 1970s, to another freezer in Copenhagen, Denmark, in the 1990s, where it languished for decades—until it surfaced when the cores were being moved to a new freezer.

More about how the core was lost, rediscovered in some cookie jars, and then studied by an international team gathered at the University of Vermont in 2019 can be read here: [Secrets Under the Ice](#).

For much of the Pleistocene—the icy period covering the last 2.6 million years—portions of the ice on Greenland persisted even during warmer spells called "interglacials." But most of this general story has been pieced together from indirect evidence in mud and rock that washed off the island and was gathered by offshore ocean drilling. The extent of Greenland's ice sheet and what kinds of ecosystems existed there before the last interglacial warm period—that ended about 120,000 years ago—have been hotly debated and poorly understood.

The new study makes clear that the deep ice at Camp Century—some 75 miles inland from the coast and only 800 miles from the North Pole—entirely melted at least once within the last million years and was covered with vegetation, including moss and perhaps trees. The new research, supported by the National Science Foundation, lines up with data from two other ice cores from the center of Greenland, collected in 1990s.

Sediment from the bottom of these cores also indicate that the ice sheet was gone for some time in the recent geologic past. The combination of these cores from the center of Greenland with the new insight from Camp Century in the far northwest give researchers an unprecedented view of the shifting fate of the entire Greenland ice sheet.

The team of scientists used a series of advanced analytical techniques—none of which were available to researchers fifty years ago—to probe the sediment, fossils, and the waxy coating of leaves found at the bottom of the Camp Century ice core. For example, they measured ratios of rare forms—*isotopes*—of both aluminum and the element beryllium that form in quartz only when the ground is exposed to the sky and can be hit by cosmic rays. These ratios gave the scientists a window onto how long rocks at the surface were exposed vs. buried under layers of ice. This analysis gives the scientists a kind of clock for measuring what was happening on Greenland in the past. Another test used rare forms of oxygen, found in the ice within the sediment, to reveal that precipitation must have fallen at much lower elevations than the height of the current ice sheet, “demonstrating ice sheet absence,” the team writes. Combining these techniques with studies of luminescence that estimate the amount of time since sediment was exposed to light, radiocarbon-dating of bits of wood in the ice, and analysis of how layers of ice and debris were arranged—allowed the team to be clear that most, if not all, of Greenland melted at least once during the past million years—making Greenland green with moss and lichen, and perhaps with spruce and fir trees.

And the new study shows that ecosystems of the past were not scoured into oblivion by ages of glaciers and ice sheets bulldozing overtop. Instead, the story of these living landscapes remains captured under the relatively young ice that formed on top of the ground, frozen in place, and holds them still.

In a 1960’s movie about Camp Century created by the Army, the narrator notes that “more than ninety percent of Greenland is permanently frozen under a polar ice cap.” This new study makes clear that it’s not as permanent as we once thought. “Our study shows that Greenland is much more sensitive to natural climate warming than we used to think—and we already know that humanity’s out-of-control warming of the planet hugely exceeds the natural rate,” says Christ, a postdoctoral researcher in the College of Arts & Sciences and Gund Institute.

“Greenland may seem far away,” says UVM’s Paul Bierman, “but it can quickly melt, pouring enough into the oceans that New York, Miami, Dhaka—pick your city—will go underwater.”

In this video, Paul Bierman explains the urgent significance of this new study:

<https://youtu.be/Ota2-eEN41w>

Video: Greenland Discovery Shows Ice Vulnerable to Rapid Melt

=====

Zoom Escaper to the Rescue



*[Shelly Palmer](#) reports on a godsend solution
illustration by boredart.com*

Ever wished for an epic Zoom fail to get you out of an online meeting? Something like, "What's that noise?" or "I can't really hear you..." or "Sounds like your baby needs you." Well, your wish has been granted.

Zoom Escaper is a free web app that allows you to sabotage your Zoom audio with excessive echo or a (fake) bad connection, or by adding sound effects of an upset baby, a man weeping, construction sounds, or dogs barking. Because it's a web app, you don't need to download Zoom Escaper, but you will need to download a free virtual audio cable to hook into Zoom.

The instructions are on the website, and it sounds harder to hook up than it really is. Live out your Zoom fail fantasy... or just have some fun with it. I'm just guessing here, but I don't think everyone is going to think this is as fun or as funny as I think it is. -s

=====

Giant Arctic Walrus Washes Up on Rocks on Ireland's Valentia Island



Alan Houlihan / The Irish Whale and Dolphin Group / Facebook

By Rachael O'Connor

An enormous arctic walrus has washed up on an Irish island hundreds of miles away from home.

Yesterday, a father and daughter out for a walk on Valentia Island off the coast of Kerry came across a very rare sight indeed-- a large arctic walrus.

Alan Houlihan contacted the Irish Whales and Dolphins Group after his five-year-old daughter Muireann spotted the enormous beast resting on the rocks on the beach on Valentia Island, and the arrival of the arctic traveller has caused a huge stir.

The IWDG believe the walrus-- who is estimated to be a whopping 2m in size-- is a young adult, but they cannot determine the sex due to both male and female walruses sporting tusks.

The appearance of a walrus in Irish waters is exceedingly rare, with less than 20 confirmed sightings over the past several centuries-- the IWDG have said this specimen may be the same creature who was spotted in the waters off Denmark in mid-February this year.

Marine biologist Kevin Flannery told The Irish Examiner he believes the walrus could have fallen asleep on an iceberg which carried it across the Atlantic ocean before it eventually arrived on Valentia Island on the west coast of Ireland.

