



Tech Insider Stories 24 February 2023

Story 1: New technology advances the use of waste cardboard for home insulation

Source: TechCrunch.com

Story Tim De Chant

Link: <https://techcrunch.com/2022/11/30/transforming-old-cardboard-boxes-into-insulation-nets-cleanfiber-10-million-round/>



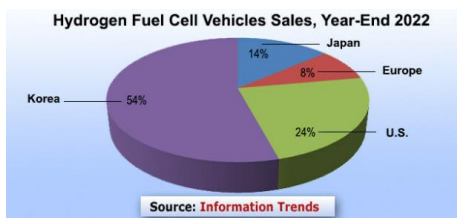
- According to the EPA, cardboard boxes account for approximately 33 to 51 million tons of waste annually in the United States.
 - Now most of it gets recycled, but there's still a significant fraction that finds its way into landfills.
- One startup [a Buffalo, New York-based outfit called CleanFiber] is now using an innovative process that turns cardboard box waste into cellulose insulation that can be blown into the walls and attics of new and existing homes.
- Typically, cellulose insulation is made by shredding old newspapers, but with the decline of the newspaper industry over the last 20 years the supply of newsprint has dropped dramatically.

- Cardboard is a great alternative as it's lighter and stronger than newspaper and contains more fiber and less clay.
- Okay, you may be thinking “so far this sounds pretty low tech” but here's the high-tech side of this story:
 - Cardboard contains some nasty contaminants including heavy metals, such as zinc, lead, cadmium and chromium.
 - CleanFiber's research efforts [backed by the National Science Foundation and conducted with the University of Maine] led to the development of an innovative wet separation and infusion manufacturing process that removes these contaminants by floating them off.
- And for added safety CleanFiber's all-borate, liquid fire retardant is infused directly into the cardboard-derived insulation fibers.

Story 2: Key trend to watch - More than 56,000 hydrogen cars sold worldwide

Source: AutoTech.news PR Newswire

Link: <https://autotech.news/over-56-thousand-hydrogen-passenger-vehicles-sold-so-far/>



Toyota and Hyundai Hydrogen Vehicles Sales, Year-End 2022

- Before we go on...a quick reminder - From a global warming perspective, cars powered by hydrogen fuel are great as they only emit water vapor and warm air as exhaust!

- So, it's encouraging to hear that as of the end of last year more than 56 thousand hydrogen fuel cell passenger vehicles have been sold worldwide [according to a recently released Information Trends study titled "Global Market for Hydrogen Fuel Cell vehicles, 2023"].
- Granted 56 thousand is a miniscule fraction of the millions of gas, hybrid, and EV vehicles sold each year, but it's a positive trend to monitor.
- It's predicted that sales of hydrogen vehicles will increase significantly once hydrogen fueling station deployments ramp up.
- According to the Information Trends report, more than half of the hydrogen fuel cell vehicles sold so far have been in Korea because it has the most extensive hydrogen fueling infrastructure of any major market.
- Other regions with growing sales of hydrogen fuel cell vehicles include Japan, Europe and California where the deployment of hydrogen stations is progressing.
- According to the report, except for California, the United States has been dragging its feet in implementing this technology, particularly because of lack of action at the federal level.



Story 3: World's first autonomous artificial intelligence jet fighter training aircraft

Source: NewAtlas.com

Story by David Szondy

Link: <https://newatlas.com/military/worlds-first-autonomous-ai-tactical-aircraft-flight/>



- Recently Lockheed Martin announced that their fighter jet trainer for the US Air Force called the VISTA X-62A is the world's first tactical aircraft to be autonomously controlled by artificial intelligence.
 - Before we dive into this news, simply put, what is artificial intelligence? It's all about computer systems able to perform tasks such as visual perception, speech recognition, decision-making, and translation between languages.
 - Developed by Lockheed Martin's Skunk Works classified research facility in cooperation with Calspan Corporation, the Variable In-flight Simulation Test Aircraft [a.k.a. VISTA X-62A] is a modified F-16D
 - It flew unmanned for more than 17 hours during recent test flights at the Edwards Air Force Base in California in December 2021. I did not find an explanation as to why the results of this testing was announced a bit more than a year later.

