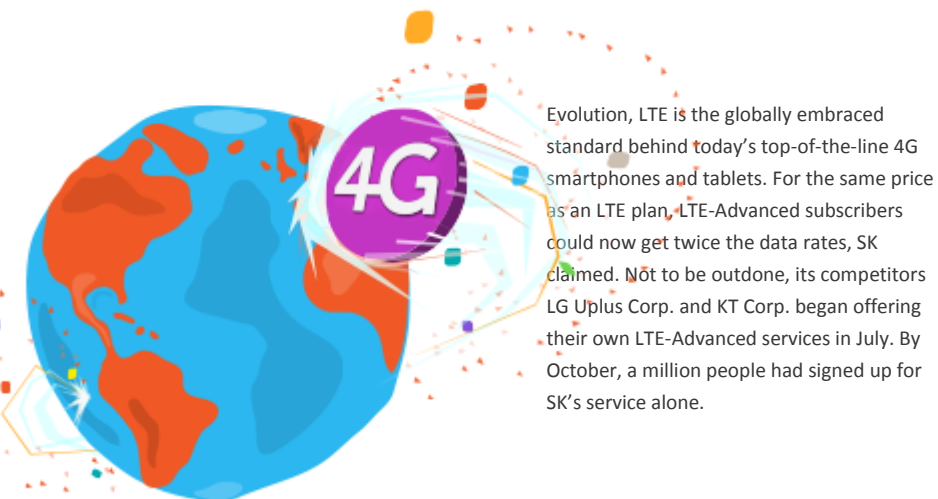


## LTE-Advanced Is the Real 4G

Have you ever called your cellphone carrier to report poor signal strength? Sure you have. And did that carrier do anything significant to fix the problem? Of course it didn't—unless you live in South Korea.

“I guarantee you—if I call my carrier tonight and complain about not getting a good signal in my bathroom, they will send someone to install a repeater first thing tomorrow morning,” said Wonil Roh during an interview in Suwon last October.

Roh heads the Advanced Communications Laboratory at Samsung Electronics Co. But he



Evolution, LTE is the globally embraced standard behind today's top-of-the-line 4G smartphones and tablets. For the same price as an LTE plan, LTE-Advanced subscribers could now get twice the data rates, SK claimed. Not to be outdone, its competitors LG Uplus Corp. and KT Corp. began offering their own LTE-Advanced services in July. By October, a million people had signed up for SK's service alone.

doesn't need the lofty title to get that kind of attention in South Korea's intensely competitive wireless arena. Home to Samsung and LG Corp., the world's first- and fourth-largest smartphone makers, the country boasts some of the most advanced wireless networks on earth. Last June, for instance, SK Telecom Co. launched what it called the “world's first publicly available LTE-Advanced network.” Short for Long Term



## ACHIEVERS OF YEAR

USN	NAME	SEMESTER	EVENTS	PLACE	PRIZE
1NH12CS004	Abhishek YSS	V	Debate	CBIT,Bangalore	II
1NH12CS008	Amar Thapa	V	Code 2 Win	CBIT,Bangalore	II
1NH12CS015	Arvind Iyer	V	BMSCE Coding Contest	BMSCE,Bangalore	I



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### P1 / AGRICULTURAL DRONES

Trend of using sensors and robotics to bring big data to precision agriculture

### P2 / AC LOWER YOUR ENERGY BILLS

Aros can track owners' movements via GPS and turn itself on and off depending on their proximity

### P3 / THE WHEEL BOOST

Attached to the back of most bicycles—that boasts a rechargeable, battery-powered motor

### P4 / THE REAL 4G

Such breakthroughs could give networks some 30 times as much capacity as LTE-Advanced.

# NEW HORIZON COLLEGE OF ENGINEERING



## ADVANCED CONTEMPORARY EMERGING TECHNOLOGY



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACE / Q1 / SEP 2014



Ryan Kunde is a winemaker whose family's picture-perfect vineyard nestles in the Sonoma Valley north of San Francisco. But Kunde is not your average farmer. He's also a drone operator—and he's not alone. He's part of the vanguard of farmers who are using what was once military aviation technology to grow better grapes using pictures from the air, part of a broader trend of using sensors and robotics to bring big data to precision agriculture.

What “drones” means to Kunde and the growing number of farmers like him is simply a low-cost aerial camera platform: either miniature fixed-wing airplanes or, more commonly, quadcopters and other multibladed small helicopters.

