PANTECH'S DISCOVER BREAKS THE BUDGET BARRIER

Can HP's Envy x2 Rise Above the Hybrid Heap?

PLUS: Q&A WITH ADAFRUIT'S LIMOR FRIED

DISTRO

012513 #75

engadget

FROM DA VINCI'S DRAWING BOARD TO SKY-SKIMMING PEDAL POWER

THE HISTORY OF HUMANKIND'S AVIAN ASPIRATIONS

THE WORLD'S
BIGGEST CHALLENGES
DESERVE EVEN
BIGGER SOLUTIONS

{ POWERFUL ANSWERS }

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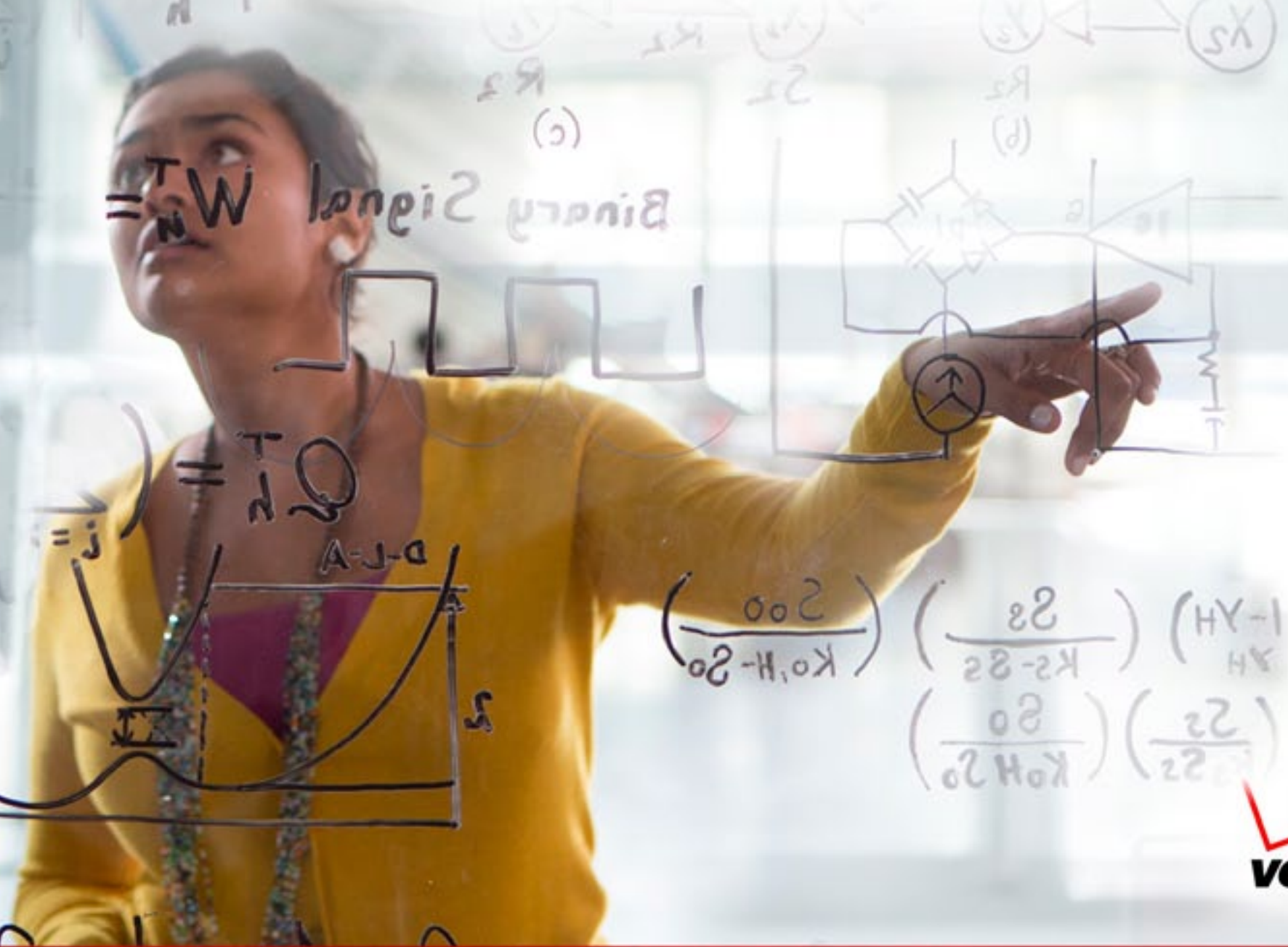

verizon

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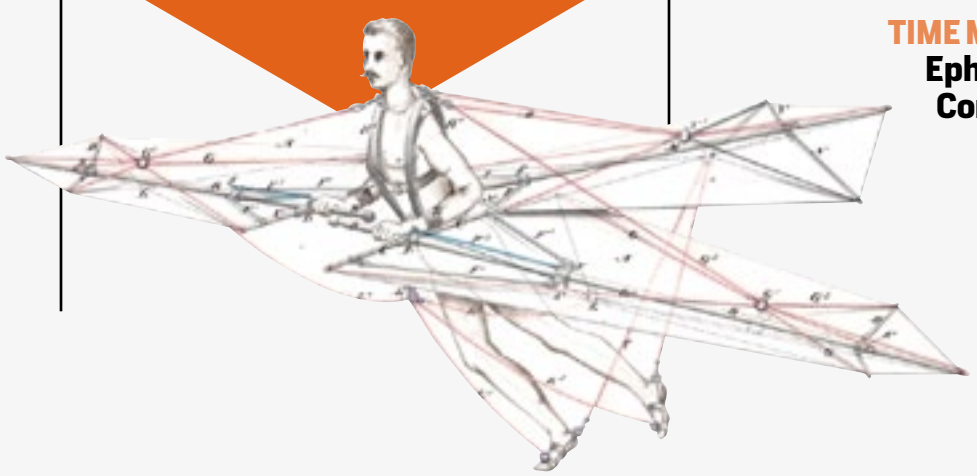

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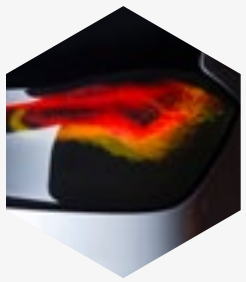

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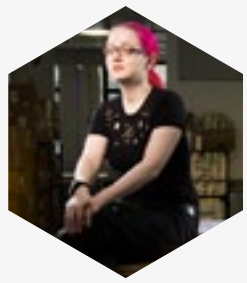

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IRL

IRL
Securifi Almond, Samsung Galaxy Note II, LG Optimus G

REHASHED
Put a Grid on It and Registration 911

TM

TIME MACHINES
Ephemeral Consoles

On the Cover:
Illustration by David Plunkert

WINNERS AND LOSERS

DISTRO
01.25.13

EDITOR'S LETTER

Earnings season comes but four times a year — give or take — and it's upon us again. It's in these mid-season times that we look back on three month's worth of corporate performance and see whose executive strategies are up to snuff and whose, perhaps, need a little retooling.

In the former, happy list we can include Google, whose Q4 2012 earnings added up to $14.42 billion in revenues — excluding Motorola Home, which would have added another $800 million to the tally. Total profit is a healthy $2.89 billion. We can also happily throw Netflix in the winners group, with its Q4 earnings showing 2 million new US subscribers (for a global total of 33 million) and $8 million profit on $945 million in revenue.

On the losing side we have AMD, which is struggling to keep up with the transition to a post-PC era. Revenues were $1.16 billion, down almost a third from the year before, and resulting in a net loss of $473 million. Logitech too gets added to the losing pile, with revenues down 14 percent to $615 million and a $195 million net loss.

And then we have Apple. The company posted record revenues of $54.5 billion, resulting in a record profit of $13.08 billion, mostly thanks to shuffling an amazing 47.8 million iPhones and 22.9 million iPads into the hands of customers. That all sounds incomprehensibly good, but Mac sales were down nearly a quarter, hurt due in large part to the rather late refresh of the iMac. All in all, Apple failed to live up to analyst expectations and its stock price has been taking a beating — but that's liable to change by the time you read this.

But, the biggest loser of all is Atari, which filed for bankruptcy protection this week. The brand itself has been sold and re-sold many times since the '80s so it hardly packs the prestige it once did, but still it's sad to see the name struggling on and having to sell off the rights to games like *Pong* and *Tempest* to survive.

But enough of that financial stuff, let's talk gadgets. Microsoft confirmed sales of the Surface Pro will begin on February 9th, with a starting price of $899. This is the x86 version of the Surface tablet running full Windows 8 and starting with 64GB of storage. But, given how much of that will likely be consumed by the OS itself, you'll probably want to spring for the $999 128GB model.

EDITOR'S LETTER

"It's sad to see the [Atari] name struggling on and having to sell off the rights to games like *Pong* and *Tempest* to survive."

Sony's Xperia Tablet Z got official, a 10.1-inch, 1,920 x 1,200 device powered by a 1.5GHz, quad-core Qualcomm processor paired with 2GB of RAM and 32GB of storage. Despite being only 6.9mm thick, it still offers microSD expansion. It weighs only 495g, making it the thinnest and lightest 10-incher on the market. Or, at least, it will be when it actually hits the market, whenever that is.

Nintendo President Satoru Iwata took to the internets to deliver an encouraging batch of news directly to fans, starting with a promised update to overall system speed, a welcome improvement to all those gamers who are short on patience — which, really, is all of them. The Wii U social network, Miiverse, is also getting a big enhancement, allowing for the creation of more granular groups on there, while also allowing far broader access thanks to a browser interface that will launch this year. Nintendo is also promising that a mobile app will launch sometime this year, which means you can get your fix of obscene stylus drawings wherever you may be.

Finally, we got what may be our first hint at how the next-generation PlayStation home console is coming together, courtesy of a leaked developer document handed to *Kotaku*. The console is reportedly codenamed "Orbis" and will offer an eight-core CPU and R10XX GPU, both from AMD. If these specs pan out, that's an interesting development, as AMD also powers the Wii U and is rumored to be powering the next Xbox as well.

In this week's Distro, we're exploring the history of human-powered flight, from old-timey bits of bamboo and paper optimistically strapped onto the arms of a hopeful/foolish man, to the modern Sikorsky prize. Sarah Silbert reviews HP's Envy x2 convertible while Brad Molen reviews the $50 Pantech Discover smartphone. Joshua Fruhlinger remembers the early days of instant delivery in Modem World, Ross Rubin tells us why Lenovo's IdeaCentre Horizon is what Microsoft's PixelSense (née Surface) should have been and Adafruit's Limor Fried is gracious enough to sit down for Q&A. Now, thank *you* for being gracious enough to sit down and partake in this week's Distro. I hope you enjoy.

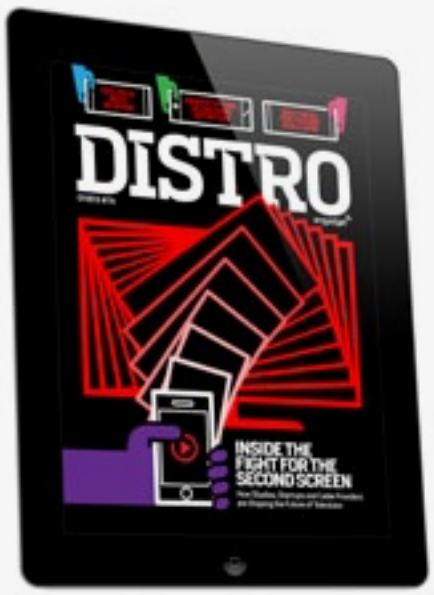
TIM STEVENS
EDITOR-IN-CHIEF,
ENGADGET

SECOND-SCREEN FLUFF, HOLOGRAM UPGRADES AND DISINGENUOUS 'LIKES'

Touch article names to read full threads

DISTRO
01.25.13

INBOX



THE STATE OF THE SECOND SCREEN
ISSUE 74,
JANUARY 18TH, 2012

"Just put the computer components in the damn TVs already."

—TEKMOLOGY

"Not all that useful.

All I do is just use the IMDb app if there is something I want to know about the movie I'm watching.

Other than that, I'm too busy watching the movie/TV show to play with a gadget.

Looking at this, it seems to be useless fluff like seeing who is tweeting about the show or what they are saying on Facebook. Like, why would I need to see that?

The Olympics? Sure. *New Girl*? Nah."

—GETERIX

DEMYSTIFYING ULTRA HIGH-DEFINITION
ISSUE 74,
JANUARY 18TH, 2013

"I just hope that next-gen consoles would be designed with 4K in mind. If the next Xbox and PS4 come out this year or next, they have to have this capability built in. I really don't think Microsoft and Sony (especially Sony since they're very much spewing 4K everywhere) would have consoles that couldn't support that resolution. If the next gen of consoles do in fact support that, I really think it will be a driving force for consumers to get into 4K just that much faster. Not just for games either. I know Microsoft already stated it, and Sony is probably going to try the same, but they really want the next-gen consoles to be the go-to center of your digital entertainment world. We can already see it on current consoles.

"Happy with my 70-inch Sharp. Maybe I'll upgrade to 16K hologram in five years."

—WASH5959

If the next Xbox and PS4 are all like, 'Get your 4K movies, entertainment, video, news, sports and games right here!' I'm sure that will be a huge boost."

— CHRISGAMA

CES 2013: BEST IN SHOW
ISSUE 74,
JANUARY 18TH, 2013

"I'm still curious how long will the Tactus thing endure the constant deflate and inflate cycle, like will it sag say after say 6 months?"

—GENIUS

"Kinda wish they'd included the best 1080p TV of the show as well, since it's unlikely that 99% of us will be buying a 4K set in the next two or three years."

—AIRELEPHANT

THIS IS THE MODEM WORLD: PLEASE DON'T PERSONALIZE ME. I KNOW WHO I AM.
ISSUE 74,
JANUARY 18TH, 2013

"I think you failed to understand what this means totally. This service is so they can make money more efficiently, and keep the services for us free. It's not there to make our lives easier; it's there for advertising companies to advertise better. Also, the pink scenario is probably, on average, a gender item, so I'm pretty sure their maths will include such algorithms. I.e., they aren't going to push tampons to males, no matter how many of your female friends like a particular brand. This whole thing is in essence a good thing, Facebook needs adverts to survive (well, if they want to keep it free), so having a way to generate more money from adverts only means one thing: less adverts on the page."

—ALEXANDERBOOTH

"I agree with the theme here. If I want a recommendation from a friend whose opinion I actually value, I will ask them … directly (via call, text, email, or in person). I don't care what my 'friends' and their 'friends' like, generally speaking, because most of what they 'like' is based on some sort of promotion, contest, or other commercial-incentive to hit the thumbs-up button.

If I am looking for something new, I use Yelp or a good old-fashioned Google Local search."

— MBOYDMCSE

MARTIAN PASSPORT WATCH
ISSUE 74,
JANUARY 18TH, 2013

"All of you who scream about a cellphone that's 'chubby' at 10mm, this is approx. 12.5mm, on a watch?"

—SLICK312

"My cell phone does all these features, and more. You know those future shows where an alert comes thru and the notification is accepted and a video hologram pops up of the caller … then that will be trendy … until then, stop."

—@JECIRE

ENTER

DISTRO
01.25.13

EYES-ON

ORANGE OPC

THE MUSICIAN'S DESKTOP

Musicians have long sought the perfect machine for tracking guitar licks and vocals in the easiest way possible. Orange's OPC not only provides a full recording setup, but it also carries the same handsome stylings as the company's popular guitar rigs.

THE DAMAGE: $1,269

Tap for detail

PRO AUDIO

RECORDING RIG

ORANGE CRUSH

PHOTOGRAPHS BY WILL LIPMAN

PRICE:
¥1,999 ($320)

AVAILABILITY:
NOW AVAILABLE

THE BOTTOMLINE:
RUNBO'S COST-EFFECTIVE, RUGGED HANDSETS RUN ANDROID 4.0 WHILE STANDING UP TO DROPS AND DUNKS.