<https://twitter.com/i/status/1371181655398965248>

The enormous creature appeared to be exhausted as it rested on the rocks on the Valentia Island beach, and experts have warned the public to keep a good distance if they are visiting.

A spokesperson for the Irish Whales and Dolphin Group urged members of the public who are lucky enough to be within the 5km of the beach, and who would like to see the walrus, to "observe this wayward traveler from a safe distance and to give it the space it requires".

Any further sightings should be reported to the IWDG website (here) for validation.

=====

John Masefield

Cargoes



Quinquireme of Nineveh from distant Ophir,
Rowing home to haven in sunny Palestine,
With a cargo of ivory,
And apes and peacocks,
Sandalwood, cedarwood, and sweet white wine.



Stately Spanish galleon coming from the Isthmus,
Dipping through the Tropics by the palm-green shores,
With a cargo of diamonds,
Emeralds, amethysts,
Topazes, and cinnamon, and gold moidores.



Dirty British coaster with a salt-caked smoke stack,
Butting through the Channel in the mad March days,
With a cargo of Tyne coal,
Road-rails, pig-lead,
Firewood, iron-ware, and cheap tin trays.

Joe Horton Explains Why Flunking out of MIT Has its Advantages



*MIT Strata Center
mostweird.com*

I spent a pleasant dinner evening with Rainer "Rai" Weiss almost two years ago. He had just delivered the commencement address at my high school, about 7 months after getting the Nobel prize. I'd talked with the school's principal about how they were planning to handle it. He thought they'd take him to lunch. I thought I'd have my nephew cook dinner for a small group of us.

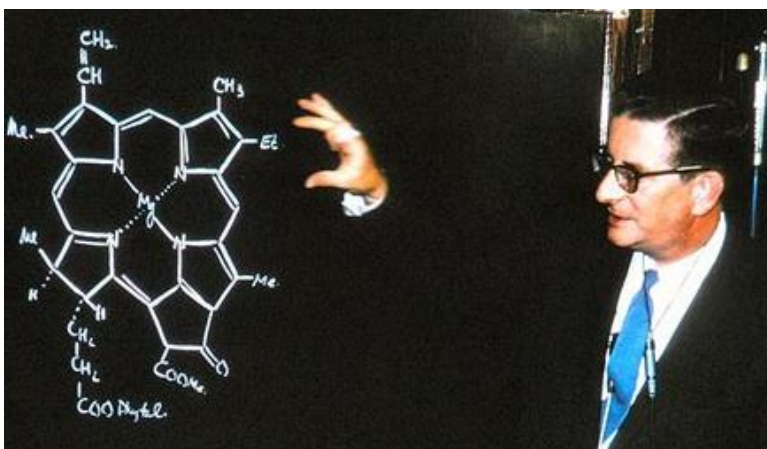
Weiss told me how he'd flunked out of MIT: he got involved with a violinist and followed her to Chicago where she dumped him. So, back he went to Massachusetts with his tail between his legs. They let him back in, but not without a stern talking-to. His delivery of the story was charmingly ironic.



Rainer "Rai" Weiss

[Rainer "Rai" Weiss Rainer is known for his contributions in gravitational physics and astrophysics. He is a professor of physics emeritus at MIT and an adjunct professor at LSU. He is best known for inventing the laser interferometric technique that is the basic operation of LIGO (Laser Interferometer Gravitational-Wave Observatory is a large-scale physics experiment and observatory to detect cosmic gravitational waves and to develop gravitational-wave observations as an astronomical tool).]

He's at least the second Nobelist I know of who first flunked out of Tech before being let back in. The other was Robert Burns Woodward, who holds the record for efficiency of going through the place. When they let him back in—more like dragged him back—he got his undergrad in one (1) year and his PhD the following year.



[Robert Burns Woodward is considered by many to be the preeminent synthetic organic chemist of the twentieth century, having made many key contributions to the subject, especially in the synthesis of complex natural products and the determination of their molecular structure. He was awarded the Nobel Prize in Chemistry in 1965.]

Woodward devised rational syntheses for some ridiculously complex molecules, like chlorophyll, vitamin B12, erythromycin, and many others. By contrast, all Rai did was spearhead the LIGO team, which "only" detects gravity waves. Einstein predicted that they exist, but was confident that, because of their absurdly minuscule effects, would never be detected. Rai and crew disproved that by designing and building a pair of LIGOs—laser interferometry gravitational wave observatories.

The interferometers arms are a kilometer long. Gravitational waves change the lengths of the arms by about 1/2000th [not a typo] of the diameter of a proton. It took some doing....

=====

My last Puppy is NOT for Sale



<https://www.youtube.com/watch?v=RpmNK6tw6xo>

=====

Choosing Your World by Conductor Benjamin Zander



<https://www.youtube.com/watch?v=hZIC2f0fMKY>

"Though the conductor's picture is on the cover of the CD, he doesn't make a sound. He depends for his power on his ability to make others powerful." Here he talks about his conversion from top down to collaboration.

=====

Here Zander conducts Mahler's Symphony no. 2



<https://www.youtube.com/watch?v=vrvFohoThHE>

From the 2013 Tour of Possibility – Amsterdam, The Netherlands.

This piece is 50 minutes long so you may not wish to listen to it now, but it should be part of your listening repertoire. Tuck it away and haul it out when you're in a mood to listen and absorb what Mahler had to say here.

=====

Nina Simone; I Could Listen to Her All Day Long



Please Don't Let Me Be Misunderstood

<https://www.youtube.com/watch?v=9ckv6-yhnIY>

I Loves You Porgy

<https://www.youtube.com/watch?v=tq5A0YadWks>

Feeling Good

<https://www.youtube.com/watch?v=BNMKGYiJpvg>

=====

Don't Those Southerners Have a Way with Words?