Here's why this AI-driven aircraft is so important:

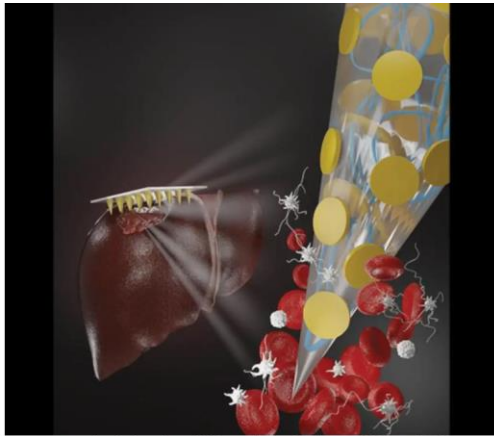
- Today's air forces are much smaller than they were in the past due to the astronomical costs of making and maintaining jet fighters. So, it's hard to free up enough of these jets for training purposes.
- And on top of that there's the challenge of training pilots to fly more than one specific model of fighter aircraft.
- So, with the development of the artificial intelligence-driven VISTA X-62A, the Air Force now has a tool to address both challenges.
- Because Lockheed Martin's fighter jet training aircraft uses programmable artificial intelligence this one plane can mimic the characteristics of various US Air Force aircraft.
 - In fact, it is now being used at the US Air Force Test Pilot School at Edwards Air Base to train pilots to handle multiple aircraft.
- In addition to helping train pilots, the VISTA X-62A will contribute to the development and testing of cutting-edge artificial intelligence techniques for use in future unmanned aircraft designs.

Story 4: New microneedle bandage can stop bleeding in less than two minutes

Source: SciTechDaily.com

[Penn State University]

Link: <https://scitechdaily.com/saving-lives-novel-microneedle-bandage-can-immediately-stop-bleeding-following-an-injury/>



Hemostatic microneedle technology can be applied like a typical adhesive bandage to stop bleeding quickly. The biocompatible and biodegradable microneedle arrays (MNAs) on the patch increase its surface contact with blood to accelerate the clotting process and also increase the adhesive properties of the patch via mechanical interlocking to promote wound closure. Credit: Designed by Amir Sheikhi and Reihaneh Haghighi; Executed by Natan Barros



Amir Sheikhi, assistant professor of chemical engineering and biomedical engineering at Penn State, developed a prototype of a microneedle patch that can immediately stop bleeding after an injury. Credit: Kelly Hochreither/Penn State

- Secondary uncontrolled bleeding resulting from traumatic injuries is the leading cause of death for Americans from age one to 46!
- To help reduce these tragic fatalities Amir Sheikhi [an assistant professor of chemical and biomedical engineering at Penn State] has developed an innovative microneedle patch, which can rapidly stop bleeding following a traumatic injury.
- Microneedles — which are already in use to deliver biologics, such as cells or drugs, through the skin or for cosmetic procedures to stimulate collagen production, are tiny [measuring in the millionths of a meter].
 - In fact, they are so tiny that applying them to the skin or a wound area is pain-free.
- And when it comes to rapidly stopping bleeding, the hemostatic microneedle technology used for the experimental patch, with its microneedle arrays, has shown it can boost blood clotting to stop bleeding in less than 2 minutes!

- In fact, “In tests the engineered microneedle arrays reduced clotting time from 11.5 minutes to 1.3 minutes; and in a rat liver bleeding model, they reduced bleeding by more than 90%.
- Here’s how it works:
 - The biocompatible and biodegradable microneedle arrays on the patch increase its surface contact with blood which accelerates the clotting process.
 - And the mechanical interlocking formation of the needles also increases the adhesive properties of the patch to promote wound closure.
- The experimental microneedle patch is also designed for immediate application and is very user friendly.
 - According to the Penn State researcher anyone can use the patch to quickly stop bleeding.
 - It’s as easy to apply as an over-the-counter adhesive bandage.
 - What a great thing this will be for paramedics!