Click on product names to read full stories

RUNBO X5, X3 AND X1

We've seen a handful of rugged Androids in our time, but none are as affordable and as weird as these. First, the Runbo X1 is an IP67-certified feature phone / walkie-talkie which packs a 2-inch, 176 × 144 display. But the real stars of the show are the two brick-sized vanilla Android 4.0.4 devices. The Runbo X5 features a 1GHz dual-core Cortex-A9 MTK6577 chipset, 1GB RAM, 4GB storage, microSD expansion, a 4.3-inch 800 x 480 IPS display, an 8-megapixel main camera, a 0.3-megapixel front camera, a super loud speaker and a removable 3,800mAh battery. And yes, this also comes with a 400 to 470MHz walkie-talkie radio along with the additional WCDMA radio, two SIM slots, WiFi, Bluetooth 3.0 and GPS. These specs are the same for the Runbo X3, except for the smaller 3.5-inch IPS panel to make space for the QWERTY keyboard.

Admittedly we went a bit crazy with the rugged phones, but that was only after seeing CEO Jemes Yang scare us a few times by randomly dropping his own devices. What confidence! Did the devices live up to their promise of ruggedness? Well, yes and no. While all three devices had pretty decent build quality and took no water damage, we did manage to crack the X5's glass after a few drops onto the concrete. Yang reckons it's because, compared to the similarly shaped X3, the larger screen on the X5 is much closer to the edges — a matter he looks to remedy.

Click on product names to read full stories

AUDOJO iPAD GAMING CASE

While many of us love playing games on the iPad, we often lament the lack of physical controls inherent to the platform. Audojo is hoping to change this with an iPad gaming case that is launching this week on Kickstarter. The accessory works with any iPad 2 or newer, and features a pair of analog joysticks, two shoulder buttons and stereo speakers. Unlike other mobile game controllers like iFrogz's Caliber Advantage or PowerA's Moga / Moga Pro, Audojo skips Bluetooth for a low-latency microphone-based interface.

The case slides open just enough to accommodate an iPad and, once closed, wraps around both ends of the tablet without interfering with any of the cameras, buttons or the 30-pin / Lightning port. Audojo automatically connects to the iPad via the standard 3.5mm audio jack, which is replicated at the bottom of the case next to a power switch, LED and mini-USB connector (for charging). At first sight, Audojo's prototype looks a little clunky since it adds quite a bit of bulk to the iPad's figure. Once you pick it up, however, that's all quickly forgotten — it's light and well-balanced and feels comfortable in hand. If there's any room for improvement, it's with the pods that house the shoulder buttons, electronics and batteries around back. Battery life presently beats the iPad when blasting the built-in speakers, and stretches to several weeks when listening with headphones.

PRICE: $99

AVAILABILITY: JULY 2013

THE BOTTOMLINE: IF YOU'RE USED TO PLAYING CONSOLE GAMES, YOU'LL BE RIGHT AT HOME WITH THIS iPAD ADD-ON.

BLACK POWDER MEDIA IMPULSE CONTROLLER

Black Powder Media showed up at our double-wide CES HQ with a couple Bluetooth Impulse Controllers on hand for us to play with. This tiny Bluetooth 2.1 controller is actually a jack-of-all-trades device as it will control your phone, tablet or PC for gaming, multimedia control, remote camera trigger and even finding your keys — via a free app — if you lose them.

We had a chance to play a bit of *Pac-Man* and *Temple Run* on an iPad and the control was really quite good, though the device's housing isn't complete as you can plainly see in the photos. Tactile response was great with the right rubbery feel to the various buttons on the face and shoulder keys on the rear. The d-pad can be flipped to the opposite side of the controller using the small mode key so that lefties can join in the fun, too. To protect your Impulse Controller while it's tethered to your keychain, it comes wrapped in a very clever plastic housing that doubles as a stand for your phone while playing a game in either portrait or landscape mode. We're definitely looking forward to seeing the final polished product and spending some quality time with the accessory. D

PRICE: TBD

AVAILABILITY: TBD

THE BREAKDOWN:

THE ULTRA-COMPACT CONTROLLER WRANGLES GAMING DUTIES, PLAYLISTS, CAMERA SNAPS AND MORE.

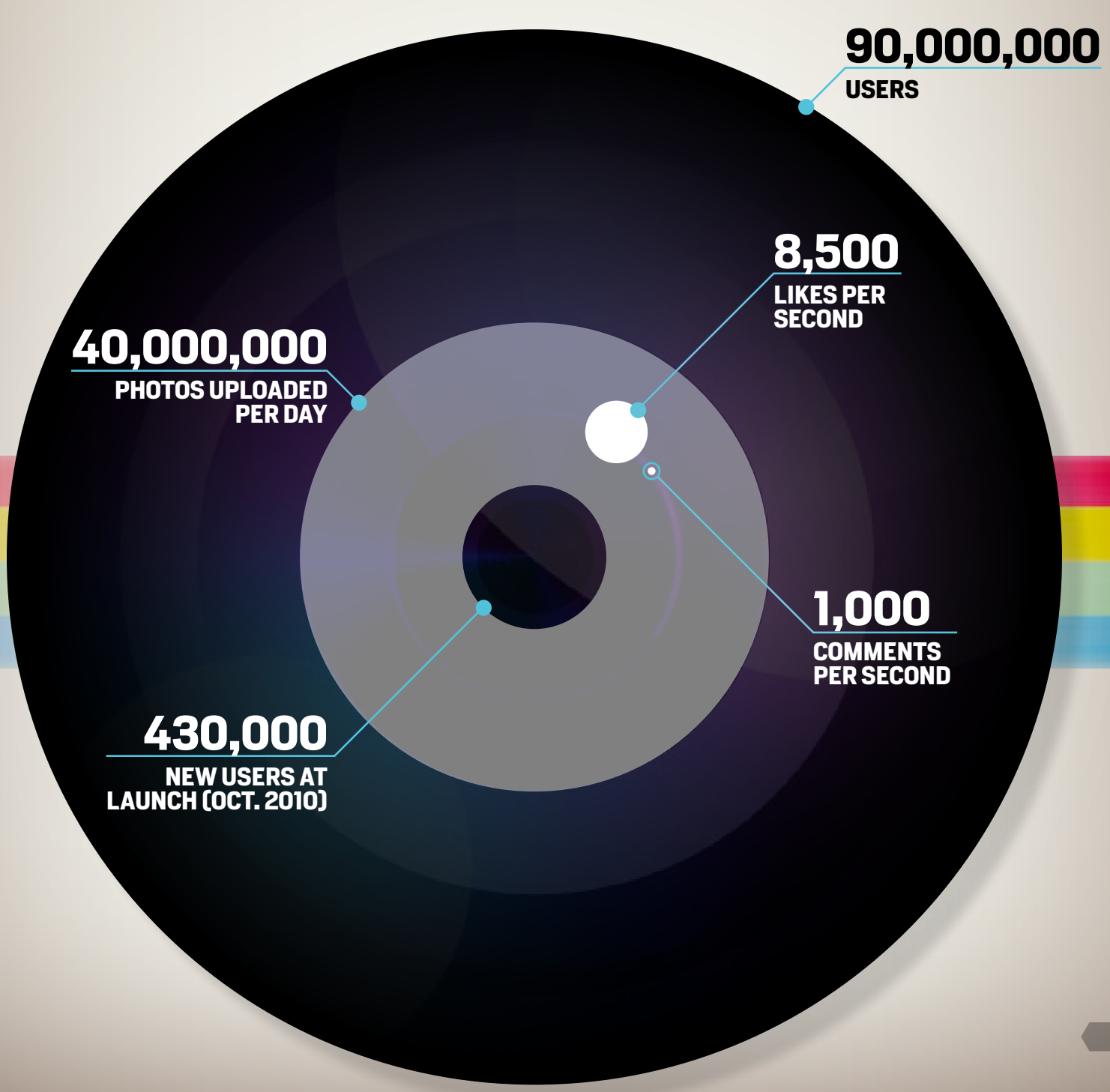
Click on product names to read full stories

Instagram Unshuttered

Instagram stayed mum on its current usage figures after its big Terms of Service brouhaha last month, but it's now finally changed its tune and offered some details on its monthly active users for the first time. According to the company, that figure currently stands at 90 million, a number that *AllThingsD* notes is actually up 10 percent from December to January — Instagram's Kevin Systrom also tells the site that the company "continues to see very strong growth around the world." As for how active those 90 million users are, Instagram says that they're responsible for 40 million photos per day, along with 8,500 likes per second and 1,000 comments per second. There's no word on a breakdown of Android and iOS users, or any further specifics, though.

—Donald Melanson

USER STATISTICS



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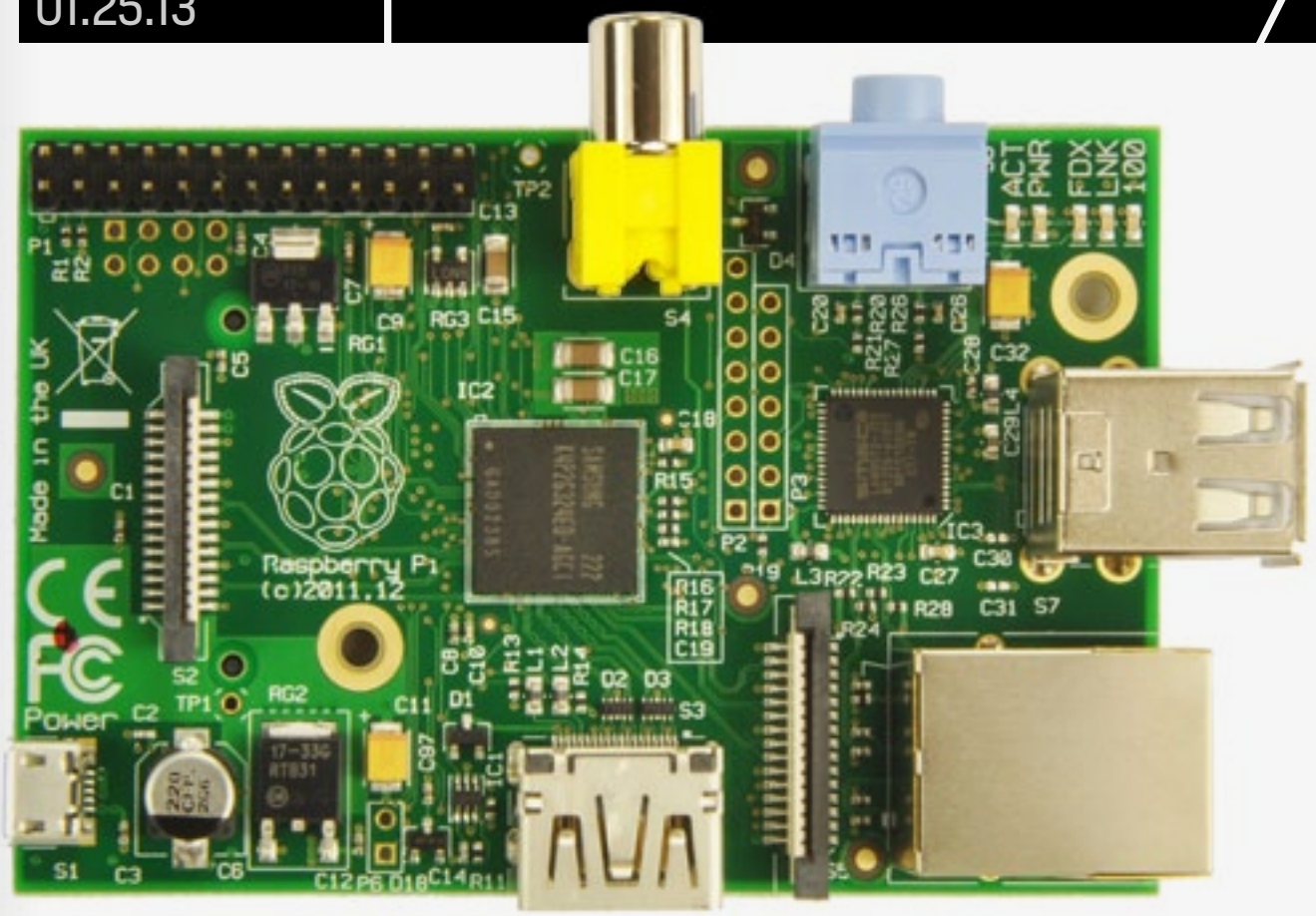


‘We Thought We’d Sell 1,000’: The Inside Story of the Raspberry Pi

By Nick Heath
ZDNet

The Raspberry Pi — a dirt-cheap, easily hackable Linux computer — is certainly one of the more interesting technology stories of the last few years, but there were plenty of skeptics of it from the beginning, including its creators. As detailed in this in-depth look at the device’s short history from ZDNet’s Nick Heath, Raspberry Pi designer Eben Upton initially thought they’d sell only 1,000 units, or “maybe 10,000 in our wildest dreams.” That proved to be just a bit off the mark — they’ve sold more than 700,000 to date and have had trouble keeping up with demand. Upton now expects sales of 100,000 to 200,000 units a month going forward, but he’s apparently in no rush for a follow-up, saying not to expect a new model in 2013.

PHOTOGRAPH COURTESY OF RASPBERRY PI

RECOMMENDED READING

Click on headlines to read full stories

For Amusement Only: The Life and Death of the American Arcade
By Laura June, *The Verge*
Arcades are the stuff of legend for those old enough to have spent a chunk of their youth in one, but unlike old console and computer gamers, it’s an experience that’s gotten harder and harder to relive. In this exhaustive piece for *The Verge*, Laura June charts their rise and fall and the many high and low points in between, including some thoughts from Atari founder Nolan Bushnell.

Google’s Larry Page on Why Moon Shots Matter
By Steven Levy, *Wired*
This interview garnered some headlines for the slight dig Google CEO Larry Page took at Facebook, but it’s well worth reading in its entirety for a relatively rare and wide-ranging conversation with Page since he took over the top job. That includes a strong emphasis on the “moon shots” referenced the title, which are largely embodied in the company’s Google X division.

2013: What *Should* We Be Worried About?
Edge.org
As it does every year, *Edge.org* asks dozens of individuals from a variety of fields to answer one question to kick off the year — generally a broad one that prompts a wide range of responses. This year’s is no exception — asking what we should be worried about — and includes contributions from the likes of Brian Eno, Terry Gilliam, Kevin Kelly, Bruce Sterling and George Dyson.

Swarming a Book Online
By David Streitfeld
The New York Times
E-books aren’t the only technology that has profoundly changed the book industry. As David Streitfeld explains here, online reviews on Amazon and other retailers can often make or break a book, and have sometimes even been “swarmed” in a concerted effort to take one down.

PIXELSENSE WITHOUT THE PREMIUM

DISTRO
01.25.13

FORUM

SWITCHED ON

BY ROSS RUBIN

Amid all the origami variations of the PC at CES this year — things that swiveled, folded, docked and rotated around their hinges — one of the more intriguing form factor variations came not from a twist on the classic clamshell, insurgent slate or a hybrid of the two. Rather, it was a variation of the desktop via the all-in-one, one of the few of that embryonic breed known as table PCs courtesy of the Lenovo IdeaCentre Horizon.

Table PCs entered a broader collective consciousness in 2007 when Microsoft introduced Surface (a name it would later repurpose for its tablet line). A chunky, waist-high device that married a Windows PC with a 30-inch projection display and five embedded cameras, the original Surface offered an integrated multi-touch experience without a touchscreen.

Surface was capable of interaction with other devices that seemed magical, especially without using NFC. Place a marked glass on top of it and it could tell you the ingredients in the cocktail it contained. Place a WiFi-enabled camera on it and the photos would appear to spill out onto the screen, ready to be freely flipped, rotated, stretched and easily converted into emails via a simple postcard creation feature.