These are actual comments made by South Carolina Troopers that were taken off their car videos:

1. "You know, stop lights don't come any redder than the one you just went through."
2. "Relax, the handcuffs are tight because they're new. They'll stretch after you wear them a while."
3. "If you take your hands off the car, I'll make your birth certificate a worthless document."
4. "If you run, you'll only go to jail tired."
5. "Can you run faster than 1200 feet per second? Because that's the speed of the bullet that'll be chasing you."
6. "You don't know how fast you were going? I guess that means I can write anything I want to on the ticket, huh?"
7. "Yes, sir, you can talk to the shift supervisor, but I don't think it will help. Oh, did I mention that I'm the shift supervisor?"
8. "Warning! You want a warning? O.K, I'm warning you not to do that again or I'll give you another ticket."
9. "The answer to this last question will determine whether you are drunk or not. Was Mickey Mouse a cat or a dog?"

10. "Fair? You want me to be fair? Listen, fair is a place where you go to ride on rides, eat cotton candy and corn dogs and step in monkey poop"
11. "Yeah, we have a quota. Two more tickets and my wife gets a toaster oven."
12. "In God we trust; all others we run through NCIC" (National Crime Information Center)
13. "Just how big were those 'two beers' you say you had?"
14. "No sir, we don't have quotas anymore. We used to, but now we're allowed to write as many tickets as we can."
15. "I'm glad to hear that the Chief (of Police) is a personal friend of yours. So you know someone who can post your bail."

And the Winner Is....

16. "You didn't think we give pretty women tickets? You're right, we don't. Sign here.

=====

Went Fishing, Caught Four Deer



A once in the history of mankind kind of thing. The Best Day Of Fishing Ever!

Some fishing stories are a little hard to believe but this guy has pictures to prove his story... I've heard of salmon jumping into boats, but never anything quite like this...

Tom Satre told the Sitka Gazette that he was out with a charter group on his 62-foot fishing vessel when four juvenile black-tailed deer swam directly toward his boat.

"Once the deer reached the boat, the four began to circle the boat, looking directly at us. We could tell right away that the young bucks were distressed.

I opened up my back gate and we helped the typically skittish and absolutely wild animals onto the boat. In all my years fishing, I've never seen anything quite like it!

Once on board, they collapsed with exhaustion, shivering."

"This is a picture I took of the rescued bucks on the back of my boat, the Alaska Quest.

We headed for Taku Harbour. Once we reached the dock, the first buck that we had pulled from the water hopped onto the dock, looked back as if to say 'thank you' and disappeared into the forest.

After a bit of prodding and assistance, two more followed, but the smallest deer needed a little more help.



My daughter, Anna, and son, Tim, helped the last buck to its feet.

We didn't know how long they had been in the icy waters or if there had been others who did not survive.

My daughter later told me that the experience was something that she would never forget, and I suspect the deer felt the same way as well!"

I told you! Awesome!

"Kindness is the language the blind can see and the deaf can hear." - Mark Twain

=====

Photonic Chip Brings Optical Quantum Computers a Step Closer

A programmable photonic circuit has been developed that can execute various quantum algorithms and is potentially highly scalable. This device could pave the way for large-scale quantum computers based on photonic hardware.

Ulrik L. Andersen



*IBM and Google are racing to create a truly useful quantum computer.
wired.co.uk*

Quantum computers promise to deliver enormous computational power and solve problems that cannot be tackled by ordinary (classical) machines. There are many hardware platforms on which quantum computing can be developed, and it is not yet clear which technology, or combination of technologies, will prove most successful. Today, the leading schemes are based on superconducting electrical circuits or trapped-ion technologies. Another approach, based on photonics, has often been considered impractical because of difficulties in generating the required quantum states, or transformations of such states, on demand. However, this method could turn out to be the dark horse of quantum computing. Writing in *Nature*, Arrazola et al.¹ report the development of a programmable and scalable photonic circuit, and demonstrate three types of quantum algorithm on this platform.

According to quantum theory, there is an inevitable uncertainty associated with the amplitude and phase of any state of light (the phase specifies in which stage of an oscillation cycle the light wave is). If this quantum uncertainty is unequally distributed between the amplitude and phase, the state is said to be squeezed; and the more the state is squeezed, the more photons it contains. Multi-photon squeezed light is found in many quantum-optics experiments, and quantum-computing models based on these states have existed for more than two decades^{2,3}. However, whether computers based on such models would be practical has been justifiably questioned, because of the quantum uncertainty.

This scepticism has disappeared in the past few years. It became clear that a relatively simple optical circuit, based solely on squeezed light, beam splitters (devices that split beams of light in two) and photon counters, could carry out a sampling algorithm (a procedure that takes a random sample of data) at a speed beyond the reach of classical computers⁴. It was also discovered that such an algorithm has many practical applications⁵. For example, it is useful in simulating transitions between states of molecules⁶ and finding matching configurations of two molecules — a process known as molecular docking⁷.

In the computing architecture used to implement this quantum sampling algorithm, squeezed states of light are generated and launched into an optical network consisting of several optical paths and beam splitters (Fig. 1). The squeezed states mix together when they meet in beam splitters because of a quantum effect called interference. As a result, all the states come out completely scrambled, in a way that depends on the relative lengths of the optical paths, known as their relative phases. Reprogramming these phases alters the type of scrambling. After scrambling, the number of photons in each output of this quantum circuit is counted using highly sensitive detectors.

