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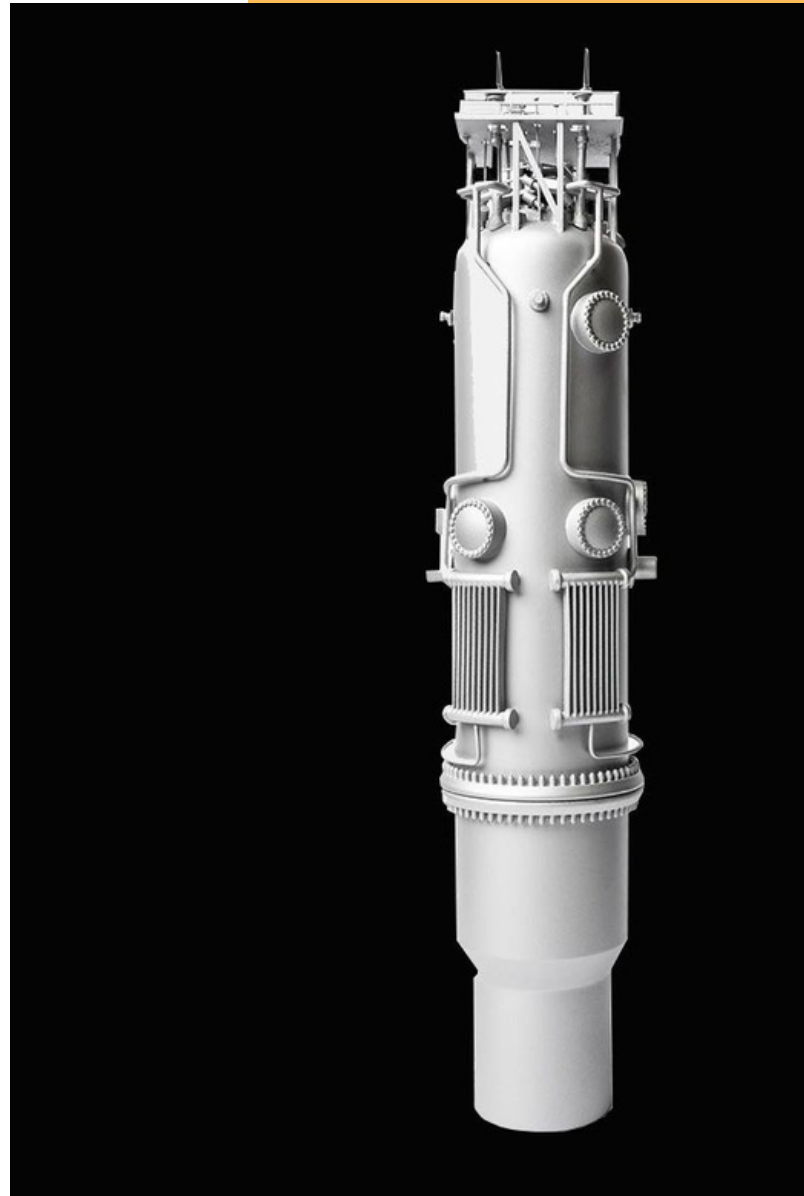
ENERGY

BY SHREEYESH S.

THE TINY, SIMPLE NUCLEAR REACTOR THAT COULD CHANGE ENERGY

An energy startup in Oregon wants us to rethink our reluctance to embrace nuclear energy, *Wired* reports. NuScale Power studies new reactor technology from a lab on the Oregon State University campus—the same university where the 2019 climate crisis petition began. Their cutting-edge reactor is tiny and, its proponents insist, *much* safer than our existing notions of nuclear energy lead us to believe. The oldest operating U.S. nuclear power reactor opened in 1969, and even the newest powered on in the mid-1990s. One completed in 2016, started construction back in 1973. “Only two new reactors are under construction in the U.S., but they’re billions of dollars over budget and years behind schedule,” *Wired* reports. Like our aging and increasingly dangerous infrastructure, these nuclear plants need to be comprehensively updated or replaced, and *soon*.

In the NuScale reactor, a core is kept cool by circulating normal fresh water, as happens in today’s operating nuclear plants on a much, much larger scale. Inside huge nuclear towers, most of the space is dedicated to cooling. The NuScale reactor uses gravity and buoyancy to naturally circulate the cooling water. The size difference is staggering: “About the size of two school buses stacked end to end, you could fit around 100 of them in the containment chamber of a large conventional reactor,” *Wired* reports. The reactor technology itself isn’t completely different than before, it’s just wildly more efficient and up to date.



FIRST 3D-PRINTED NEIGHBORHOOD NOW HAS FIRST 3D-PRINTED HOUSES

SAISH S
STUDENT

A planned 3D-printed neighborhood has its first completed houses in rural Mexico. The houses are made with a huge 3D printer that's 33 feet long, and the project was delayed for a few months while the machinery was held up in customs by understandably puzzled officials.