Alas, at about $10,000 and with most consumers already having a coffee table, Surface was too pricey for consumers. Mocked as a “big-ass table” in a parody video, it was relegated to a few

> "Alas, at about $10,000 ... Surface was too pricey for consumers."

hotels, casinos, AT&T stores and other public places. Prior to the release of the Surface tablet, Microsoft recreated the table-based incarnation using flat-panel technology. Samsung offers that product as the 40-inch SUR40 with Microsoft PixelSense. With a street price of about $8,000, it retains the ability to handle more than 50 touch points and interact with real-world objects.

Starting at around $1,699, though, the Lenovo IdeaCentre Horizon promises to deliver much of the Surface experience at a consumer price. Unlike the original Surface, it is practical to use as a regular Windows 8 all-in-one desktop. Snap in the stand and lay it flat, though, and you can take advantage of a Lenovo app store that includes optimized games and other media-centric apps for the device. They are very much in the spirit of those early Surface apps.

A good example of how this works is with the classic board game *Monopoly*, an engaging version of which has been created for the iPad. But putting that same experience on the Horizon really opens it up to multiplayer interaction in a way that the tablet-driven experience cannot. You can see the whole board during everyone's turns. Air hockey comes closer to approximating the actual experience (although there was some controller lag in the version shown at CES).

Just as the iPad's larger palette enabled experiences that were either inferior or impossible on the iPhone, the same can be said for Horizon versus the iPad. This is especially true for multiuser experiences, a novelty in the realm of personal touch devices. That said, moving to a device the size of the Horizon forces one to give up the kind of orientation features one takes for granted in today's smartphones and tablets. With Horizon you don't rotate the tablet; you rotate around it.

Horizon is not the first time Lenovo has been led down the sometimes challenging path of creating its own app store; it rolled its own for TV apps when it introduced its Android-based smart TV (not available in the US) at last year's CES. Indeed, yet another challenge that 2007's Surface faced was competing for developer mindshare with Apple's iPhone. But just as modern Windows 8 dockable tablets or convertibles reduce risk for the PC manufacturer by serving as a PC as well as a tablet, Lenovo can fall back on the Horizon's use as a large all-in-one with normal viewing angles and keyboard input if optimized apps don't take off. It's low table stakes for a table PC. D

THE INTERNET USED TO BE BETTER

DISTRO
01.25.13

FORUM

THIS IS THE MODEM WORLD

BY JOSHUA FRUHLINGER

Back in the ‘90s — before many of you were born — the internet was much better than it is today. I’m only halfway kidding, too. Let me explain. ❡ At the time, we were sure anything was possible. We were also pretty stupid. We launched sites that just sold socks. Others sold balls. Social networking was just something we did — we didn’t need a site or a name for it. We were happy to go out at night and create real-life memes over drinks regarding the 2-minute video that took all afternoon to download.

Every site was new and fresh and daring. Two of the most shameless sites of the time introduced something that I am afraid we will never get back. Those sites were Kozmo.com and Urbanfetch.com. Some of you will remember them fondly. Others might recognize the names. Others, well, sit down and listen to a story of yesteryear when unicorns roamed the earth and virtually anything was available to your door within an hour at any hour.

Both Kozmo and Urbanfetch — we’re still not really sure which one came first — would deliver items to your place within an hour. If they didn’t get it to you within an hour, you got a discount or a gift certificate code. You could rent a DVD that was returnable to any mailbox-like receptacle on street corners. You could order a pint of ice cream that

came sealed in its own freezer bag. You could order a stereo and make some poor soul carry it up five flights to your walk-up apartment on the Lower East Side. You could order a case of beer.

And we did.

Oh, how we did.

We ordered frozen pizzas in the afternoon, shampoo at midnight and boxes of fresh coffee in the morning. We were crazy addicts, sucking at the teat of ridiculous convenience. We were sure this was the future. We didn't step inside real stores. Who needed real stores when it all came to you?

And then it all ended. Someone realized that selling stuff at a discount, warehousing it, paying couriers to carry it around major cities and doing it at little to no cost to the consumer wasn't a very sustainable business plan.

The first few months without our citywide concierge services were rough. We were incredibly spoiled by the whole thing, and walking into regular drug stores to buy cold medicine felt foreign, ancient and wrong.

We didn't know it then, but we had emerged from the magical era of the internet and into the rational, present one filled with marketers, social networking experts, advertising schemas that made money and business plans that placed a premium on profitability rather than straight-up awesome. The sorcerers were gone, replaced by search engines and cookies.

Some other reasons the internet was better:

1) Not everyone was on it. While there were plenty of trolls and not-so-smart people already, there was a certain headiness to it all. Maybe it was pretentious — who knows — but there was a lot more interesting experimentation going on. Sites like *Word.com*, *Charged.com*, *Suck.com* and *Slate.com* were changing the way we were entertained.

2) There was no social networking. Your high school friends weren't online, weren't posting pictures of their children and weren't announcing their relationship status.

3) It was slow. As much as we love instant streaming video, the slowness of the internet forced people to return to the real world and find other forms of interaction.

4) Cool Site of the Day. The internet was so small that we looked to this one DJ-like site to tell us what was new and noteworthy. It was exciting, surprising and sometimes amazing.

5) It was innocent. The world was still super optimistic, the economy was irrationally on fire and criminals hadn't yet realized that the internet was a great place to do all sorts of nasty things.

Yes, it was a silly era, and yes, it had to end. But we enjoyed it while we could, and someone out there like me still keeps a Kozmo bag in the back of a closet just for memories. And because it's great for picnics. D

REVIEW

CONTENTS

DISTRO
01.25.13

HP
Envy x2

Pantech
Discover

REVIEW

HP ENVY X2

The dynamic new Envy x2 hybrid has a solid design and some rich features, but will it hold its own against fierce competition?

By Sarah Silbert

Like every self-respecting company releasing new Windows 8 devices, HP has refreshed its existing laptops with touch-optimized features ready to handle the new OS' gestures. But *also* like any self-respecting PC maker, HP is outing a device with a more adventurous form factor. The Envy x2 stands out among other hybrids running the same 1.8GHz Atom processor for its more attractive design, IPS display and nice-to-have features like NFC and pen input. At $850 with the included keyboard dock, though, it's a hair more expensive than comparable prod-

ucts such as the Acer Iconia W510. So is the x2 a solid machine — both as a laptop and as a standalone tablet?

LOOK AND FEEL

The x2 looks like a clamshell netbook — and an attractive one, at that. The silver, brushed-aluminum chassis is sleek but not slippery to the touch, and the reflective HP logo on the back doesn't strike us as too obtrusive (you won't see it most of the time, anyway). Compared to other laptop / tablet hybrids like the plastic-clad Acer Iconia W510, this system feels elegant and well made. The x2's aluminum build is sturdy, but if you hold the device by the keyboard base, the screen wobbles a bit in its hinge. We don't think you'll be holding the device this way too often, though, so it shouldn't be a dealbreaker.

At 1.5 pounds and 0.3 inch thick as a standalone tablet, the Envy x2 feels very light; the LTE version of the Samsung ATIV Smart PC is a slightly bulkier 1.65 pounds and 0.39 inch thick in slate form, though the 10.1-inch Acer Iconia W510 is a bit more featherweight at 1.27 pounds. The x2's rounded edges and lightly textured backing make for a comfortable grip. With the keyboard dock attached, the machine weighs 3.1 pounds, and it's quite manageable, even for carrying one-handed.

We questioned our sanity for a moment when feeling around for this hybrid's power button. It's located on the back of the tablet — along with the volume rocker — which just doesn't feel intuitive. Most slates have these buttons on the sides, and we definitely prefer that setup. Once you get over the initial confusion, you'll still have to feel around a bit if you're viewing the screen from the front. Other ports are more conventionally located: along the left edge of the dock are HDMI and USB 2.0, while the right hosts the power connector, another USB 2.0 connection and an SD card slot. Detach the tablet from the dock, and you'll find the slate includes a

The Envy x2's design is similar to that of a netbook.

microSD card slot, a 3.5mm headphone jack and a docking port that connects to the keyboard or the charging cable.

Connecting the tablet to the keyboard dock feels satisfying, but it can take a few moments to line up the connectors correctly. Once you've managed that, slide the release latch and the device snaps into place. When it's locked into laptop mode, the device feels very secure. It won't fall out of place until you pull the latch in the opposite direction to release the slate.

KEYBOARD AND TOUCHPAD

At first glance, the Envy x2's keyboard looks pretty nice. The black, island-style chiclets are well-spaced, and the layout doesn't feel cramped. (This is one advantage that laptop / tablet hybrids have over sliders; the slate doesn't infringe upon the keyboard deck.) There's ample space for your wrists, too. Get ready for the "but": the keys themselves feel mushy; they don't offer the springy, satisfying feedback we crave. On a typing test we notched a lower wpm score — and a higher error rate — than we typically muster. We wouldn't classify this keyboard as horrible, but it's less comfortable than its looks would suggest.

We *would* use stronger language to describe the Synaptics touchpad. On the plus side, it's very responsive; we had no issue executing Windows 8 gestures like swiping in from the right to reveal the Charms bar, for example.

The keyboard layout is ample, but suffers from mushy keys.

But the fact is this clicker is too sensitive. Almost every time we accidentally grazed the touchpad with our finger, it was interpreted as a click or swipe. You'll find this issue especially irksome when you're writing emails or working in a document, as the cursor often moves to an earlier point in the text.

DISPLAY AND AUDIO

Though the Envy x2's 11.6-inch display has a standard 1,366 x 768 resolution — this pixel count is especially prevalent among hybrids running Atom processors — IPS technology makes for better-than-average viewing angles. We were able

The tablet easily locks into place and takes a click to eject.

to view content on-screen when we moved to the far right and left, but tipping the panel forward more than a bit causes images to wash out. This issue aside, though, colors look accurate, and text is crisp.

Evaluating the touch display as an input method, we don't have any complaints. Executing Win 8-specific gestures is seamless and easy. At the same time, the screen offers enough traction that you won't accidentally be clicking on items constantly. Incidentally, the Envy x2 also supports pen input, though we weren't able to test this functionality with our review unit.

HP includes Beats Audio on the x2, but it doesn't pack as much of a punch here as it does on full-fledged laptops. Sound is very muffled and tinny — both for music and dialogue — and even at max volume audio isn't very loud.

CAMERA

The x2's 8-megapixel rear-facing camera snaps decent shots with accurate colors. When we took it for a spin outside the Las Vegas Convention Center, images were bright and the shooter did an okay — though not great — job at focusing. Shooting indoors yields more blurry, out-of-focus images, especially if the atmosphere isn't well-lit. The rear camera can also capture 1080p video. Our test footage didn't exhibit any jerkiness, but colors were quite muted. The x2's front-facing cam delivered very dark and pixelated self portraits; we'd recommend finding a brightly lit spot before you start video chatting.

PERFORMANCE AND BATTERY LIFE

The Envy x2 runs a 1.8GHz Intel Atom Z2760 processor, and that should be enough to tell you that Ultrabook-level performance is out of the question. On PCMark07, which measures overall performance, the x2 scored miles behind Ivy Bridge systems (read: 1,425 compared to ultraportable scores in the 3,000 to 5,000 range). Its I/O performance is similarly lackluster, with write speeds maxing out at 34 MB/s and reads hitting just 83 MB/s

Cold-booting into the Windows 8 Start screen takes about 15 seconds, which doesn't feel particularly slow but definitely tails the 10-second boot time for most Win 8 Ultrabooks. As the x2's benchmark scores suggest, everyday performance is also less snappy. There's a slight lag when loading apps or launching several tabs in a browser. It's not more than three to five seconds, but you'll definitely notice the difference if your previous system ran a non-ULV chip.

Because the Envy x2 doesn't support DirectX 11, we weren't able to run our standard benchmarks, and we weren't able to load Steam games like *Batman: Arkham City*. We were able to play some casual online games (we're talking *Tetris* and the like) without issue.

The Envy x2 includes a battery in the keyboard dock in addition to one in the tablet, so we ran our battery test once with the keyboard attached and once without. (As you may know, this test entails playing a video on loop with WiFi on and brightness set to 65 percent.) In laptop mode, the machine lasted a very strong 12 hours and 30 minutes. When we ran the test on the tablet, it notched seven hours and 53 minutes.

BATTERY LIFE	
HP ENVY X2	7:53 (TABLET ONLY) / 12:30 (WITH DOCK)
ACER ICONIA W700	7:13
LENOVO IDEAPAD YOGA 13	5:32
DELL XPS 12	5:30
TOSHIBA SATELLITE U925T	5:10
SONY VAIO DUO 11	4:47
ACER ASPIRE S7	4:18
LENOVO THINKPAD TWIST	4:09

SOFTWARE AND WARRANTY

HP pre-loads the Envy x2 with the standard set of Windows 8 apps, including Bing, Finance, SkyDrive, along with shortcuts to eBay, the Kindle store and Netflix. There's also the Fresh Paint drawing app and iHeartRadio. Proprietary programs include the Snapfish photo service, HP Page Lift, HP Printer Control and the HP+ hub. Finally, there's a Getting Started with Windows 8 utility, which could be helpful for those still learning the OS' many gestures. We'll also mention here that the machine includes NFC support for sharing by tapping two devices together.

The x2 comes standard with a two-year limited parts-and-labor warranty.

CONFIGURATION OPTIONS AND THE COMPETITION

The x2 we reviewed happens to be the only configuration available. For $850, you get an Intel Atom Z2760 processor with 2GB of RAM and a 64GB SSD. The only real customiza-

The keyboard dock has a battery to bolster the tablet's juice.

tion option is your choice of warranty; you can supplement the included support with up to three years of accidental damage and theft protection for $230.

There are several other laptop / tablet hybrids on the playing field, so we'll compare apples to apples as much as we can here. There's the Acer Iconia W510, a 10.1-inch system that packs a 1,366 x 768 Gorilla Glass display with a 1.8GHz Intel Atom Z2760 processor and offers a 32GB SSD. We weren't completely satisfied with the W510's build quality when we gave it a go late last year, but we like how light it feels (it's just 2.63 pounds with the keyboard dock). The device starts at a lower $500, but that doesn't include the dock — for that, you'll have to spring for the $750 model, which steps up to a 64GB SSD.

You could also check out the 11.6-inch Samsung ATIV Smart PC, which runs the same Atom chip as the x2 and W510 and is available with or without AT&T LTE. It'll cost you $700 on contract without the dock, and the WiFi-only version goes for $500 without the keyboard. The WiFi version does, however, include an S Pen, a feature that may entice stylus-wielding types.

Finally, there's the Lenovo IdeaTab Lynx, which includes many of the same specs you've seen in the aforementioned products (read: 1.8GHz Atom processor, an 11.6-inch IPS display with a 1,366 x 768 resolution, up to a 64GB SSD) in a similarly lightweight package (three pounds with the keyboard). The Lynx isn't shipping yet, but Lenovo has priced it at $600 for the tablet and $750 for the slate and dock.

WRAP-UP

Laptop / tablet hybrids have their work cut out for them: providing a fluid experience as both a portable slate and a productivity-minded laptop — let alone with an Atom processor doing the grunt work — is a tall order. Making the design comfortable and easily convertible isn't exactly a simple task for PC makers, either.

Overall, this combo has a solid and sturdy build quality.

HP did hit some high notes with the Envy x2, especially with the attractive and lightweight design. Battery life in laptop mode is also nothing to sniff at, but there are several things that hold the x2 back from being a truly comfortable device. The mushy keyboard is a huge downside, and the Atom chip's meager performance isn't encouraging for shoppers who want this to be their one and only computing device. We'd say your $850 is better spent elsewhere, but if you're dead-set on a device in this category, you could do a lot worse than HP's option. D

Sarah is Reviews Editor, a wannabe tap dancer and a closet film critic.