Figure 1

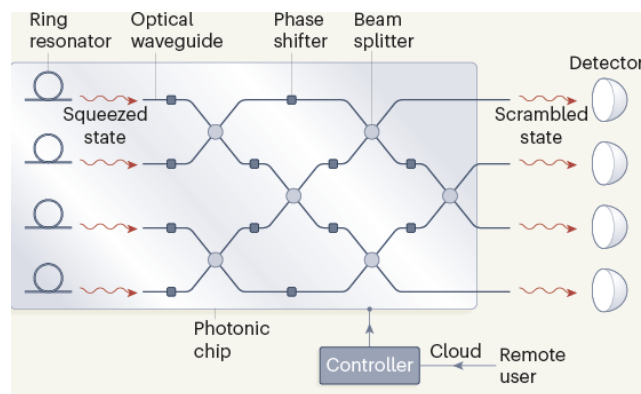


Figure 1 / *Quantum algorithms implemented on a photonic chip. Arrazola et al.¹ carried out an experiment using a photonic chip, a highly simplified illustration of which is shown here. On the chip, devices called ring resonators produced quantum states of light known as squeezed states. These states were launched into an optical network consisting of optical waveguides (structures that direct light) and beam splitters (devices that split beams of light). The squeezed states became mixed together when they met in the beam splitters, and all the states were completely scrambled when they left the network. Finally, highly sensitive detectors counted the number of photons in each scrambled state. The authors used their chip to execute quantum algorithms in which the input squeezed states represented input variables and the number of photons in each scrambled state represented the output achieved when the algorithm processed those variables. The chip could be reprogrammed to run different algorithms by using a controller to adjust the beam splitters and to manipulate devices called phase shifters. The controller could be accessed by a remote user through the cloud.*

The measurement outcome provides a specific sample of data from the quantum experiment. For a classical computer, the time needed to take such samples scales exponentially with the number of input squeezed states (amounting to billions of years

when this number is high). By contrast, the quantum circuit can produce a sample in fraction of a second, demonstrating what is called a quantum advantage.

Arrazola et al. implemented their photonic circuit on a silicon nitride chip that is compatible with the fabrication processes used by the semiconductor industry. The authors produced a squeezed state in each of four micrometre-sized devices known as optical ring resonators on the chip using an effect called four-wave mixing. They achieved light propagation and interference by carefully etching tiny structures known as optical waveguides on the chip. The network of beam splitters was fully controllable and was made fully reprogrammable for a remote user through the cloud. The output of the network was then directed to four photon-counting detectors, and these detectors generated the samples that were sent to the remote user.

Quantum computing takes flight

The authors executed different types of measurement to characterize the quality of the squeezed-light sources and the overall performance of the chip. First, they measured the uncertainty suppression of the squeezed states relative to ordinary states to be about 84%. Second, they measured the temporal purity of the states (a property that is crucial for successful interference in the network) to be 85%. Third, they carefully tested the quality of the interference. And finally, they verified that the samples generated had a genuinely quantum nature by testing them against a criterion for non-classicality — a necessary condition if the device, when scaled up, is to produce samples that are impossible to simulate using a classical computer.

In addition to the sampling algorithm used to demonstrate a quantum advantage, Arrazola and colleagues implemented two algorithms of greater practical relevance: one that determines energy spectra for transitions between molecular states, and another that finds the similarity between mathematical graphs that represent different molecules. The authors achieved this feat by encoding the specific problem into the squeezed states and beam-splitter network, and then using the samples generated to estimate the molecular spectra or classify the graphs.

Quantum sampling based on squeezed states has been demonstrated by other research groups^{8–10}. In particular, one group last year ran the sampling algorithm on 50 squeezed states in 100 optical paths, and reported a quantum advantage¹⁰. The researchers estimated that it would take 600 million years to simulate such an experiment on a supercomputer. However, these demonstrations were not scalable because of the bulkiness of the set-up^{8,10} or owing to photon losses⁹. Moreover, the circuitry of these previous experiments was not reconfigurable, and therefore only a single, random algorithm could be executed. By stark contrast, Arrazola and colleagues' circuitry is programmable and potentially highly scalable.

A milestone in quantum computing

Nevertheless, there are still some hurdles to overcome before the quantum-sampling algorithm can reach its full potential and become useful for real-world applications. For instance, the quality of the squeezed states must be markedly improved, and for some

applications, the degree of squeezing and the amount of optical power in each squeezed state must be individually controlled. Moreover, to scale up the system, photon losses need to be decreased; otherwise, the photons will not survive their journey through the circuitry.

Without doubt, the authors' demonstration of quantum sampling on a programmable photonic chip using highly squeezed states is remarkable and represents a milestone in this field. However, the number of commercial applications that can be implemented using the current architecture is limited. Completely different platforms are required to run heftier algorithms, such as Shor's algorithm for factoring large numbers into prime numbers¹¹, in an error-free manner. Fortunately, such platforms (also based on squeezed states) have been proposed^{12,13}, and their implementation constitutes the next step towards constructing a full-blown optical quantum computer.

Nature 591, 40-41 (2021)

doi: <https://doi.org/10.1038/d41586-021-00488-z>

=====

How to Tell it's Winter



=====

Poetry for Today

Jack Kerouac (1922-1969) The Poet

Kerouac had a huge influence on mid-century American culture, emerging as a leader of the Beat Movement. In many ways his book, On the Road, provided insight into the spirit of its time, similar to F. Scott Fitzgerald's look into the world of the 1920s in The Great Gatsby.