These aircraft are equipped with an autopilot using GPS and a standard point-and-shoot camera controlled

“ Compared with satellite imagery, much cheaper and offers higher resolution. ”

>> CONT. PAGE TWO

# Drone Technology

>> CONT. FROM PAGE ONE

by the autopilot; software on the ground can stitch aerial shots into a high-resolution mosaic map. Whereas a traditional radio-controlled aircraft needs to be flown by a pilot on the ground, in Kunde's drone the autopilot (made by my company, 3D Robotics) does all the flying, from auto takeoff to landing. Its software plans the flight path, aiming for maximum coverage of the vineyards, and controls the camera to optimize the images for later analysis.

This low-altitude view (from a few meters above the plants to around 120 meters, which is the regulatory ceiling in the United States for unmanned aircraft operating without special clearance from the Federal Aviation Administration) gives a perspective that farmers have rarely had before. Compared with satellite imagery, it's much cheaper and offers higher resolution. Because it's taken under the clouds, it's unobstructed and available anytime. It's also much cheaper than crop imaging with a manned aircraft, which can run \$1,000 an hour. Farmers can buy the



“ It's also much cheaper than crop imaging with a manned aircraft, which can run \$1,000 an hour ”

drones outright for less than \$1,000 each.

The advent of drones this small, cheap, and easy to use is due largely to remarkable advances in technology: tiny MEMS sensors (accelerometers, gyros, magnetometers, and often pressure sensors), small GPS modules, incredibly powerful processors, and a range of digital radios. All those components are now getting better and cheaper

at an unprecedented rate, thanks to their use in smartphones and the extraordinary economies of scale of that industry. At the heart of a drone, the autopilot runs specialized software—often open-source programs created by communities such as DIY Drones, which I founded, rather than costly code from the aerospace industry.

## The AC that Lowers Your Energy Bills

Americans spend more than \$11 billion each year to blast their homes with air-conditioning, releasing 100 million tons of carbon dioxide into the air. Experts say a sizable portion of that is waste. IT consultant Garthen Leslie realized as much while driving to work last summer in Washington, past rows of empty-looking houses with humming window units that could not be turned on or off remotely. There had to be a better way. "So I sent an idea to Quirky," he says, referring to the GE-backed site that turns people's concepts into creations. Four months later, they had a prototype.

The Aros air conditioner, which has sold nearly 50,000 units since its May 2014 release, is a provocative departure from the familiar window unit. For one thing, it's elegant, with a sleek white exterior that's almost Apple-esque. It's smart too. Thanks to a companion mobile app, Aros can track owners' movements via GPS and turn itself on and off depending on their proximity to home. It also tells people exactly how much money they're spending to cool their residences. That's how Quirky knows it's working: so far, the company says, Aros owners who use the "smart away" feature that turns the unit on and



nd off automatically have trimmed their energy use by nearly 10%.



## ITECH UPDATE

### THE NEW FACEBOOK BUSINESS PAGE

A lot of news has been coming out of Facebook recently, after its recent algorithm change, introduction of video ads and the demise of sponsored stories, many page owners have complain that their organic reach has almost disappeared. Even though Facebook has not responded, they did present a total redesign of Facebook Business pages. The big news: A new "pages to watch" tool.

### ROKU STREAMING STICK

Apple TV, Chromecast, and the more recent Amazon Fire Stick have made internet-powered TV viewing simple. This year, the longstanding champion of home streaming in a stick, Roku, updated its original Roku Streaming Stick.



## The Wheel that Gives Bikers a Boost

We know that biking is good for us and good for the environment.

But getting around on a bicycle can seem daunting, especially in a large city with a hilly terrain. To lessen that burden, Cambridge, Mass.-based Superpedestrian has developed the Copenhagen Wheel, a standard-size wheel—it can be attached to the back of most bicycles—that boasts a rechargeable, battery-powered motor. Depending on rider preferences, entered through a smartphone app, the motor can kick in power throughout the ride or just on hills. Sensors also track road conditions, air

temperature and potholes, so cyclists can share real-time information about best routes. "Cities are reaching a limit in terms of how many more cars they can accept," says Assaf Biderman, founder and CEO of Superpedestrian; indeed, studies like those from the University of Michigan Transportation Research Institute suggest that the U.S. has reached "peak car." The Copenhagen Wheel, which has raised more than \$6 million (partially through crowdfunding), may help make cycling a more viable alternative.

### OCULUS RIFT

This VR headset garnered such buzz that Facebook acquired its maker, Oculus, for \$2 billion. The Oculus Rift has not gone on sale yet (only developer kits are available) but consumers have gotten the chance to test it out at events such as SXSW and Comic-Con.