BOTTOMLINE

HP ENVY X2

$850

PROS

- Slick, lightweight design
- Good battery life (in laptop mode)
- Decent IPS display

CONS

- Uncomfortable keyboard
- Netbook-grade performance

BOTTOMLINE

The HP Envy x2 is an attractive laptop / tablet hybrid, but its Atom processor doesn't offer great performance, and its keyboard disappoints.

REVIEW

PANTECH DISCOVER

Does Pantech's $50 handset offer enough to garner serious consideration in AT&T's budget-minded range?
By Brad Molen

Watch out, folks: Pantech is moving up the AT&T food chain. Once known in the US as little more than a budget brand, the Korean company is learning that it's possible to push out a device with premium components without increasing the going price (while choosing an outside-the-box design at the same time). The latest piece of evidence supporting this is the Discover, a $50 smartphone with enough trimmings to turn some heads. But will the phone set a new precedent for its pricing tier, or is it just blindly checking off items on a spec sheet to-do list? Follow ahead and find out.

HARDWARE

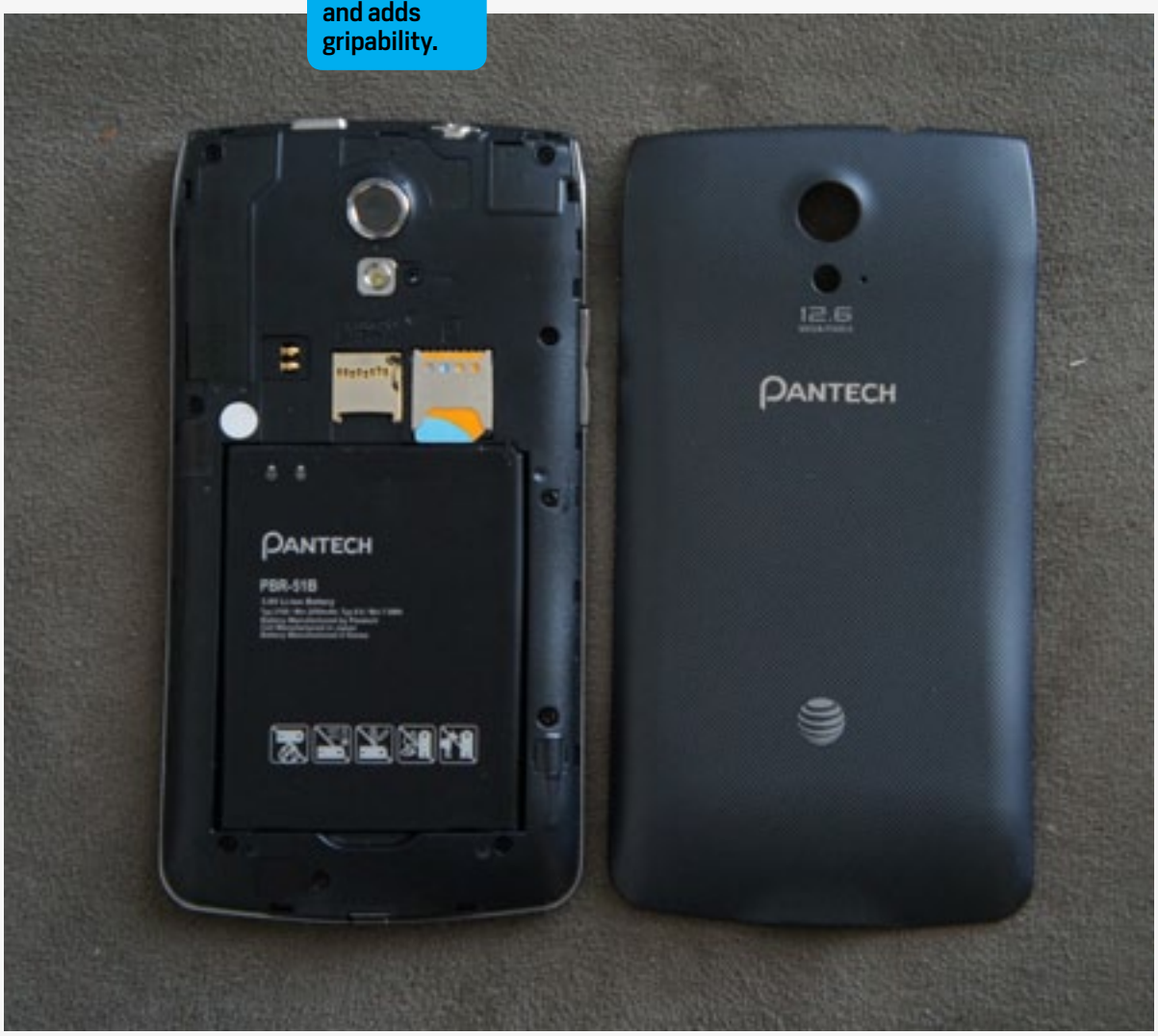
On our stage at CES, Pantech's Manager of US Marketing, Chandra Thompson, told us that nearly 60 percent of the company's employees are dedicated to R&D, a claim that certainly can't be made by very many companies. We were quite surprised to hear that from a company like Pantech — it caters almost exclusively to the penny-pinching demographic in the US, so it's easy to dismiss its hardware as cheap and unexciting.

Au contraire, naysayers: the Discover, Pantech's latest budget-friendly offering on AT&T, actually bucks the trend of the stereotypical slab, making it a visually arresting device to behold. The curvaceous back is chock-full of contours, but each one is done up in a way that enhances how the phone feels when you hold it in your hands. (We can't help but be reminded of the Sony Xperia arc when looking at it.) In fact, we'll go ahead and say that the Discover is one of the most comfortable phones we've used in recent history; its chassis hits the ruler at 134.2 x 68.6 x 9.1mm (5.3 x 2.7 x 0.36 inch) and gives us a solid grip that made us confident it wouldn't slip out of our grasp. It's also relatively light, weighing in at 4.76 ounces (135g).

Much of that has to do with the textured plastic material on the removable back panel, which adds just the right amount of traction without drawing too much attention to itself. The Discover is not only attractive; it also exudes durability. If you've only handled it for a few minutes it might be hard to tell that the device is as inexpensive as it is. We were happy to discover (pun not intended) that the back doesn't flex or creak when you add pressure, lending even more credibility to the phone relative to its pricing tier.

The front of the device shows off the 4.8-inch 720p

The textured plastic back is lightweight and adds gripability.



TFT screen, with a 2-megapixel front-facing camera and the typical array of sensors above. You won't find any capacitive nav buttons on the bottom, as the Discover uses virtual keys instead. To take the place of the missing keys, you'll expectedly find a Pantech logo.

The sides are where the Discover starts to get really interesting. The phone bulges near the top to make room for a pair of 3D surround sound speakers, and the back cover tapers inward to meet up with the chrome edge. The speaker grilles are dotted with a snowflake-like pattern — the only hole in this analogy is that they're all exactly alike. On the left side, adjacent to the grille, you'll find a volume rocker that blends in perfectly with the rest of the chrome trim; the top end houses the power button and 3.5mm headphone jack, while the bottom end is where you plug in your micro-USB charger.

The slight bulge at the top houses 3D surround speakers.

Completing our tour, we take you to the back of the Discover, which is where the 12.6-megapixel rear-end camera module is located, with the LED flash directly beneath. You'll also see a pair of logos for AT&T and Pantech, but neither is so ridiculously large so as to distract from the overall elegance of the device. Rip open that removable cover and you'll find slots for the micro-SIM and microSD cards, as well as the replaceable 2,100mAh battery and NFC contacts.

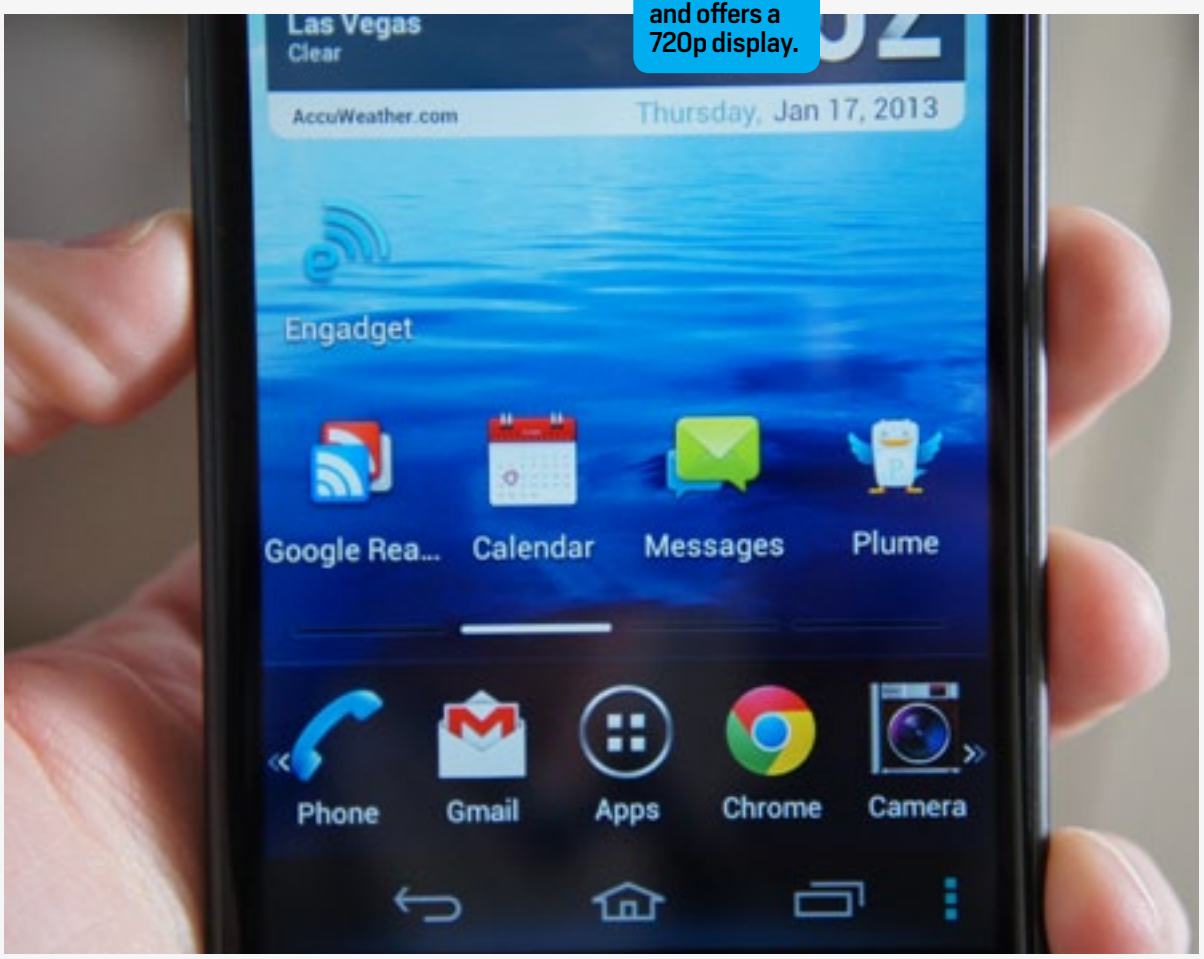
Antenna-wise, the Discover is packed with plenty of radios: GSM / EDGE: 850/900/1800/1900; HSPA+ / UMTS 850/1900/2100; and LTE 700/850/1900/AWS. While most observers may be puzzled by the inclusion of four LTE bands when AT&T's network is only currently utilizing two (700/AWS), it actually means that your device will continue working properly if the operator decides to begin refarming 850/1900 HSPA+ spectrum for the use of LTE. Many of AT&T's latest phones offer the same new LTE setup, but it's

typically not advertised — in the past we've had to dig into each handset's FCC filings to figure it out.

Rounding out the specs, the Discover also offers a GPS, Bluetooth 4.0, 802.11a/b/g/n, 16GB of internal storage and supports DLNA. That microSD slot is capable of holding cards up to 32GB in size. There is, however, one glaring omission: there's no LED notification light.

DISPLAY

Now, let's dive deeper into the display itself. Typically, the only time we see a $50 phone sporting a panel with a 720p (1,280 x 720) resolution is either when it's on sale or is near the end of its retail shelf life (such is the case with the HTC One X). Thus, the fact that Pantech is pushing out a device with a higher-end screen at such a low price point should be enough to get any budget-conscious consumer excited. But how is it in real life? How does the display hold up against similar offerings?



The Discover breaks the budget mold and offers a 720p display.

While the HTC One X still holds the crown for best 720p display, the Discover doesn't disappoint. It's not quite as bright as the One X, but it certainly bests the Galaxy S III in this area. We also like the decent viewing angles and natural-looking colors — it's definitely less saturated than the GS III, but then again, most phones are. It doesn't use a PenTile matrix, so the fonts were crisp and easy to read without any jagged edges getting in our way.

SOFTWARE

Pantech is just as creative in its firmware design as it is in hardware. The Discover runs Android 4.0.4 (Ice Cream Sandwich), though company reps have told us that Jelly Bean is in the works — unfortunately, they wouldn't tell us which version, but this is at least a step in the right direction. Despite the fact it's running now-antiquated firmware, it at least throws in quite a few differentiators that make its custom skin one of the most unique we've

Discover's custom UI skin offers a set of unique features.

encountered on this side of the Pacific.

For starters, the app dock on the front screen allows 14 total icons, instead of the standard four. How so? If you look carefully, you'll see arrows on either side of the dock indicating that you can swipe left or right for more shortcuts, folders or apps. We imagine this will only come in handy if you prefer using most of your front screen space for widgets, but it's a nice touch regardless.

Additionally, while the virtual nav buttons at the bottom of the display feature the usual suite of back, home and recent apps, Pantech throws in a tiny menu button on the right-hand side that's visible only on the front screen. (It doesn't replace or duplicate the settings buttons you'll find in most apps.) Pressing it brings up a menu that overlays the app dock and offers widgets, wallpaper, themes, settings and tips. Sounds great in theory, but it's absolutely pointless since long-pressing the home screen achieves exactly the same result.

Moving on to the app menu, you'll first notice that widgets are nowhere to be found — you'll need to access them using the settings bar. Pantech has chosen to use the tab space on top to enhance the group-viewing experience. Essentially, you can choose to put any of your apps into customizable groups — just as if they're a separate folder — and each group you create gets its own tab up on top. You can also assign each tab its own specific color and change the name to whatever you want; even better, you can also long-press the tab to install the entire group as a folder on your home screen, making it less work for you to set up groups in multiple places.