Visions of Cody (written in 1951–52 and published posthumously in 1972), was a more poetic variation of On the Road describing a buddy trip, was the most successful realization of the sketching technique.

His sonnets and odes ranged across Western poetic traditions. He also experimented with the idioms of blues and jazz in such works as Mexico City Blues (1959), a sequential poem comprising 242 choruses. Later in the 1950s his poetry showed the influence of the Haiku.

Hitchhiker

"Tryna get to sunny Californy" -

Boom. It's the awful raincoat

making me look like a selfdefeated self-murdering imaginary gangster, an idiot in a rueful coat, how can they understand my damp packs - my mud packs -

„Look John, a hitchhiker"

„He looks like he's got a gun underneath that I. R. A. coat"

"Look Fred, that man by the road"

„Some sexfiend got in print

in 1938 in Sex Magazine" –

„You found his blue corpse in a greenshade edition, with axe blots"

Daydreams for Ginsberg

I lie on my back at midnight
hearing the marvelous strange chime
of the clocks, and know it's mid-
night and in that instant the whole
world swims into sight for me
in the form of beautiful swarm-
ing m u t t a worlds-
everything is happening, shining
Buhudda-lands, *bhuti*
blazing in faith, I know I'm
forever right & all's I got to
do (as I hear the ordinary
extant voices of ladies talking
in some kitchen at midnight

oilcloth cups of cocoa
cardore to mump the
rinnegain in his
darlin drain-) i will write
it, all the talk of the world
everywhere in this morning, leav-
ing open parentheses sections
for my own accompanying inner
thoughts-with roars of me
all brain-all world
roaring-vibrating-I put
it down, swiftly, 1,000 words
(of pages) compressed into one second
of time-I'll be long
robed & long gold haired in
the famous Greek afternoon
of some Greek City
Fame Immortal & they'll
have to find me where they find
the t h n u p f t of my
shroud bags flying
flag yagging Lucien
Midnight back in their
mouths-Gore Vidal'll
be amazed, annoyed—
my words'll be writ in gold
& preserved in libraries like
Finnegans Wake & Visions of Neal

10th Chorus Mexico City Blues

The great hanging weak teat of India
on the map
The Fingernail of Malaya
The Wall of China
The Korea Ti-Pousse Thumb
The Salamander Japan
the Okinawa Moon Spot
The Pacific
The Back of Hawaiian Mountains
coconuts
Kines, balconies, Ah Tarzan—
And D W Griffith
the great American Director

Strolling down disgruntled
Hollywood Lane
— to toot Nebraska,
Indian Village New York,
Atlantis, Rome,
Peleus and Melisander,
And

swans of Balls

Spots of foam on the ocean

=====

What, Him Worry?

Al Jaffee turns 100, and Mad magazine salutes its legendary artist with a birthday tribute



*Legendary Mad magazine cartoonist Al Jaffee in his New York studio.
(Will Mayo)*

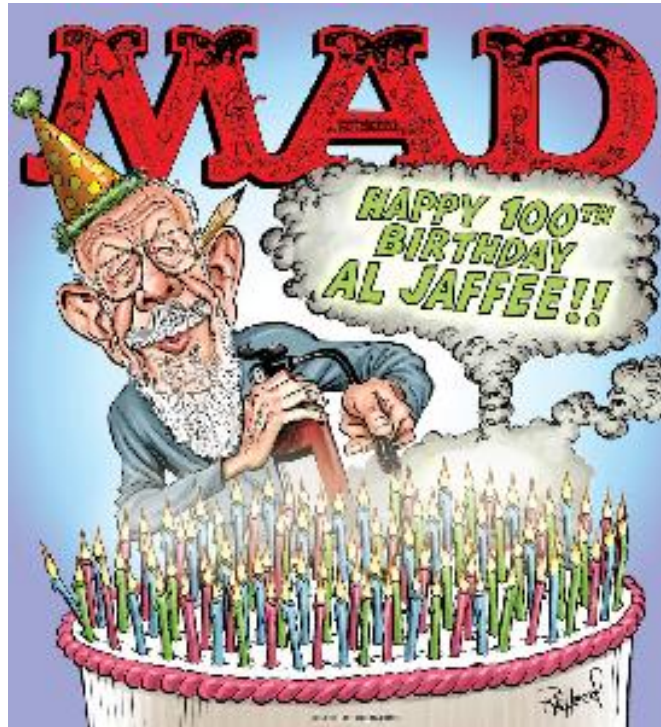
By Michael Cavanaugh

Al Jaffee, one of Mad magazine's longtime "Usual Gang of Idiots," is enjoying a rather unusual week. Several days ago, the cartooning legend got vaccinated for the coronavirus. On March 13, he plans to celebrate turning 100 years old.

"Hitting the century mark in age, it's a nice number" for the brain to consider, Jaffee said with a warm laugh Thursday from his New York home — even if some body parts don't "seem to appreciate it."

To mark the occasion, the humor publication is announcing that its "Mad Predicts the Future" edition, on sale next month, will salute its eldest statesman. The issue's center-spread article, titled, "Amazing All-Seeing Al Jaffee's MAD E.S.P.," will note how the

artist's ever-inventive mind foresaw such ideas as the multi-bladed razor and the "autocorrect" function — once described and drawn in the artist's wry style.



*A Tom Richmond illustration, as part of a Mad birthday tribute, salutes the magazine's eldest statesman, Al Jaffee.
(Tom Richmond/Mad)*

Jaffee, who made his Mad debut 65 years ago, is best-known for the magazine's iconic back-page Fold-In — he has created more than 450 of them — and the running feature "Snappy Answers to Stupid Questions."