Residents are moving into 500-square-foot homes with two bedrooms, a kitchen, a living room space, and an indoor bathroom with plumbing. They're all built in one sweep of the 3D printer, ICON's Vulcan II, which pipes a special concrete mixture to form exterior and interior walls. The new homes will withstand local weather in a way their builders say is new among 3D printed home technology, which has largely not been tested in the "real world."

The international nonprofit New Story, working in partnership with ICON, works to reduce not just homelessness, but "survival mode" living around the world. Researchers estimate that up to 1.6 billion people around the world are housing-insecure or live in inadequate housing, like the shacks that New Story is hoping to replace in the rural Mexican community where it's 3D-printing houses.

New Story considers its homes in Mexico to be proof of concept in a way, both as a sign that its 3D printer technology is sound, and as encouragement to other groups that may enter the affordable housing fray.



RUSSIA'S NEW WARSHIPS WILL PACK HYPERSONIC MISSILES

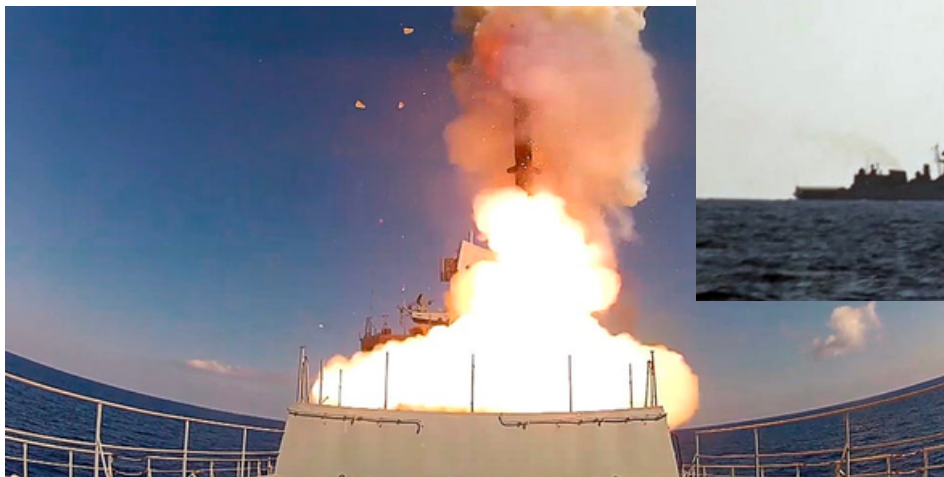
PRIYANK VARTAK
FACULTY

All of Russia's new and upcoming warships will carry a new hypersonic missile capable of traveling nearly 7,000 miles per hour. According to the head of Russia's main warship manufacturer, all modern warships serving in the Russian Navy and those on the drawing board will carry the weapon. Zircon is reportedly capable of striking both ground and naval targets and is likely so fast as to make it unstoppable against modern naval defenses.

The head of Russia's United Shipbuilding Corporation, Alexei Rakhmanov, told reporters that Zircon will arm "all the new Projects of ships" for the Russian Navy. Russian warships are typically known internally as a project number. For example, the older cruise missile submarine *Irkutsk*, known to NATO as part of the *Oscar*-class, is known within Russia as part of the Project 949A class.

Irkutsk, currently under modernization, was built in 1988 as a cruise missile submarine designed to carry up to 24 P-700 Granit anti-ship missiles. In wartime, *Irkutsk* and her sister ships were meant to hunt down and destroy U.S. Navy aircraft carriers and other high value targets. Now *Irkutsk* will carry Zircon missiles, presumably for the same mission.

Zircon—provided the reports are true and the missile is all it's cracked up to be—seems to be a smart investment for the Russian Navy. Due to budgetary and technical issues, much of Russia's surface fleet is old and their weapons obsolete. The Russian Navy has commissioned just one destroyer-sized ship since the end of the Cold War.



FIRST ALL-ELECTRIC PLANE FLIES FOR JUST ABOUT 15 MINUTES

MANSI LAKHANI
FACULTY

A completely electric plane has made its longest flight ever at just under 15 minutes. The plane is a collaboration between a Seattle engineering firm named MagniX and a nearby Vancouver air charter company named Harbour Air. Like an electric car, it runs on a parcel of lithium ion batteries.

Harbour Air offers services you might describe as an air taxi—it ferries people to places just outside of Vancouver, where many people live on and visit islands, resorts, and more that are accessible by boat or air ferry. The company also flies back and forth to Seattle. These short, frequent trips make Harbour an ideal candidate for an electric fleet.

MagniX chief Roei Ganzarski says the plane it tested for this flight could fly up to 100 miles. Like early electric cars, this limitation precludes people who must go longer distances, but works for many who are just going short distances—especially suited for the corridor between Seattle and Vancouver, where many people work and play in both places. Where the airline industry in general is drawing constant criticism for how much carbon it produces, an electric fleet of local charters is very appealing.

Harbour Air says it's already carbon neutral, flying 500,000 people per year on over 40 airplanes. If the company's entire map of 12 destinations is within the 100-mile threshold, founder McDougall is right that it makes undeniable sense to electrify. The next step for Harbour and MagniX's Magni500 electric powertrain is to go through a long period of regulatory tests and other paperwork and government safety rules.