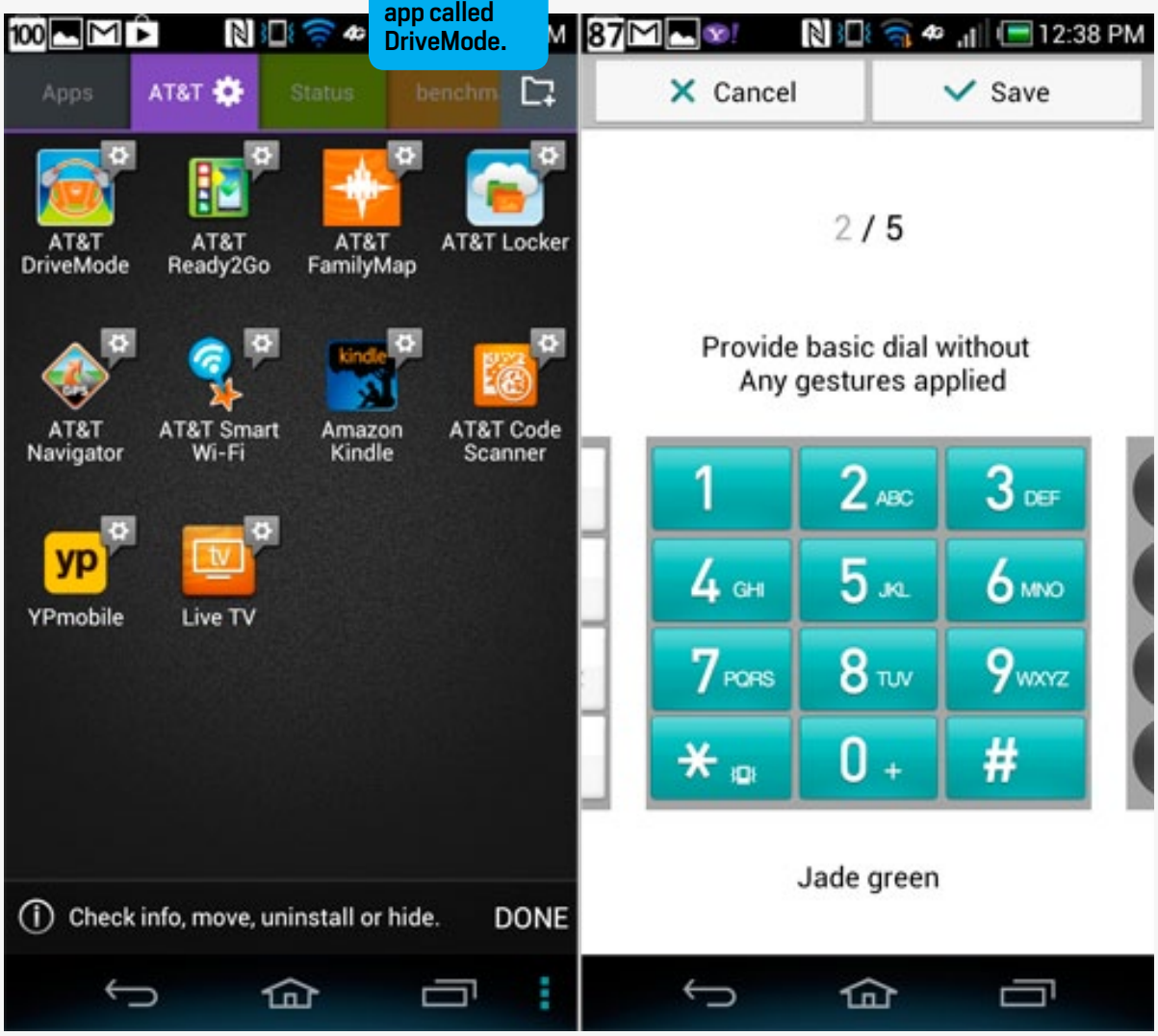
The navigation menu also has a few tweaks of its own: the top of the menu features a quick settings bar (nothing

new there) and a second bar for settings shortcuts. This bar, which can be collapsed if you deem it unnecessary, includes icons for sound, WiFi, display, Bluetooth and more — the idea is to get you one step closer to these individual settings, thus reducing the amount of time you spend trying to reach them. We don't foresee this saving more than a fraction of a second, but it's there for you as an option if you want.

Pantech is also taking a page out of Samsung's book by introducing its own set of motion / gesture controls. The concept is roughly the same: by waving your hand left and right over the front-facing camera, you can answer calls and navigate through pics and music without touching the screen. It worked much better than we expected; the camera recognized our hands from as far away as two feet.

Speaking of looking to Samsung for inspiration, the Discover also features a pop-up video option. When you begin watching a video, tap the proper button near the top of the screen and it hovers above whatever app you want to use simultaneously. You can also do something similar in the music app: the press of a button will float a "now playing" widget (which can be switched to playlist view as well) above your other programs.

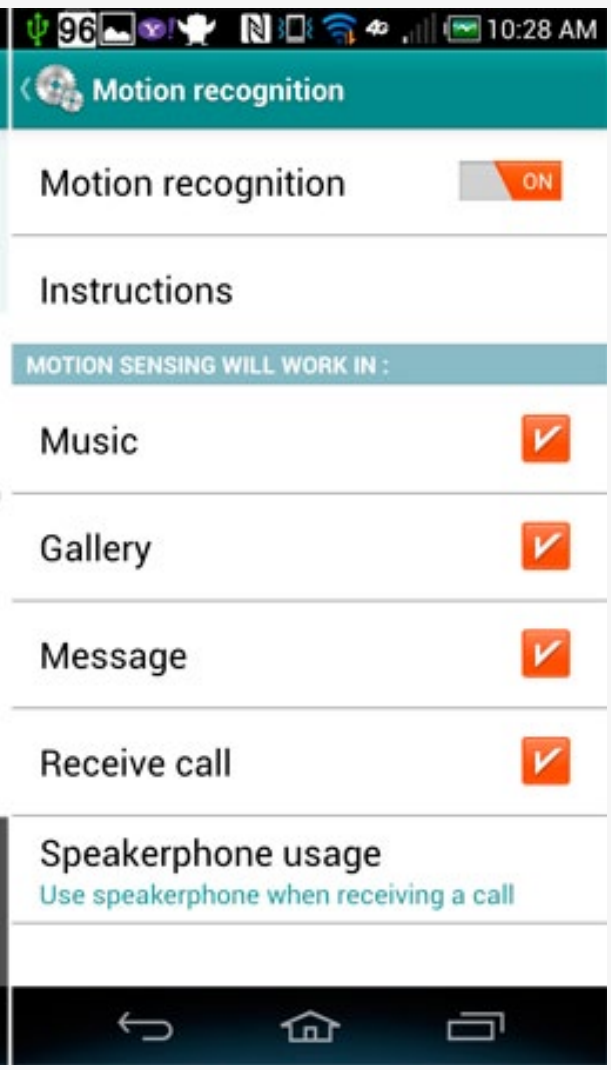
Easy Experience Mode is offered with the Pantech Discover. We went into more detail on this particular feature in our review of the Flex, but in a nutshell: Easy Experience is essentially a special introductory launcher that helps first-time smartphone users settle into the whirlwind world of Android without experiencing as drastic a learning curve. There's less stuff to customize, the font and icons are a little larger and the app menu is much more streamlined. Not much is different on the Discover, with the exception of a new toggle switch on the main UI, which makes it pretty easy to go back and forth between



the two modes.

As you might expect, you'll still have the normal onslaught of preloaded apps (though fortunately Pantech lets you hide unwanted apps or tuck them away in groups), but AT&T is pushing one new program in particular: DriveMode. The app is intended to prevent drivers from reading texts or taking calls when on the road. When your driving speed is above 25MPH, the service (which can be disabled if you prefer) sends an automatic SMS response to anyone who calls you or sends a text, letting them know you'll get in touch with them as soon as you've finished your journey. It definitely does the job as intended — when we first began this review, our unit had the service enabled by default, and it showed up as soon as we hit the right speed. (Disclaimer: the reviewer was in the passenger seat when making this discovery.)

Lastly, the Discover uses the same stock Skyfire browser as the HTC One VX and LG Optimus G (among others). This means it comes with the love-or-hate browser bar at the bottom of the screen that offers several shortcuts and other settings. It appears that this particular browser is here to stay, and we shouldn't be surprised to see it continue to surface on future AT&T models.



A breakout feature offered here is motion recognition.

One major quirk with the UI is that Pantech doesn't really take full advantage of the vertical space afforded to it. In addition to the virtual keys taking up room at the bottom of the screen, most of the phone's UI elements are much larger than your typical device. The app dock on the front screen, the extra settings in the navigation menu and even the tabs on top of the app menu are easy to press, but you only get this benefit by sacrificing precious screen real estate.

CAMERA

The weakest link in every Pantech phone

we've ever reviewed is the camera. The 8-megapixel sensor used in the Flex was certainly an improvement over the 5-megapixel models used previously, but it still couldn't hold a candle to Samsung's and HTC's 8-megapixel units. So what did we get out of the Discover's 12.6-megapixel rear-facing cam? Pixel count isn't everything, after all.

First, let's go over the user interface on the camera. The shutter button sidebar consists of a few toggle switches: front / rear, camcorder and HDR. The other sidebar is where you'll find your various settings, as well as shortcuts that can be customized to specific things you tweak the most (this bar is free of shortcuts by default — you have to add them in at your leisure). Among the listed settings are exposure, flash, resolution, white balance, color effects and focus mode (in which you can choose between touch focus and tracking focus). Long-pressing the viewfinder in touch mode will lock your focus, and then you can touch the screen another time to lock exposure.

Speaking of which, the Discover is missing the ability to lock focus on objects in low-light or near-dark conditions; the phone doesn't give us

The camera lacks many features and output is middling.

the option to use LED flash as a focus mechanism prior to taking the shot, so you may need to take several images in low light before it truly comes out the way it should. The LED flash itself is sufficiently bright, so that particular part of the camera isn't an issue.

In fact, low-light images in general didn't turn out very well. Perhaps a big part of the problem is the fact that Pantech didn't throw in any special modes like the ones you'll find on the One X, Galaxy S III and other flagships. No low-light, night or candlelight modes are offered; the phone doesn't even have macro mode. Unfortunately, it's just not as decked out as we'd like it to be. Frankly, this is to be expected on a phone that is geared toward the budget user, but we have a hard time understanding exactly why Pantech would go through the effort of boosting the megapixel count without enhancing the actual image-taking experience.

While we have a difficult time recommending the Discover's camera over the proven modules found on the HTC One X and Samsung Galaxy S III, the images on the Discover were still at least on par with what we originally expected (which unfortunately isn't saying much). We had quite a few issues with washed-out colors, middling dynamic range and soft focus. The upside is that white balance seemed to be pretty good. Regardless, it's not the point-and-shoot replacement you'd like it to be.

We actually didn't have so much to complain about with the video capture performance (MPEG-4, 18 Mbps bit rate, 30 fps frame rate). It was very smooth when catching motion or panning, and the mics picked up our voice loud and clear. Its only drawback was that it couldn't properly handle sunlight without ultimately washing out the colors in the process.

PERFORMANCE AND BATTERY LIFE

On the performance side, the Discover doesn't bring anything new to the table. It sports the same 1.5GHz dual-core Snapdragon S4 Plus processor that we enjoyed on the Burst and Flex, along with 1GB RAM and an Adreno 225 GPU. Thus, it shouldn't come as any surprise that its actual output is nearly the same. Responsiveness is great and lag is near non-existent when performing most processor-heavy tasks. All told, we didn't feel like we were using a subpar handset. Gaming was also as smooth as we've come to expect on an S4 Plus device.

In terms of battery life, our standard endurance test — looping a video with a series of notifications rolling in the background — went on for six hours and 45 minutes. That's hardly spectacular, but it's still better than what we saw on the HTC One VX. What this means is that moderate users can make it through an entire day before having to charge up the phone, but anyone who uses the device extensively will get a solid nine or 10 hours out of it. However, unless you're barely using it, you

BENCHMARK	PANTECH DISCOVER	HTC ONE VX	LG ESCAPE
QUADRANT V2	**5,782**	5,242	5,026
VELLAMO 2.0	**1,928**	1,268	1,461
ANTUTU 3.0	9,652	**10,552**	N/A
SUNSPIDER 0.9.1 (MS)	1,614	**1,504**	1,598
GLBENCHMARK 2.5 EGYPT 1080P OFFSCREEN (FPS)	**14**	12	11
CF-BENCH	**9,824**	7,423	8,112

SUNSPIDER: LOWER SCORES ARE BETTER.

shouldn't expect it to last overnight and into the next day.

On AT&T's LTE network in Salt Lake City, the Discover zoomed through speed tests at an average of 18 Mbps down and 12 Mbps up. Keep in mind that this number may vary depending on the strength of your local network. We had mixed results with the phone's WiFi performance; on multiple occasions it randomly disconnected from our preferred network and would refuse to reconnect again (it often would get stuck in an endless loop, going back and forth between "connecting" and "saved"). Quickly shutting WiFi off and then turning it on again typically resolved the problem, but that's of course an annoyance.

When it came to actually making phone calls, our callers could hear us perfectly loud and clear. Noise canceling was in full force, as callers had no idea that we were in a noisy room. On our end, other voices came through crystal clear, although the volume was a little softer than we would have preferred.

So what about the dual 3D surround sound speakers on the Discover? In a couple words: not bad. Thing is, it's louder than your typical budget phone, so in that sense you're getting your money's worth; however, we could barely tell any difference between it and the audio output on flagship phones like the iPhone 5 and Samsung Galaxy S III. In fact, when doing direct comparisons between the three devices, the Discover's sound was on the tinny side and not as full or rich as the others. Again, it's pretty good for its intended price range, but not the best out there. One other thing: while the surround sound concept works okay when the phone's in portrait mode, it's a completely different story when you're watching movies in landscape, since both speakers are on the same side. It's pretty difficult to mimic stereo sound very well with this kind of setup.

PRICING AND COMPARISON

Going by the spec sheet alone, the Pantech Discover blows away any other brand-new device in its price range — you may see some better-specced phones on sale around the $50 margin, but this surpasses any other budget or midrange phone that has begun at this particular cost. On AT&T's network, the next in line would be the HTC One VX, a phone that, for the same amount of money, snags you a qHD display, 5-megapixel rear camera, 8GB internal storage and a few other mid-range specs to go along with it. While we were fond of the VX, the Discover ultimately offers more bang for your buck.

The Pantech moniker stands tall on the front of the device.

WRAP-UP

With each of its recent phones, Pantech has shown that it's possible to make an inexpensive handset without sacrificing premium components. It specializes in the lower-end (in the US, at least), and it does its job very well. With a going price of $50 (after a two-year commitment), it's sure to turn quite a few heads. It's far from perfect, of course, but right now, at least, we have a hard time seeing how anyone could make a better budget device. D

Brad is a mobile editor at Engadget, an outdoorsy guy, and a lover of eccentric New Wave and electro. Singer and beatboxer.

BOTTOMLINE

PANTECH DISCOVER

$50 (ON CONTRACT)

PROS

- Nice display
- Solid performance
- Outside-the-box design
- Affordable price

CONS

- Camera still needs work
- "3D sound" offers average output

BOTTOMLINE

Thanks to its solid build and premium components, the Discover is the best phone in its price range on AT&T.

For thousands of years, humans have sought to take flight under their own power. From sixth century China to Red Bull's Flugtag, engineers, pilots and amateur inventors have taken a daring leap into the sky — and some even survived.

By James Trew

The Gossamer Albatross making its Kremer Prize–winning flight across the English Channel in 1979.

The Highs and

PHOTOGRAPH COURTESY OF AEROVIRONMENT, INC./WWW.AVINC.COM

Lows of Human-Powered Flight

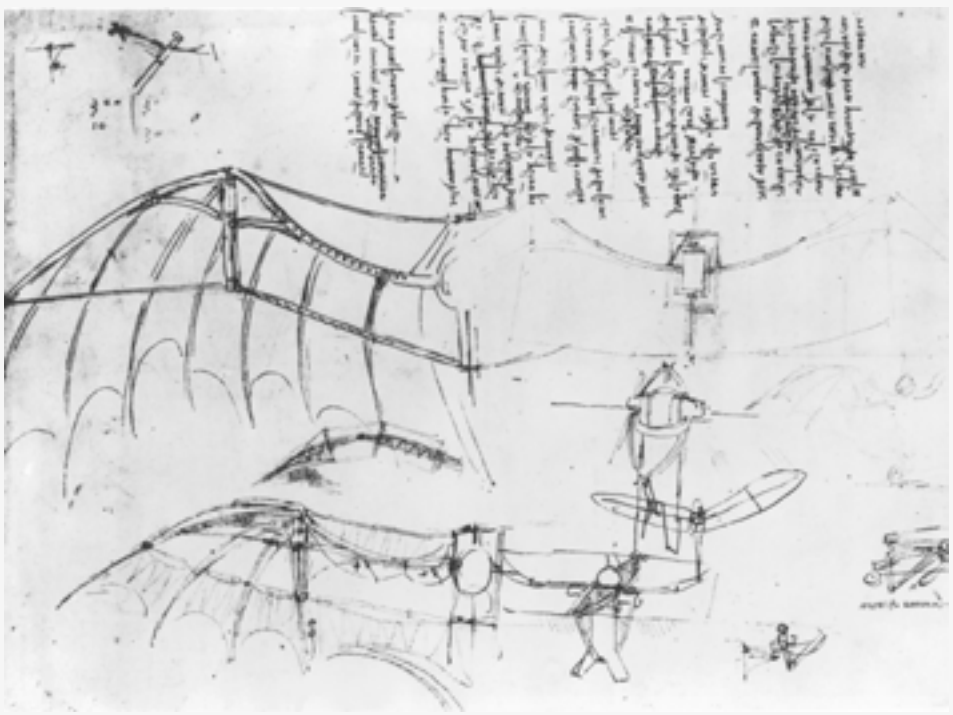
PHOTOGRAPH BY CHRIS GARRISON/RED BULL CONTENT POOL

Team "Go Batty" launches into the air and, inevitably, the water at Reb Bull Flugtag in Miami, Fla., Nov. 2012.