"The most impressive thing about Al and his work is his seemingly bottomless well of great ideas for features, and how varied they are," says caricaturist Tom Richmond, who rendered the new center-spread piece. "If all he did was invent the Fold-In and write and draw it for 55 years, that would already be deserving of legend status. But he did so much more: comic books, comic strips and features for Mad that were completely different from one to the next."



*Al Jaffee draws himself in a double self-caricature.
(Al Jaffee/DC/Mad)*

When Jaffee retired last June, Mad published a tribute edition that included his final Fold-In. (When the back page is folded inward, the condensed image and wording reveal a “hidden” answer that satirizes politics, pop culture and social trends — born as Jaffee’s winking twist on magazine fold-outs.)

“AI represents the peak of achievement in humorous cartooning to me,” says Johnny Sampson, who inherited creating the Fold-In directly from Jaffee. “He has carved out his own unmistakable space and forever left his imprint on the medium. What he has done seems almost unachievable nowadays, but it’s still something that inspires me on a daily basis.”

Jaffee launched his career in 1942, beginning with Joker Comics, and worked continuously until last year. In 2016, Guinness World Records awarded him its title of “longest career as a comic artist.” Says Sampson, noting that Jaffee was never on Mad’s editorial staff: “I’d venture to say he also holds the title for longest-working freelancer, as well.”

Jaffee has received the National Cartoonists Society’s Reuben Award and was inducted into the Will Eisner Hall of Fame. Five years ago, New York Mayor Bill de Blasio declared March 30 Al Jaffee Day.

Last year, The Washington Post posed its stupidest question to the cartoonist: “Are you proud that your work with Mad endures?”

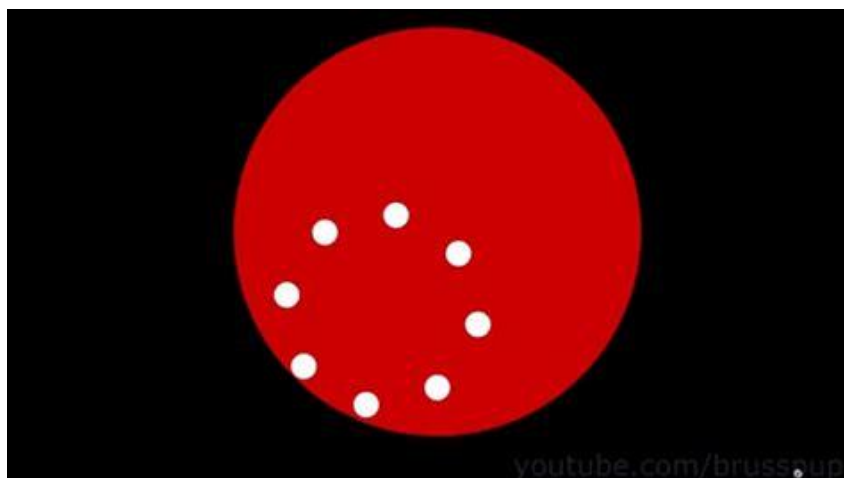
Jaffee’s snappy answer: “I would be stupid to say, ‘No.’”

Yet beyond the jokes, Jaffee believes in the power to viscerally reach the reader through cartoon art, saying Thursday: “There’s a certain personality in the drawings that can affect emotional reaction.”

Jaffee, who has drawn just for fun at times this year, is still reaching generations of cartoonists he has inspired. And warmth rumbles through his commanding voice as he looks toward the next tribute and says: “See you next year.”

=====

Crazy Circle Illusion



<https://www.youtube.com/watch?v=pNe6fsaCVtI>

Reminds me of a round motor

=====

Republic XR-12 Rainbow - World's Fastest Four-Engine Piston-Powered Aircraft



<https://www.youtube.com/watch?v=ZTy0zyfP6KI>

The right airplane at the wrong time - the story of Republic's attempt to build a record-breaking photo-recon aircraft and commercial airliner in 1946.

=====

A Roosting Rover Meets a Nesting Falcon



https://www.youtube.com/watch?v=4RXV-p_Ec6Q

<http://i.imgur.com/YW6Fufm.jpg>

Field day for birdwatchers.

=====

The Eagle

This is the kind of story you need when it seems like the world is spiraling out of control. Not many people get a picture of this proud bird snuggled up next to them!



Freedom and Jeff

Freedom and I have been together 11 years this summer. She came in as a baby in 1998 with two broken wings. Her left wing doesn't open all the way even after surgery, it was broken in 4 places. She's my baby.

When Freedom came in, she could not stand and both wings were broken. She was emaciated and covered in lice.

We made the decision to give her a chance at life, so I took her to the vet's office. From then on, I was always around her. We had her in a huge dog carrier with the top off, and it was loaded up with shredded newspaper for her to lay in. I used to sit and talk to her, urging her to live, to fight and she would lay there looking at me with those big brown eyes. We also had to tube feed her for weeks.

This went on for 4-6 weeks, and by then she still couldn't stand. It got to the point where the decision was made to euthanize her if she couldn't stand in a week. You know you don't want to cross that line between torture and rehab, and it looked like death.

She was going to be put down that Friday, and I was supposed to come in on that Thursday afternoon.. I didn't want to go to the center that Thursday, because I couldn't bear the thought of her being euthanized; but I went anyway, and when I walked in everyone was grinning from ear to ear.

I went immediately back to her cage; and there she was, standing on her own, a big beautiful eagle. She was ready to live. I was just about in tears by then. That was a very good day. We knew she could never fly, so the director asked me to glove train her.