Harbour and MagniX expect this will take at least a couple of years, after which they can hopefully upgrade their entire fleet. The MagniX powertrain comes in 375- and 750 HP versions, so Harbour's larger planes are covered, too. In a time when elites are booking long flights to nowhere to boost their airline miles status, Harbour Air and MagniX's planned electric fleet is a breath of fresh, unpolluted air.



TURKEY'S NEW DRONE COMES WITH A MACHINE GUN

SUSHIL MISHRA -
FACULTY

Turkey has unveiled the country's first armed drone, a small tactical unmanned aerial vehicle designed to provide fire support for convoys or defensive positions, day or night, to ranges of up to six miles. The drone is not only armed with cameras but a light machine gun.

The Songar drone is built by Turkish defense contractor Asisguard. According to the company, Songar is designed to, "increase survival against harassment fire in patrol zones and fortress patrol areas, or in the event of any ambush or threat during the transition of land vehicles and convoys."

In the video above, four Turkish troops traveling down a dirt road are the victims of an ambush. The Turkish soldiers remove a Songar drone from the back of their vehicle, fire it up, and send it to locate those responsible for the attack. After locating them, the pilot of the Songar sends it in to open fire on the enemy, firing bursts of 5.56-millimeter automatic weapons fire point-blank into their location. The enemy neutralized, the Turks are able to drive safely away.

Songar weighs 55 pounds, has a range of 6.2 miles, and can reach an altitude of 9,200 feet. The drone is equipped with a day/night camera that transmits video in real time, providing damage assessment after the drone carries out an attack. The drone uses both the American GPS and Russian GLONASS navigation systems to get around, in case the country operating the drone finds itself locked out of one or the other. The system does not appear to be autonomous, requiring the drone operator or "man in the loop" to make the decision to open fire.

The drone is primarily meant as a defensive system, designed to fly above ambushers, locate them, and engage them with small arms fire. Asisguard admits, however, that the drone is heavily armed enough it could be used for offensive missions.



PORSCHE REVEALS TAYCAN-INSPIRED STAR WARS STARFIGHTER

MANOJ YADAV -
FACULTY

The product of the collaboration between Porsche and Lucasfilm has arrived: the Taycan-inspired Tri-Wing S-91x Pegasus Starfighter. The fantasy vehicle has the iconic sloping roof of a Porsche and the intakes seen on the 2020 Taycan. It's a sports car for the sky.

From the Lucasfilm side, the starfighter took inspiration from the X-Wing, Y-Wing, and U-Wing fighters. The six-week collaboration between the teams was documented in this 12-minute documentary detailing how each team offered up their design cues and experience to create the starfighter.

The designers were given parameters for the starfighter they were collaborating on: it had to have two front entries, a large rear cargo door, and room for two pilots and a maximum of five crew members. The Porsche team said it opted for a wide, thin body as opposed to a tall and narrow one in order to not deviate from the design ethos of Porsche.

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WIND TUNNEL COULD CLEAR MOST AERODYNAMIC VEHICLES YET

SURAJ G
STUDENT

You might expect an automaker with Honda's reputation to have all the latest tools for developing cars—including new battery electric vehicles (BEVs)—at its fingertips. But for years, the Tokyo-based automaker has actually been leasing wind tunnels from other car and aerospace companies and governments around the world to bolster its own facilities. That will change this fall when Honda finishes calibrating its \$124 million state-of-the-art wind tunnel in East Liberty, Ohio, and begins aerodynamic testing.

The new Honda Automotive Laboratories of Ohio facility (HALO, for short) will do more than just help shape street cars and race cars to be aerodynamically slippery and fuel efficient; it will also allow Honda to fine-tune the sound of the air flowing over those vehicles. Wind noise is noticeable in any car, but in a battery electric vehicle, it's a major distraction. A wind tunnel that can help designers minimize the noise could be a boon to the electric vehicle (EV) industry.

It's reasonable to associate wind tunnels with aircraft, since aviation drove pioneering work in aerodynamics forward. However, wind tunnels have also been fixtures of the automotive industry since 1960, when the first purpose-built automotive wind tunnel—the Motor Industry Research Association tunnel—became operational at a former Royal Air Force airfield in Warwickshire, England. To provide airflow, it used four aircraft propellers as fans, each driven by a 325-hp electric motor. That strategy also puts such one-off prototype cars at risk, as evidenced by the sinking of the roll-on roll-off car carrier *Felicity Ace* back in March, when thousands of luxury vehicles—Porsches and Lamborghinis among them—went down with the ship after it caught fire in the Atlantic Ocean. Not to mention the other thorn in Honda's side: the expense of having its engineers continually traveling (sometimes as much as two weeks a month) to leased wind tunnels across the map.

"It got to the point that our development load became high enough that [leasing] didn't make sense anymore. We finally came to the conclusion that 'Hey, we should build our own wind tunnel,'" Unger says.