On March 19th, 2012, YouTube user jarnosmeets80 uploaded a video with the title "Flying like a bird | part 14/14." In it, a man donning a set of homemade wings and a helmet with a GoPro attached achieves what many wishful-thinkers, scientists and millennia of bipeds have long dreamed of doing: flying. Sadly, one month later, the video's creator, filmmaker Floris Kaayk, admitted the whole thing was an elaborate hoax. Skeptics were quick to dismiss the video straight away, and anything more than a cursory Google search might have convinced most of the same. But, with more than 7 million views at the time of this writing, it's pretty clear that as a land-based species, it doesn't take much for us to suspend our disbelief at the idea of being able to fly. Even if it is just for one minute and 50 seconds.

Of course, Kaayk is far from the first to be inspired by the birds. Greek mythology's Daedalus and Icarus famously got airborne under their own steam, and set the stage for a lively cast of historical characters that flew the noble flag for science while taking to the skies — and more often than not, the ground again a little too quickly. One of the earliest known accounts comes from China. Emperor Kao Yang (circa the sixth century) took to strapping prisoners to kites to see if they would fly as a means of entertainment, under the pretense that it was part of a Buddhist rite of liberation. Something that semi-backfired, however, when one plucky prisoner, Yuan Huang T'ou, actually landed safely and survived. This earned him a place in the history books as one of the earliest recorded human flights, along with the dubious privilege of a "lighter" sentence: death by starvation. Around the turn of the 10th century, Andalusian inventor Abbas Ibn Firnas was reported (by "several trustworthy writers") to have glided a "considerable" distance after making some wings, covering himself with feathers and launching from a suitable "emi-

Original designs for a fixed-wing aircraft with ornithopter extensions from the notebooks of Leonardo da Vinci (1452-1519).



PHOTOGRAPH COURTESY OF SSPL/GETTY IMAGES

Commemorative stained-glass window in honor of Eilmer of Malmesbury (Elmer the flying monk), located in Malmesbury Abbey, England.

PHOTOGRAPH BY ANDREW DUNN / WWW.ANDREWDUNNPHOTO.COM

nence." Then there was Eilmer of Malmesbury, a Benedictine monk who, with his crude cloth wings, threw himself from a church watchtower in the 11th century, landing alive, but at the cost of two broken legs.

Not all of the early developments were quite so ... hands-on. In the 15th century, Leonardo da Vinci — famous for such artistic works as the *Mona Lisa* and *The Last Supper* — also had an interest in the physics of the natural world. Pictures of proto-ornithopters (machines that fly with flapping wings) are well-known findings from his journals. These have never been proven to be airworthy, but at the very least, they demonstrated his keen eye for the basic mechanics of nature-inspired flight.

It's not hard to imagine that with such a poor success rate, those early attempts didn't really inspire a deluge of future efforts. Some years later, though, science, and a new understanding of aerodynamics, would see the quest for human flight reinvigorated. But, as anyone who's ever been to a Birdman Rally (or more popularly of late, a Red Bull Flugtag) will attest, it hasn't stopped people from throwing themselves off of things, all for a brief taste of flight.

UP, UP AND (NOT) AWAY: THE RISE OF THE MODERN ERA

Around the beginning of the 20th century, human-powered flight took some important — and slightly less suicidal — steps forward, with the formation of the Peugeot Prize. "10,000 francs which has been offered for any one [sic] who can fly a distance of ten meters in a man-powered machine" read a report in the *New York Times* about the event. Essentially bicycles with wings, these "man-powered machines" (known as aviettes), would descend upon Bois de Boulogne, France and attempt to take to the skies (or at least get off the ground) to secure the pot of cash. The first such competition was held in 1912, but it would be a full nine years until someone would get their hands on the money. On the morning of July 9th, 1921, champion cyclist Gabriel Poulain managed the 10-meter distance, at one meter above the ground with his dual-winged aviette. He managed the distance a total of four

Cover of French newspaper Le Petit Journal documenting Gabriel Poulain's pedal-powered aviette flight in 1921.

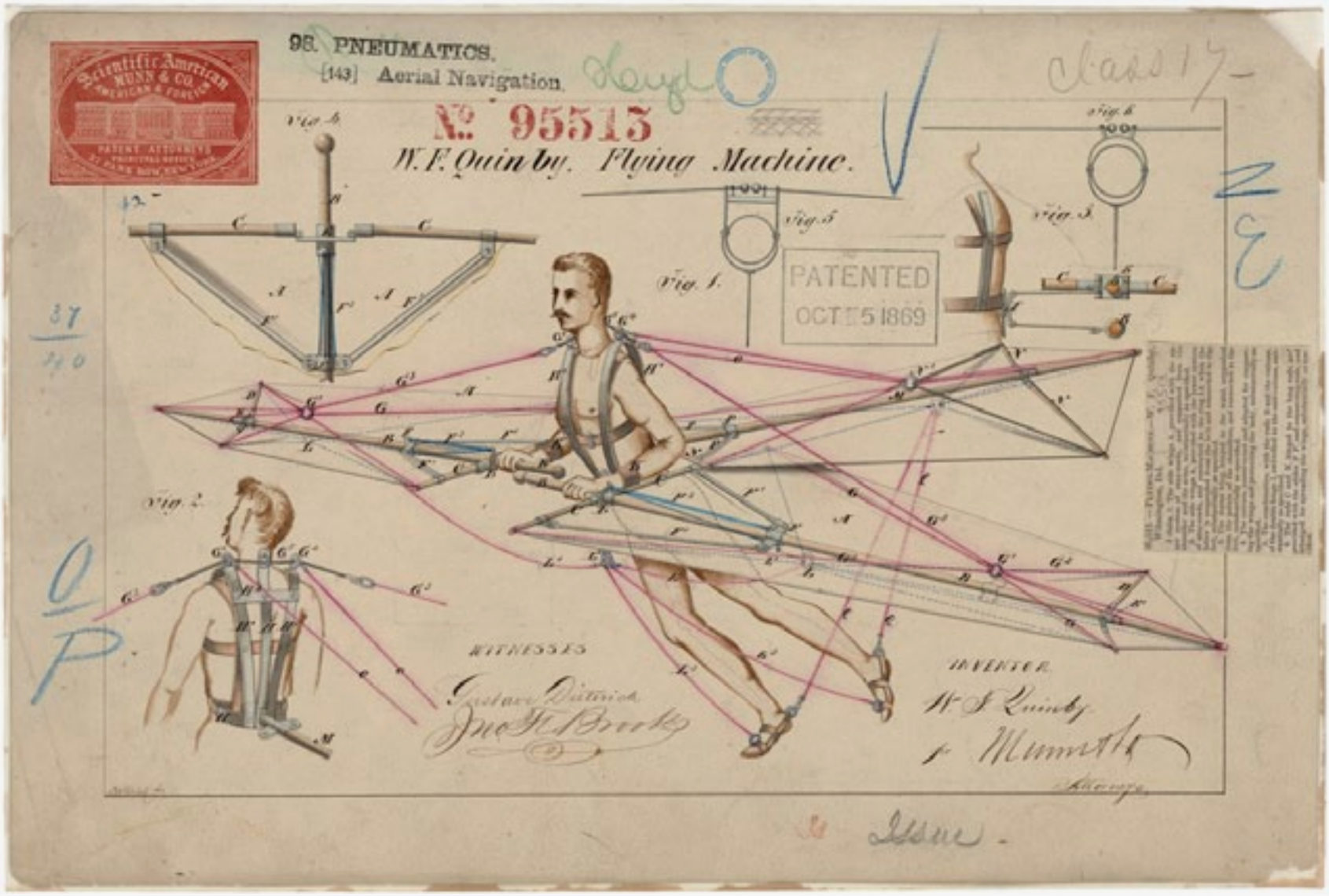
times, with his longest voyage reportedly measuring in at a full 12 meters. To achieve this distance, it's estimated (albeit by Poulain himself) that he reached a speed of 40KPH while riding the unwieldy device. Finally parted with his money, Robert Peugeot began a trend, one that we still see today, of inspiring would-be pilots with large monetary sums.

Shortly after signing Poulain's check, he announced a second prize of 200,000 francs for the "next step" (although there are few details of what this entailed, or if it ever took place). Of course, pedal power is all well and good for brief 10-meter jaunts along the French countryside, but with no means of further propulsion, these flights were bound to remain on the short side. Considering the Wright brothers' first powered flight, in 1903, was only 120 feet by comparison, 10 meters (32 feet) might seem humble, but with only the power of the human body, and a little bit of cunning and determination, it wasn't a bad effort.

If pilots ever hoped to harness any level of control over their man-powered craft, they'd need to look further than a bicycle with wings. That's possibly one reason why a revival of the ornithopter would soon follow. In 1929, German engineer Alexander Lippisch developed one such human-powered craft (they can be engine-powered also). It was launched via an elastic cord, and piloted by a young man named Hans Werner. Legend has it Werner wasn't really putting his back into the job of keeping the vehicle afloat, and that when Lippisch learned of this, he offered the romantic pilot a holiday to see his girlfriend if he could power the craft for the desired 300-meter distance. After which, he dutifully managed it on the very next go. There are, however, some doubts cast over the validity of this reported flight as being truly man-powered, including some suspicion that the vehicle didn't have enough wing area to perform the task. With solid evidence hard to find, and some speculation that the launch mechanism was as much responsible for the flight as the red-blooded German at the controls, Lippisch's achieve-

Biplane tailless glider design by Alexander Lippisch in Germany, circa 1920.

PHOTOGRAPH BY LEEMAGE/UIG VIA GETTY IMAGES (*LE PETIT JOURNAL*)



Above: Flying machine patent by W.F. Quinby, 1869. Below: Voyage à la Lune, (Journey to the Moon), a French caricature of pedal-powered flight, circa 1865-70.

PHOTOGRAPH COURTESY OF THE NATIONAL ARCHIVES (PATENT)

ment remains up for debate. He would, however go on to put any doubts of his aerodynamic knowledge to rest, by later designing the first-ever rocket-powered fighter plane — the Lippisch Ente — and the Messerschmitt Me 163.

THE KREMER PRIZE AND THE FLIGHT OF THE GOSSAMERS

Following in the footsteps of Robert Peugeot, British industrialist Henry Kremer figured the best way to inspire innovation in the world of human-powered aircraft, was to appeal to the pockets of engineers. Beginning in 1959, he set up a number of challenges (three of which have since been claimed) each with a financial reward reflecting its difficulty: The first to fly a figure-eight course around two markers half a mile apart, the first to fly from England to France and a world speed challenge.

It was these prizes that inspired the biggest turning point in muscle-powered flight's history, and where the work of Dr. Paul MacCready and his various teams would start a new chapter in human-powered flight. MacCready

Test flight of the Gossamer Albatross II, circa 1980.

took on the first Kremer Prize — for flying a figure eight — in 1977 with his Gossamer Condor craft. The final version of this vehicle, comprised of a large wing, pilot nacelle and double-skinned airfoil, was flown by cyclist and hang-glider Bryan Allen. On August 23rd of that year, Allen completed the 1.6-mile course as designated by the Royal Aeronautical Society, located at Minter field in Shafter, Calif. This flight was important for a number of reasons, but in no small part because it represented the first controlled, sustained flight complete with human-powered takeoff. It was a long way from the wonky bicycles of Bois de Boulogne, or haphazard pre-WWII ornithopters.

MacCready would go on to claim a second Kremer Prize with another Gossamer: the Albatross. Upon awarding the £50,000 for the successfully completed figure eight, Kremer set a new challenge of crossing the English Channel. Using

PHOTOGRAPH COURTESY OF NASA

PHOTOGRAPH BY DON MONROE AND AEROVIRONMENT, INC. / WWW.AVINC.COM

AeroVironment's Dr. Paul MacCready in the hangar at Terminal Island, San Pedro, working on construction for the Gossamer Albatross II and Gossamer Penguin, circa 1979.

their work with the Condor, MacCready's team started on a new craft. This time, they used exotic materials to lower its weight, which included the then-new technique of creating carbon-fiber tubes, and Kevlar — a first for a Human Powered Aircraft (HPA). Test flights of the shorter-winged design in 1978 proved encouraging, with flights of 15 minutes being recorded on multiple occasions. Soon, after continued improvements to the design, pilot Allen managed a 13-mile, 69-minute flight over Harper Lake, Calif. The target distance of 22 miles was now within sight for MacCready's team, which brought the Albatross over to the English coast ready for the prize attempt on June 12, 1979.

The team started assembling the craft in the small hours of the morning, to much media anticipation. At around 6 AM, Allen launched from a makeshift runway, and the challenge was on. Despite their best preparations, and favorable conditions, the voyage was peppered with problems. An account on the AeroVironment website (the company MacCready went on to found) details how Allen reported, not long into the journey, that the transmit button on his radios malfunctioned, meaning he could hear his colleagues below him on the boats, but only respond with nods and gestures. Later on, due to the crossing taking longer than expected, Allen's water supply would run out leaving him dangerously dehydrated and contending with leg cramps — far from ideal when pedaling across the English Channel. Another knock-on effect of this extended journey time would see the dials and controls inside the craft lose power, leaving Allen to guess his altitude and airspeed. But, despite all this, they forged on. At one point the team came close to aborting, with turbulence starting to aggravate the already precarious situation. In a last-ditch effort to carry on, Allen lift-

Craft-Pal, Yamagata University's human-powered aircraft entry in the Japan International Birdman Rally 2006.

Dr. Paul MacCready and some pre-historic inspiration, the pterodactyl.

ed the Albatross higher where he found calmer winds, at least calm enough for him to endure another hour before finally landing on the beach at Cap Gris Nez victorious.

MacCready and his team scooped up two major Kremer Prizes in as many years. This would prove to be a pivotal period for human-powered aircraft, and the Gossamer designs would be the new reference point for future projects. Prior efforts had been a mixture of trial and error and hard work mixed with a basic understanding of the mechanics of flight. The Gossamer projects had spear-headed a new era where computational work was becoming increasingly important, especially in nailing down the precise aerodynamics and lift required. That, and improving efficiency really made human-powered flight move from sustained hops and skips to the international crossings of the Albatross. With these two major challenges achieved, the Kremer Prize would look to new and different areas to encourage eager engineering teams to explore. Next up? Speed.

Kremer's world speed competition would keep things much simpler: a triangular course to be completed in less than three minutes with a pot of £20,000 for the first to do so. Prizes of £5,000 were also given to subsequent attempts that beat the previous best time by at least 5 percent (until the total prize fund of £100,000 was exhausted). MacCready fielded a team, this time with an entry called the Bionic Bat, which featured a design much closer to modern light aircraft, incorporating a rear propeller and a more robust pilot gondola. One of the other participants in the competition was John Langford, an MIT grad. Langford had been part of MIT's 1979 Chrysalis project that resulted in a biplane design that enjoyed a modicum of success — a project MacCready had also played a small part in. Now, the two would field competing craft in a bid to claim the first — and substantially bigger — Kremer world speed prize.