I got her used to the glove, and then to jesses, and we started doing education programs for schools in western Washington. We wound up in the newspapers, radio (believe it or not) and some TV. Miracle Pets even did a show about us.

In the spring of 2000, I was diagnosed with non-Hodgkin's lymphoma. I had stage 3, which is not good (one major organ plus everywhere), so I wound up doing 8 months of chemo. Lost the hair - the whole bit. I missed a lot of work.

When I felt good enough, I would go to Sarvey and take Freedom out for walks. Freedom would also come to me in my dreams and help me fight the cancer. This happened time and time again.

Fast forward to November 2000. The day after Thanksgiving, I went in for my last checkup. I was told that if the cancer was not all gone after 8 rounds of chemo, then my last option was a stem cell transplant.

Anyway, they did the tests; and I had to come back on Monday for the results. I went in Monday, and I was told that all the cancer was gone.

So the first thing I did was get up to Sarvey and take the big girl out for a walk. It was misty and cold. I went to her flight and jessed her up, and we went out front to the top of the hill.

I hadn't said a word to Freedom, but somehow she knew. She looked at me and wrapped both her wings around me to where I could feel them pressing in on my back (I was engulfed in eagle wings), and she touched my nose with her beak and stared into my eyes, and we just stood there like that for I don't know how long.

That was a magic moment.. We have been soul mates ever since we came in. This is a very special bird.

On a side note: I have had people who were sick come up to us when we are out, and Freedom has some kind of hold on them.

I once had a guy who was terminal come up to us and I let him hold her. His knees just about buckled and he swore he could feel her power course through his body. I have so many stories like that.

I never forget the honor I have of being so close to such a magnificent spirit as Freedom.

=====

What Determines a Stock's Value?

STOCK VALUE VS PRICE WHAT'S THE DIFFERENCE?

“ Price is what you pay; value is what you get. ”

Warren Buffett says it even better: *Value is what you get.*



To help investors understand the difference between a stock's price versus its value, we highlight the following key distinctions.

SOURCE: THE BALANCE SEP 2021

VALUE

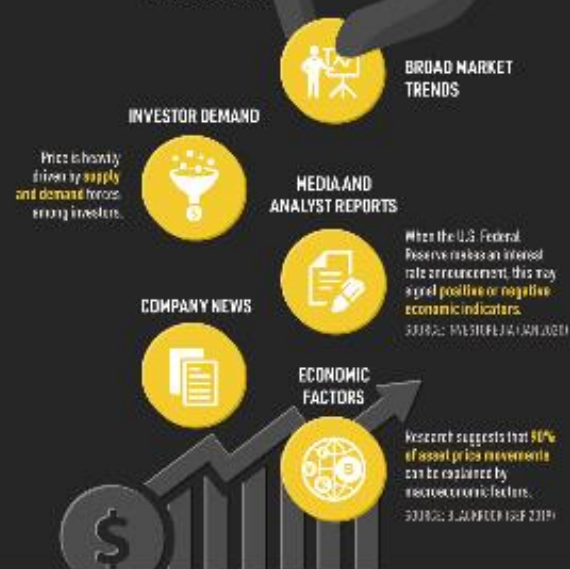
A stock's value is separate from its market price. It considers financial statements, market analysis, and fundamental factors.



PRICE

A stock's price represents how much the stock trades at, and is impacted by short-term market fluctuations. In the long-term, fundamental factors such as profit margins usually play a role.

PRICE IS INFLUENCED BY THESE FACTORS:



A company (represented by a stock) derives its value from fundamental factors including:

Earnings

Earnings, or profitability, is often an indicator of company performance. Past and present numbers indicate a company's profitability thus far, while future earning projections help investors gauge potential performance going forward. This is germane to investors because a company will typically reinvest its earnings into the business or distribute them as dividends to investors.

Market Share

Companies with strong market share possess economic moats, which create a barrier against competitors. These moats can protect a company from new market entrants or allow for cost advantages, increasing the company's value to investors.

P/E ratio and Other Metrics

The price-to-earnings (P/E) ratio is a common metric for valuing companies. It measures a company's price in relation to its earnings per share (EPS). If a company has a low P/E ratio compared to its peers, this may suggest that it is undervalued.

Here are common metrics used to value a stock:

P/E ratio

Price/Earnings Per Share

Compares a company's stock price relative to its earnings

P/B ratio

Price/Book Value Per Share

Compares a company's stock price relative to its tangible net asset value

Debt-to-equity ratio

Total Liabilities/Total Shareholders' Equity

Shows company leverage, or the extent that a company is financing operations through debt

Competitors (Current and Potential)

Comparing a company against its peers can indicate its relative strength. An investor may discover value discrepancies between competitors, presenting potential investment opportunities.

What Determines a Stock's Price?

A stock's price, on the other hand, is typically influenced by a separate set of factors:

Investor Demand

Supply and demand is central to determining the price of a stock. When an influx of market participants are buying a stock, the market price will rise. If the number of sellers for a stock exceeds the number of buyers, the price may drop.

Broad Market Trends

Bull and bear markets are examples of primary markets, which may influence a stock's price performance. Rallies or directional turnarounds are other types of shorter market trends which often last between two to eight weeks.

Media and Analyst Reports

When a company faces a controversy, media reports may influence investor behavior, causing them to sell. Conversely, a strong analyst rating may influence investors to buy.

Economic Factors

Across asset classes, six macroeconomic factors have been shown to explain 90% of a stock price's movements: real rates, economic growth, liquidity, inflation, emerging markets, and credit.

