

## Tech Universe: Wednesday 21 August

By Miraz Jordan

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Imagine not needing to use batteries to power wireless devices. Photo / Thinkstock

**SOMETHING IN THE AIR:** Every day there are more devices and gadgets available to us that do interesting or useful things. Every device needs a source of power though, so battery technology is also continuously developing. Now engineers at the University of Washington have created a wireless communication system that enables devices to interact with each other [without needing batteries](#) or cables for power. The ambient [backscatter technique](#) reflects existing cellular and TV signals already in the air. Antennas detect, harness and reflect a TV signal, which is then picked up by other similar devices. That means a whole a network of devices and sensors could communicate without a battery in sight. One application could be sensors monitoring a bridge or other structure that could send an alert back to base. I bet someone's going to claim they own those ambient RF signals and start charging for their use.

**DIY ARM:** A prosthetic arm can cost tens of thousands of dollars, but one Colorado teenager built a [fully functional arm](#) for a mere \$500.

The arm can throw balls, shake hands or do almost anything,

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given the correct programming. The arm, which reaches all the way to the shoulder, is controlled with an [electroencephalographic headband](#) connected via Bluetooth. The extremely low cost is thanks to 3D printing. It's exciting to think that hobbyists can create such useful devices that could make a real difference in the world.

**ELECTRIC CUBES:** [The Cube](#) is a new fuel cell from the University of Maryland that can power a small shopping mall. It's around one tenth the size and cost of current commercial fuel cell systems. Attach the Cube to a natural gas line then it electrochemically converts methane to electricity. Alternative fuel sources include propane, gasoline, biofuel and hydrogen. Solid oxide cells inside the Cube convert the source fuel chemically into electricity at a comparatively low temperature of 650 C. Nearly every layer of the cell has been optimised to generate more power at lower cost. The machine is highly efficient and puts out few pollutants. A smaller version of the Cube could power a single house. But is it cheaper than a conventional source of electricity?

**ON THEIR OWN:** In Singapore those travelling the 2 Km between Nanyang Technological University and the [CleanTech Park](#) may step into a driverless shuttle vehicle. The autonomous electric shuttle can carry 8 passengers and has a maximum speed of around 20 Kph. The shuttle is a test of not only autonomous vehicles but also battery, charging and other tech. Autonomous cars still seem like something that belongs in the future.

**PHONES IN SIGHT:** Peek turns a smartphone into a portable eye testing machine. Around the world millions of people are blind who needn't be: their blindness is easily avoidable. But costly equipment and trained personnel are hard to come by in many places. With [PEEK](#) a healthcare worker can walk or ride a bike to even remote locations with all the gear in a solar powered backpack. The eye exam is recorded on the phone, including photos of the retina. That data can be sent to experts anywhere in the world, while a map shows locations of all those needing treatment, so a co-ordinated plan can be developed. The phone can then guide workers to individual patients to take them to a clinic for treatment. Vision is a great gift.

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