On May 11th, 1984, Langford's team with its Monarch B entry managed the course in two minutes, 54 seconds, earning it the £20,000 pot. MacCready's Bionic Bat would

PHOTOGRAPH COURTESY OF AEROVIRONMENT, INC. / WWW.AVINC.COM

go on to beat this time by getting around the course in two minutes, 43 seconds just over two months later, on July 18th. No doubt spurred on by his success, Langford would soon be instrumental in a new project that would represent a definitive milestone for HPAs.

DAEDALUS SOARS AGAIN

If you're planning a world-record human-powered flight, it's probably more motivational to name it after the Greek mythological character that *didn't* fall into the sea. Nomenclature taken care of, Daedalus would attempt to follow in its namesake's wing-steps, and fly from Crete to the island of Santorini. The team behind the project was made up of MIT students — lead by Langford — but also had support from the Smithsonian Institute, NASA and the Greek government. After a couple of successful prototypes, the team settled on the final design — known as Daedalus 88 — which weighed just 68.5 pounds, despite sporting a 112-foot wingspan.

The record-breaking flight would lift off on April 23rd, 1988. The team had held out, waiting for the absolute perfect conditions for the lengthy crossing. While weather may have been good at the launch point, with potentially four hours of flight time, it needed to remain calm for the whole distance. A team of pilots had been operating a standby rota, and the honors on this occasion fell to Greek cycling champion Kanellos Kanellopoulos. With just a sheet of Mylar polyester plastic between him and the ocean, he launched with a 3MPH tail wind. Fortunately for him conditions held, and Kanellopoulos arrived at Santorini — a distance of 72.4 miles and some three hours, 54 minutes and 59 seconds later. Despite a safe voyage, Kanellopoulos' attempt at landing on the beach saw him fly into some head wind causing him to crash into the sea just feet from his intended destination. Once safely ashore, however, Kanellopoulos and Daedalus could lay claim to two world records: the longest human-powered flight, and the longest duration of a human-powered flight — records that still stand today.

The Daedalus 88, with pilot Glenn Tremml, on its last NASA test flight at Dryden Flight Research Center in Edwards, Calif., circa 1988.

PHOTOGRAPH COURTESY OF NASA

It's not just the world records that continue

Daedalus' legacy. Langford is still in the business, working for Aurora Flight Sciences, along with other MIT alumni. Many of their products — largely UAVs for commercial and military use — owe more than a passing nod to Daedalus. Many more craft have flown since then, and continue to fly, but the Gossamers and Daedalus represent what many consider the defining moments in HPA.

Human-powered Flight Today

There's still a lot of work going on in the area of muscle-powered flight, particularly of the rotor-driven variety. And while winged craft had Henry Kremer as a benefactor, using his challenges (and rewards) to advance their designs, the helicopter world has the American Helicopter Society and the Sikorsky Aircraft Association. The result is the Sikorsky Prize, and much like the Kremer deal, there's a lot of money on the table for the first team that can meet a set of prescribed goals. The prize was initially

$20,000 when it was first set up in 1980. But, due to the lack of successful designs, this fund has since swollen to a substantial $250,000. This has evidently proven to be a good motivator as, right now, there are at least two teams tantalizingly close to claiming it for themselves, both of them with some great heritage.

> Sikorsky Prize Requirements: "The flight requirements shall consist of hovering for one minute while maintaining flight within a 10-meter square. During this time, the lowest part of the machine shall exceed momentarily three meters above the ground."

TEAM AEROVELO AND THE ATLAS

Before working on a human-powered helicopter, Cameron Robertson and Todd Reichert were already making waves in the HPA scene. Airwaves to be precise. The pair worked together on the Snowbird ornithopter. Historically, these wing-flapping machines haven't fared so well. That all changed with Robertson and Reichert's mind-blowing project, which managed a sustained flapping-wing flight of 19.3 seconds — a world's first. It was a good reminder of exactly how far things have come since the gold-rush era around the '70s and '80s, especially with a project as complex as Snowbird.

Assembly and preparations for a record-breaking human-powered ornithopter flight in AeroVelo's Snowbird, Ontario, Canada 2010.

"[With Snowbird] there was a lot of hand design, but a lot of the work behind it was very computationally intensive. And that's the sort of thing that in the '80s would have required crazy supercomputers," said Robertson.

Buoyed by their initial success the duo decided to take on the human-powered helicopter (HPH) challenge with their latest project: AeroVelo. As team AeroV-

PHOTOGRAPHS COURTESY OF AEROVELO

Gearing up for an early test flight of the Snowbird ornithopter in Tottenham, Ontario, October 2009 before a winter hiatus from the project.

PHOTOGRAPH COURTESY OF AEROVELO

elo, Robertson and Reichert are currently working on Atlas, a rotocopter they hope will earn them the coveted Sikorsky Prize. Atlas is about twice as big as any previous HPH, and uses some of the same design optimization that was born out of the Snowbird project. Modern projects profit — almost literally — from other technologies too, with Atlas being funded by a recent Kickstarter project.

Since the Kickstarter success (it's raised $4,000 more than the requested $30,000), the team behind Atlas has been hard at work refining its design, and recently completed a successful 17-second flight. This might be some way off from the full 60 seconds required to nab the prize, but Robertson and Reichert remain quietly confident.

"We're hoping that in the new year, in January, we might be able to get some flight testing in. We built a single-rotor test stand, so we can test one at a time and really, really refine things. The next time we go back to [full flight] testing we're going to be very sure of our numbers and our control systems. So there shouldn't be nearly as many unknowns," Reichert assured us. It looks like Janu-

Construction at the Tottenham location and final assembly of AeroVelo's Sikorsky Prize challenger, the Atlas, at the Soccer Centre in Vaughan, Ontario, August 2012.

PHOTOGRAPHS COURTESY OF AEROVELO

ary could be a busy month for the American Helicopter Association, however, with another team in hot pursuit of the prize.

THE UNIVERSITY OF MARYLAND AND GAMERA II

With something of a head start on AeroVelo, the Gamera team at the University of Maryland started work on its HPH more than four years ago with the very definite goal of winning the Sikorsky Prize. The all-student project began in 2008 at the A. James Clark School of Engineering, which led to the development of the original Gamera HPH. This culminated in a — then record-breaking —11.4-second flight in July 2011. Although this was good progress, to stand a chance of winning the Sikorsky Prize, a more streamlined design would be required. So, going back to the drawing board, the Gamera team enhanced the rotor design, worked on improving the transmission and redesigned the cockpit, all as part of Gamera II.

"Structurally, the big challenge is making it as light as possible; working with composite materials and advanced structural design to try to minimize weight. A lot of the innovation that's lead us to be successful on this project has been the structural design elements," Project Manager William Staruk said. "Our main problem at the moment is stability and control. How to keep the vehicle from drifting away or crashing into walls."

Initial flight attempts of the Gamera in May 2011, piloted by University of Maryland student Judy Wexler.

PHOTOGRAPH COURTESY OF AP PHOTO / JOSE LUIS MAGANA

With a non-official flight of more than one minute apparently already in the bag, and a max height a whisker under the required three meters awaiting official verification, Gamera II certainly appears to have the

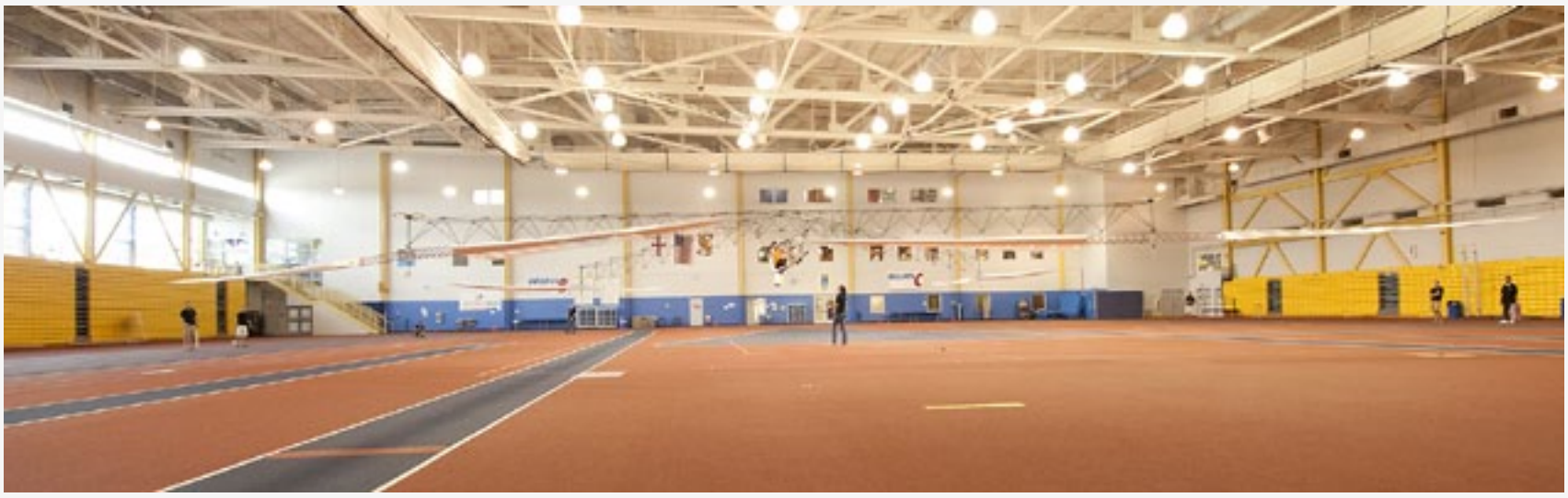
main ingredients already taken care off.

"We think we're close to that 3-meter combination ... we think we know how much power it takes to do it," Staruk said. "So we're having our pilots run on exercise machines on what we think the flight profile will be, and we gather that they're very close to doing it, and believe that they *are* capable of doing it."

So, if the team can stop the craft from drifting beyond that 10-meter square, it would seem they have everything to play for. So much so that they, too, are planning another attempt at the prize, also in January. The main drawback actually has nothing to do with funding, resources, engineering or design. Instead, it's finding a location to test and perform such flights. With the outdoors being almost certainly too windy to run test flights, both Gamera II and Atlas are limited to the time they can secure in facilities large enough to host them. A trivial problem, but a very real one. Either way, by the time this is published, the ink could by drying on a freshly cut check from the American Helicopter Society.

Above: Rotor blade preparation, test pilot Kyle Glusenkamp. Below: Flight test of the Gamera II in Aug-Sept. 2012.

It's a shade more than 100 years ago that Robert Peugeot started the long-running tradition of inspiring progress in human-powered flight by reward. Over that time we've seen huge steps made towards an impossible dream: taking flight with just the power of human muscles (plus a bit of clever engineering). This goal has since



PHOTOGRAPHS COURTESY OF THE UNIVERSITY OF MARYLAND / GAMERA PROJECT

Above: Henry Enerson in the pilot's seat on Gamera II during an Aug. 2012 test flight. Below: Constructing the rotor blade airfoil.

PHOTOGRAPHS COURTESY OF THE UNIVERSITY OF MARYLAND / GAMERA PROJECT

grown to become a life's work for many. With big prizes still up for grabs, it's likely there are more chapters still to come.

Not least, because, if one thing can be divined from the successes — and perhaps more so, the failures — it's that something deep within human DNA yearns to take to the skies. The unconvinced only need to look to the innocent Flugtags, to see this desire manifesting itself in the most accessible form there is — fun social gatherings. Most people won't have the resources to go after a Kremer Prize, but show them a YouTube video of colorful contraptions being launched off a pier, and there's a good chance they'll think — even if only briefly — that they could have a go at that. Some might even go as far to fake it. D

James loves music and technology, especially music technology, particularly when he gets to write about it. Figures really.

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See it in action!

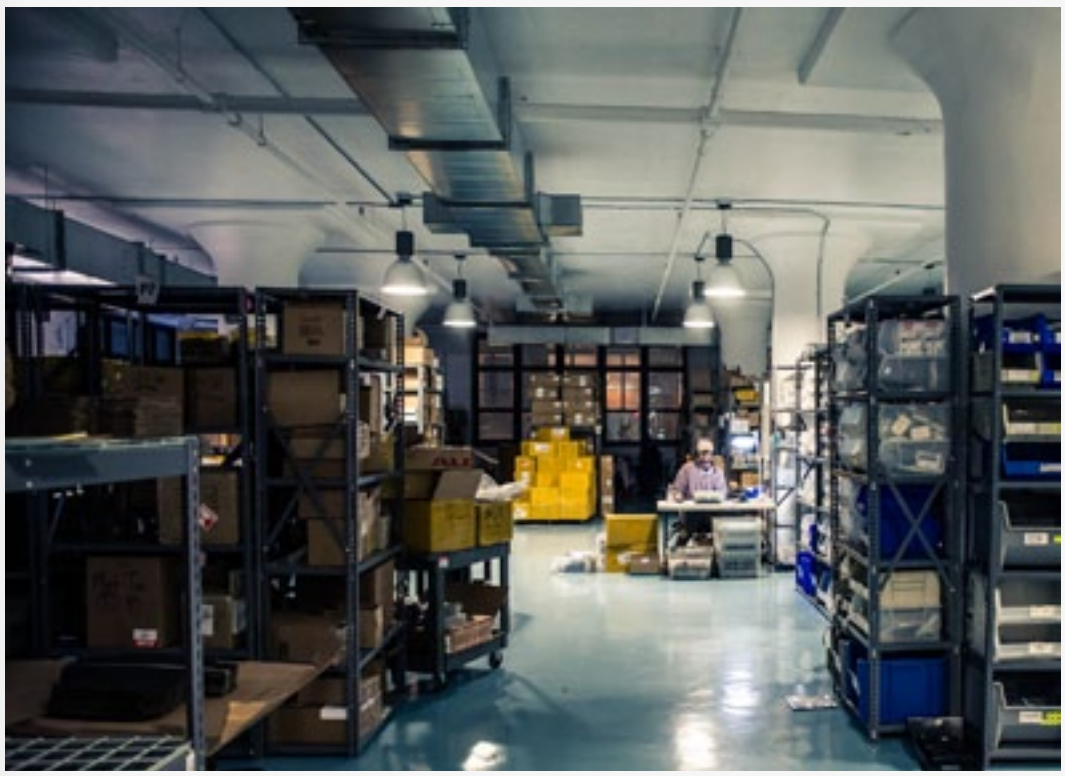
PHOTOGRAPH COURTESY OF AUDI

LIMOR FRIED

THE ENGINEER AND ADAFRUIT ENTREPRENEUR elaborates on the joys of open-source build projects and improving the child-to-ceiling reach ratio.

PHOTOGRAPH BY RAYON RICHARDS

PHOTOGRAPHS COURTESY OF ADAFRUIT



Behind the scenes at Adafruit Industries, NYC.

What gadget do you depend on most?
I would say the gadget I depend on the most is my Metcal MX-500 soldering station. If you're doing SMT (surface-mount technology), having the right tools will save you tons of time, frustration and money.

Which do you look back upon most fondly?
I really liked my Atari 2600; being able to play arcade-type games when I was a kid was the best thing ever.

Which company does the most to push the industry?
From a hardware, software, engineering and manufacturing standpoint, for me, it's Apple. Apple has completely pushed everyone in directions some love and others loathe. Cherish them or hate them; they're impossible to ignore and everyone doing hardware will be compared to Apple for quite a while.

What is your operating system of choice?
Up until recently I was using XP, but it's harder to have newer hardware work that well on XP, so I'm on Windows 7 for now. I wouldn't say it's by choice; it's just a tool I need to use to get my work done. At Adafruit we have released our own operating system for the Raspberry Pi; every free moment I get, I work on updates to it for the next release.