Company News

When a company releases quarterly earnings reports, it may influence investor demand. If Apple's company's earnings exceed expectations, for instance, its stock price may consequently rise after the announcement.

In the short term, many of the variables that influence a stock's price are driven by external forces. But in the long term, fundamental factors such as profit margins or earnings, often play a bigger role.

Forest For the Trees

With the above factors in mind, investors are better equipped to recognize the driving forces that underscore a stock's price and value, especially in the face of volatility and market exuberance.

By knowing these core differences, investors will not only get a better awareness of their portfolios, but will learn how to make more rational investment decisions.

=====

Biggest Mobile Hydrogen Fuel Cell in the World To Power Sergey Brin's Mysterious Airship

By Julie Campbell

The purpose of the renewable energy use will be for crossing oceans and delivering aid.



LTA Research and Exploration, the secretive and mysterious airship company owned by Google co-founder and former Alphabet President Sergey Brin, will use the biggest mobile hydrogen fuel cell in the world to power its disaster relief airship.

The company releases very little information about itself other than basic aerospace research intentions.

LTA (which stands for Lighter Than Air) Research and Exploration is an aerospace research and development company with a focus on the development and creation of "experimental and certified manned and remotely piloted airships." Among the primary goals of this Mountain View, California- and Akron, Ohio-based company is to reduce the cost associated with modern airships. The purpose of those vehicles would be the delivery of humanitarian aid while simultaneously reducing greenhouse gas emissions and employing Americans.

Though the company rarely announces much in terms of detail regarding its plans and strategies, it is now planning to power a massive airship for disaster relief with the biggest mobile hydrogen fuel cell the world has ever seen. This was revealed by way of one of several job listings on the company's official website.

The company is already listing jobs for the configuration of the biggest mobile hydrogen fuel cell.

The job listing describes the intention to configure a 1.5-megawatt hydrogen propulsion system. This would be used for powering a humanitarian aid airship while simultaneously turning transportation on its head. The job listing does not provide detail about the specs for the H2 system. However, a system that powerful would be enough to take a craft over oceans.

Even though airships are substantially slower than most other forms of air travel, jets in particular, they have the potential of carrying considerable amounts of goods and could land them virtually anywhere.

Using the biggest mobile hydrogen fuel cells in the world would give these airships a vast range. Moreover, they are more appealing to this kind of craft as they are lighter than lithium-ion batteries. Biggest mobile hydrogen fuel cell - image of airship and have the potential to be notably cheaper as well. This helps to explain why H2 is a renewable energy source in a growing number of aircraft projects worldwide.

=====

LtGen Michael Groen, USMC, Director of the Joint Artificial Intelligence Center



Breaking Defense

The U.S. Senate has confirmed LtGen Michael Groen to be the new director of the (JAIC), the Department of Defense's (DoD) division for developing and advancing artificial intelligence (AI) technologies, FedScoop reported on Monday. With Groen's recent confirmation, he has also been promoted to major general.

In his new role, Groen will be responsible for spearheading the development of emerging technologies. JAIC recently announced that the center will expand its solutions to new warfighting initiatives, transitioning from the earlier, lower-risk projects.

To help operationally prepare the DoD for AI, the JAIC integrates technology development, with the requisite policies, knowledge, processes and relationships to ensure long term success and scalability.

JAIC will use AI to solve large and complex problem sets that span multiple services; then, ensure the Services and Components have real-time access to ever-improving libraries of data sets and tools.

Groen has a long history of working with military technology and intelligence. Before his appointment, Groen served as the chief of the Marine Corps. intelligence and on the Joint Staff in senior positions. Most recently, Groen served as deputy chief of computer network operations at the National Security Agency (NSA).

He was nominated for assignment as the Joint Artificial Intelligence Center's (JAIC) next director and promotion to the rank of lieutenant general in Sept. 2020. Groen will succeed Nand Mulchandani, who has served as acting JAIC director.

=====

GAME CHANGERS

First 3D Printed Home Hits Market



Photo cred: SQ4D

SQ4D, a 3D printing company, has listed for sale the first 3D printed home in the United States.

This residential property, printed on site using SQ4D's revolutionary Autonomous Robotic Construction System (ARCS), is the first 3D printed home slated to receive a certificate of occupancy and is listed on MLS for sale as new construction for \$299,999.

The 3D printed home will feature over 1,400 square feet of living space, plus a 750 square foot 2 ½ car garage on a ¼ acre. This home includes 3 bedrooms, 2 full bathrooms, and features an open floor plan. Built with concrete, this home will deliver

strength and durability that conventional wood-frame construction cannot match, according to the company. SQ4D will be including a 50-year limited warranty on their 3D printed structures.

https://youtu.be/TPm_UmnkNhg

SQ4D used its patent pending ARCS technology to robotically build the footings, foundations, interior, and exterior walls on site of their homes. SQ4D's proprietary hardware and software enables the construction site to be safer while creating eco-friendly concrete homes compared to traditional wood-frame construction at a fraction of the cost.

SQ4D's 3D printing technology can drive a lasting solution to this crisis by drastically reducing the cost of new home construction. Stephen King of Realty Connect, the Zillow Premier agent who has the listing, said, "At \$299,999, this home is priced 50 percent below the cost of comparable newly-constructed homes in Riverhead, New York, and represents a major step towards addressing the affordable housing crisis plaguing long island."

SQ4D's listing of the first 3D printed home will forever change the construction industry, making its tagline, "Changing the Way the World is Built" a reality. SQ4D currently has building plans being reviewed from New York to California.

=====