

## NASA Has Invented a Lightweight Machine That Can Detect a Human Heartbeat Under 30 Feet of Rubble

[HTTP://WWW.THEATLANTICCITIES.COM/TECHNOLOGY/2013/09/NASA-HAS-INVENTED-LIGHTWEIGHT-MACHINE-CAN-DETECT-HUMAN-HEARTBEAT-UNDER-30-FEET-RUBBLE/6930/](http://www.theatlanticcities.com/technology/2013/09/nasa-has-invented-lightweight-machine-can-detect-human-heartbeat-under-30-feet-rubble/6930/)

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Shortly after an EF5 tornado flattened Moore, Oklahoma, this past May, the Department of Homeland Security called Jim Lux at NASA's Jet Propulsion Lab. "We were asked to come out with our machine," Lux says. The machine in question unfortunately wasn't ready. It will be next time.

Short for "Finding Individuals for Disaster and Emergency Response," NASA's FINDER is a prototype portable radar system, small enough and light enough to be carried by a single person, and powerful enough to detect a heartbeat under 30 feet of rubble. Assuming the federal government contracts with a manufacturer in a timely manner, first responders at the local and state level should be able to buy FINDERs starting in spring 2014 for about \$10,000 each.



*That's it. That little thing on the ground is FINDER. It's controlled using a tablet.*

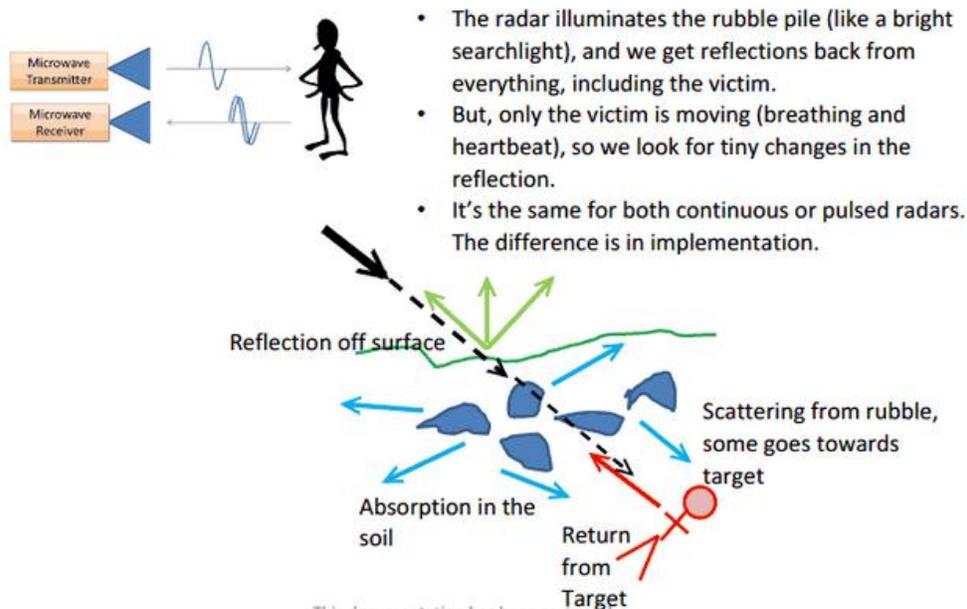
"People have done this for a while," Lux says of radar technology that can detect heartbeats and breathing. "There are products that look for sleep apnea in infants, and there's been people who

have built laboratory systems that can detect heartbeats but have to be moved into the field for an experiment." The difference between previous life-detecting radar technology and FINDER is like the difference between the first super computer and an iPhone: ease of use.

"The basic underlying technique has been around for decades. Technology from the wireless industry made it small and cheap. The processing power made the software possible," Lux says.

Whereas laboratory radar equipment requires "an incredible amount of expertise and a lot of familiarity with the device," a layman can be trained to use FINDER in about five minutes. There are almost no dials to twist. It has a small but accurate screen. It runs on a battery that lasts 14 hours per charge (two hours longer than the average search and rescue shift). It can fit in an overhead luggage compartment. You operate it using a tablet. "Right now it's a Panasonic Toughbook, which you can read in the sun."

## How the Radar Works



*Someone at NASA made this little diagram for us.*

I ask Lux if using the machine is as simple as pointing it at a big pile of rocks and hitting start. "Basically yes," he says. "Think of it as shining a big floodlight on the rubble. If someone's in there, you can see the heartbeat coming back to you." While the technology is actually more complicated than that, the ideal user won't have to understand it.

"It takes about five minutes," Lux says. "You set it up, make the measurement, see if anybody's there. You do that twice. It lets you rapidly go through a whole row of collapsed buildings." FINDER can actually detect up to five separate heartbeats. (After that it just says "many.")

FINDER is a new use of radar, but it's not intended to replace methods currently used for search and rescue. "It's a complimentary technology" to be used with dogs and microphones, which are both pretty good at finding conscious people capable of making noise. But microphones can't detect an unconscious person, and dogs can't tell the difference between an unconscious person and a recently deceased one. That's where FINDER, and its ability to detect a heartbeat, comes into play.

Next week, Lux and his team will fly to Virginia for FINDER's first public test run with Virginia Task Force One at the Fairfax County Fire Department. If it works like it has been working, says Lux, "we'll celebrate."

*Top image: Ovaldo Hernandez (L) and his son, Nathaniel, work to raise a University of Oklahoma flag on top of what is left of their home in a neighborhood heavily damaged by the May 20 tornado in Moore, Oklahoma May 27, 2013. REUTERS/Lucas Jackson*