What are your favorite gadget names?
Raspberry Pi
Arduino
FLORA
MintyBoost

“I built an extender arm to get balloons from the ceiling when I was 10 years old; after that I knew I wanted to build things.”

Which app do you depend on most?
For desktop computer, I depend on CadSoft EAGLE. It’s my tool of choice for designing the electronics I create at Adafruit Industries. EAGLE is a PCB (printed circuit board) design software that a lot of engineers use to make the circuit boards you see inside many electronic products. I do open-source hardware and release my designs under a Creative Common ShareAlike, Attribution license so others can improve upon them and learn from the designs. You can check them out on GITHUB.

While I don’t have a phone, I do have an iPad; my favorite app is CIRCUIT PLAYGROUND. It’s the best engineering calculator app and we made it at Adafruit.

What traits do you most deplore in a smartphone?
I don’t have a cell phone or smartphone; I spent a lot of time designing the WAVEBUBBLE (a cell phone jammer) so it would be an odd thing for me to have a phone, I think.

What is your idea of the perfect device?
The perfect device is the one you build, you make, you can improve upon and share what you’ve done. The perfect device has source files, firmware, code, design files, bill of materials and all under a good open-source license.

What is your earliest gadget memory?
I built an extender arm to get balloons from the ceiling when I was 10 years old; after that I knew I wanted to build things.

What gadget do you depend on most?
Metcal MX-500 soldering station

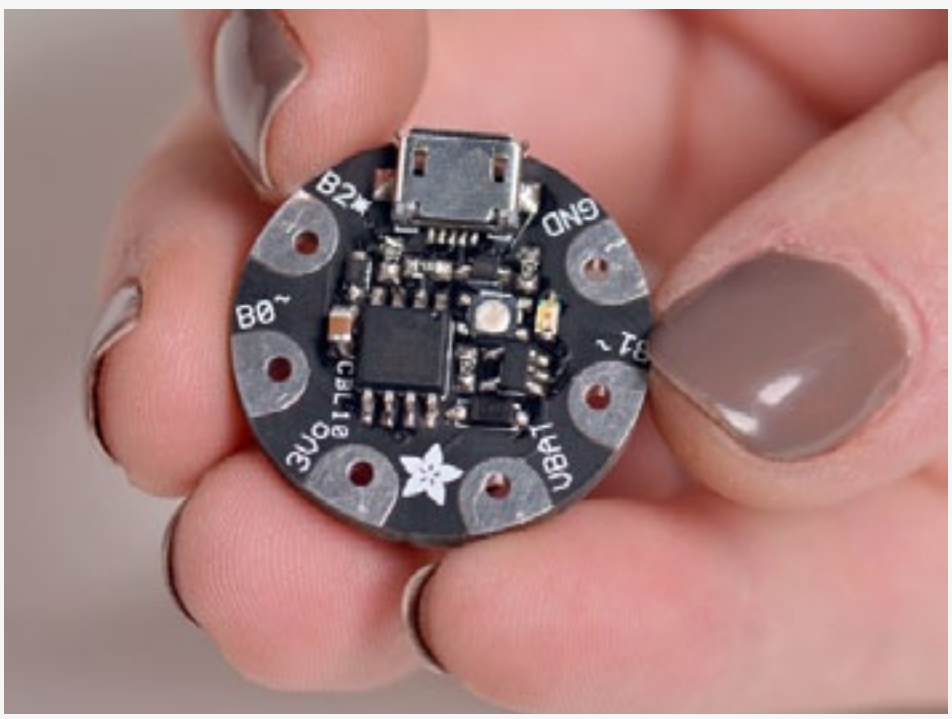
What technological advancement do you most admire?
The internet; we have not even begun to see how powerful and amazing everyone being connected and sharing will be.

What fault are you most tolerant of in a gadget?
I understand the tradeoffs and challenges of battery life. We're still using basically the same tech for batteries for quite some time; they need space and get warm and things don't always go right with power management.

What device do you covet most?
I'm currently researching a new Pick-and-Place machine; these are giant machines with moving heads and high-res microscopic cameras that pick up small parts and put them on circuit boards. They cost hundreds of thousands of dollars; for my company Adafruit to meet demand, we need to get a bigger version of the one we have now. I can't wait :)

What does being connected mean to you?
Being connected means being able to share the best things with each other; it's a challenging world out there, but being connected means we can give each other something in some way to support one another.

Adafruit's forthcoming pint-sized programmable platform, Gemma.

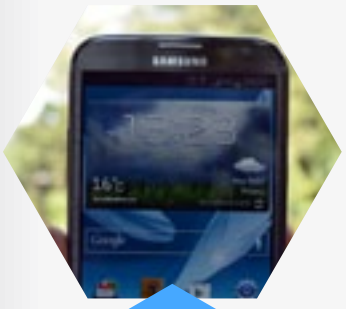


PHOTOGRAPH COURTESY OF ADAFRUIT (GEMMA)

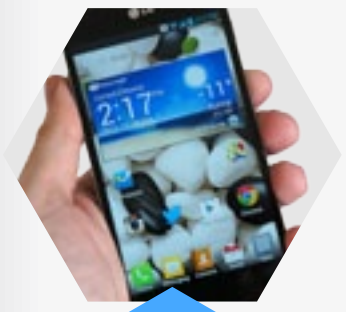
When did you last disconnect?
I try to tune out each day for at least a few hours to read a book; it's really tempting to have a short attention span with everything shiny out there and calling you to do something. I've found I can do my best work when I make a habit of being offline as much as possible each day; that usually means one to two hours plus sleep :) D

IN REAL LIFE is an ongoing feature where we talk about the gadgets, apps and toys we're using in real life.

SECURIFI ALMOND



Samsung Galaxy Note II



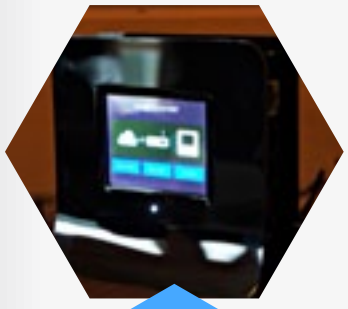
LG Optimus G on Rogers

Look, I moonlight as the IT guy at the White House, okay? Now that we're having such an honest conversation, I will say that I've been on the hunt for an ideal WiFi range extender for some time now. Western Digital's My Net Wi-Fi Range Extender does a fine job, but a) it's pretty large and b) it lacks bells and whistles. If you're looking for an alternative that addresses both of those issues, let me introduce you to the *other* product I'd trust to stretch WiFi waves from the Situation Room to the Rose Garden: the Securifi Almond.

While this is a bona fide WLAN access point / router at heart, I was focused primarily on testing its range extension abilities. I plugged the unit in some 90 feet away from a Netgear N900, watched the colorful touchscreen dance to life, and then tapped on a few screens in the Wizard Guide to set it all up. We've all heard it before — "easy to set up!" — but this one's truly capable of doing as advertised. Within four minutes, the unit had found my local 2.4GHz network, accepted my password and created a new network using that same password for areas that were previously out of reach.

In practice, it adds another 150-odd feet of range to my N900, and I saw no degradation in performance while streaming video. The touchscreen also continues to be useful after you've pecked in your information. You can have it display the local weather or the time, making it a pretty awesome glanceable piece of technology while it's broadcasting in the background. Two quirks, though: one, the weather forecast (apparently) doesn't update on its own, and two, the clock reversed AM and PM in my testing. Granted, both of these are in "Beta," and I'm hoping the company adds even more functionality through OTA software updates — which the unit is fully capable of receiving.

The other bits you should know about: it won't rebroadcast 5GHz signals (boo!), and it actually creates a *new* SSID (network name) instead of just amplifying your existing one. This means that once you walk out of range of your existing router, you need to disconnect and reconnect to a new network name, which is a slight hassle. Those things aside, it's a solid performer at $80, and hopefully it'll get even better once the updates begin to roll in. — *Darren Murph*



Securifi Almond

LG Optimus G on Rogers

SAMSUNG GALAXY NOTE II

I was among the naysayers when Samsung released the Galaxy Note. Maybe it was my memories of the Streak 5 or perhaps it was just dread at the idea of carrying around a gargantuan handset. The Note's massive success did little to change my perception, but it did make me look at its successor with respect. Spec bump aside, the Galaxy Note II is certainly a more mature product compared to the OG Note, what with its bag of software tricks and that improved S Pen. I can see the S Pen's usefulness for not only the creative types, but also obsessive note takers and for general tomfoolery. Add smooth performance and impressive battery life, and it makes the Note II quite a compelling proposition indeed.

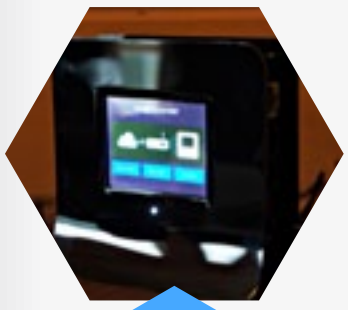
Attempting to occupy that middle ground between smartphone and tablet, the Note II's size is its chief strength as well as its weakness, depending on how you look at it. Despite the new one-handed mode that shrinks the keyboard and dialing pad and docks them to the side, I still think the large size is tough to handle with a single hand. Heck, even using the lock screen slider to accept or reject calls might be an issue if you try doing it one-handed, making the pebble-smooth handset prone to slipping. Ditto when you stretch your thumb across the glass to pull down the notification bar or to reach any app controls placed on the top.

On the flip side, watching movies is lots of fun thanks to that big display, as is playing games. Apps like Flipboard also shine with all that extra display space. Features such as multi-window and pop-up video make great use of the extra screen real estate and add to the device's pull factor, much more than having the same functionality on its smaller sibling, the Galaxy S III.

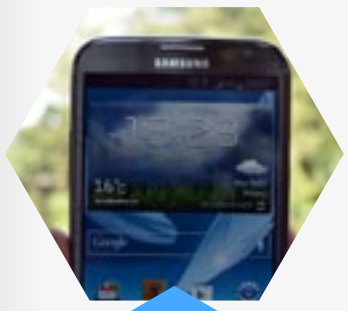
Basically, when it comes to smartphones, size does matter. It's really up to you what you prefer — a large slab that can possibly help avoid the hassle of lugging both a phone and a tablet, or a conventional-sized blower that's more pocket-friendly but leaves something to be desired when it comes to the media and app experience. Personally, I think of these high-end phablets as SUVs of the smartphone world — hardly easy to parallel park or squeeze into tight spaces — but big, powerful and spacious. Love 'em or leave 'em, they're here to stay.

— Deepak Dhingra

LG OPTIMUS G ON ROGERS



Securifi Almond



Samsung Galaxy Note II

The Optimus G feels like the Nexus 4's neglected cousin. Both LG phones are capable, but the Nexus 4's status as the official Google phone — and the accompanying $350 unlocked price — tend to overshadow the Optimus G's more traditional approach. I felt compelled to try the Optimus G on Rogers for a few weeks for just that reason. Is it worth it to give up stock Android and pay more, all so that you can score a few hardware advantages?

The CliffsNotes answer: yes. In some cases, anyway. The battery life could certainly clinch a few sales. Where the Nexus 4's runtime is fairly average, the Optimus G has no problem lasting through a photo- and Twitter-heavy day. The 32GB of storage space is naturally useful for a hefty music collection like mine, too. LTE is indeed appreciated versus the Nexus 4's dual-carrier HSPA+ 3G, although I'll readily acknowledge that the 3G in my area is often fast enough. I'm even sanguine about the interface, despite my preference for pure Android. LG's custom interface feels relatively unobtrusive and light, at least next to Samsung's TouchWiz. It mostly stays out of the way, and it doesn't lean on gestures that might only be useful once in a blue moon (see: Samsung's tilt-to-zoom).

If an unfettered Google experience isn't a factor, about the only potential dealbreaker is that oh-so-frustrating camera focus system. The Optimus G's camera (eight megapixels on the Rogers model) is fine much of the time, but it's tough to compose some macro or close-up portrait shots when the continuous autofocusing offers just a split second of sharpness before it re-adjusts. I've taken a few photos that looked fine in the preview but were blurred by the time I hit the capture button. If LG ever embraces traditional autofocus for the Optimus G's camera, though, it'll be easier to recommend it, regardless of whether the Nexus 4 is on the shopping list.

— Jon Fingas

The week that was in 140 characters or less

Put a Grid on It, Registration 911 and Lessons Unlearned

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@stretta

NAMM 2013 is going to be the year where half of the products are last year's product WITH A GRID CONTROLLER STAPLED TO IT.

@dylanized

There's a National Day of Civic Hacking. Think about that. #change #hope

@omarelakkad

The registration form for RIM's upcoming BlackBerry 10 event has a mandatory field for "Emergency Contact." This is going to be awesome.

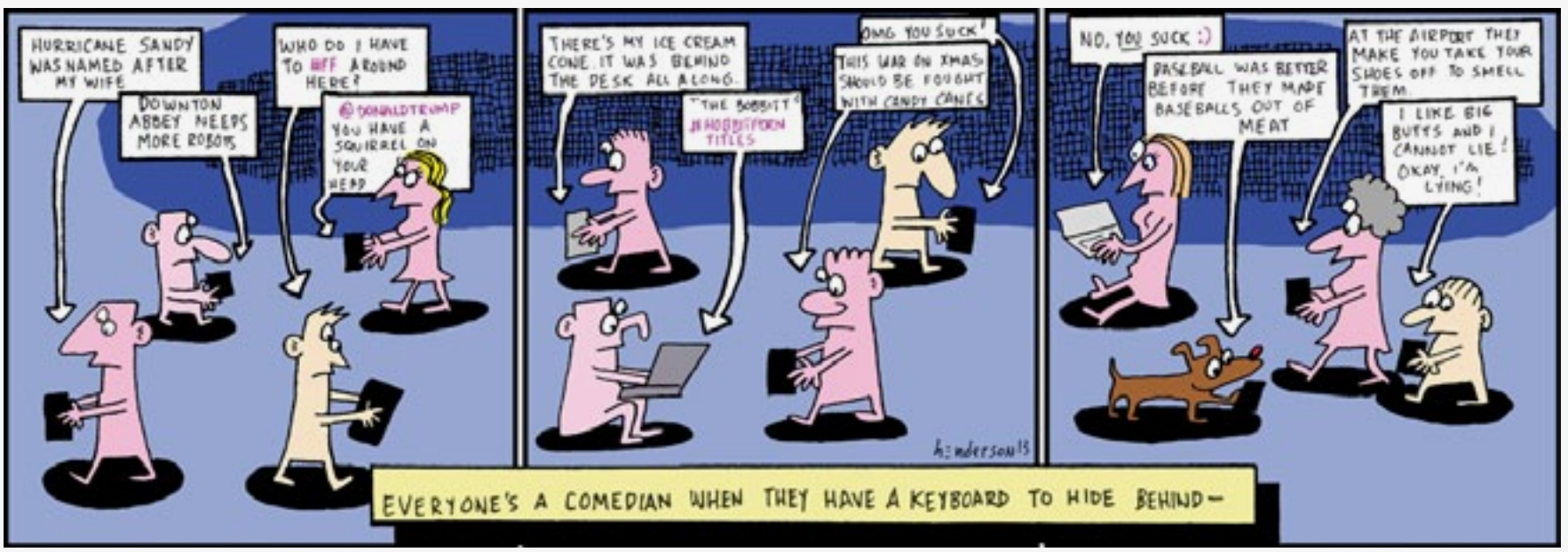
@joubiku

Apple makes $13 billion in profit, stock drops 10%. Netflix makes $8 million in profit, stock rises 30%. Tell me how that makes sense.

@JM77

NEC produces dual screen Android phone in a move reminiscent of not learning its lesson from any other manufacturer who's tried this, ever.

THE STRIP | BY SAM HENDERSON



WHAT IS THIS?
TOUCH TO FIND OUT

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