We put Oculus Quest’s two craziest new VR features through their paces



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SAN JOSE, Calif.—Oculus is clearly bullish on its wireless VR system, the Oculus Quest, which means this week’s Oculus Connect conference is chock full of the $400 headsets. The biggest queues at the show, unsurprisingly, have been dedicated to Quest—and to the headset’s pair of surprise “coming soon” features announced on Tuesday morning.

So much Quest attention is due to promising sales figures: “over $20 million” of games and apps have been sold on Quest’s digital marketplace since its May launch, Oculus announced on Tuesday, as opposed to “over $80 million” of Rift-specific software since that platform’s March 2016 launch. Four months

versus three-plus years? We don’t need a graphing calculator to plot which platform is kicking more software-sales butt.

With that momentum in mind, I cut a few lines to see the two intriguing features slated for Quest’s near-future: a wired PC-VR connection, launching this November, and a full hand-tracking API, launching in “early 2020.”

Oculus Quest Link: A killer perk, not a Rift S replacement

- Oculus Quest as connected to the official Oculus Quest Link cable.
  Sam Machkovech
- A better zoom at the new plastic clench that’ll pair with the official Quest Link Cable.
- Yes, my test was indeed running from a PC with a connected, wired tether.

The comment sections in every Oculus Quest article at Ars have included a common refrain: wireless VR is cool, sure, but is there a way to plug it into a more powerful computer to get a two-in-one device?

That question got an answer on Wednesday, when Oculus unveiled the new “Quest Link” feature, coming via a firmware update in November. This will allow anyone to connect a Quest headset to a gaming-caliber PC via any wired USB Type-C cable (so long as it’s rated highly enough for data transfer), then use the Quest as if it were the Oculus Rift. Meaning: it will load the PC-exclusive Oculus Home and Oculus Dash interfaces, and it will support “every” Oculus Rift game and app with the Quest’s paired Oculus Touch controllers.

Hours after the announcement, Oculus researchers hosted a panel to explain *why* the feature wasn’t ready at launch. Long story short: the data throughput of USB Type-C might be high,

but it’s not high enough for the demands of high-resolution, low-latency visuals strapped to a person’s face. Without optimization, any VR video sent to a Quest via Oculus Link suffered from two key problems: obvious visual artifacts (pixellation, noise), and increased latency between your real-life motions and what appears in VR.

- The box on the left is the native PC’s VR render. The box on the right is what’s being sent to Oculus Quest via Quest Link. It’s a little tricky to tell, but if you do a before-and-after comparison of this gallery’s slides…
- …you’ll see the outer radius’s pixels are reconstructed and de-warped upon building the final frame of VR data.

Oculus admits the USB Type-C pipeline isn’t fast enough for a pure 1:1 VR video signal. So the team had to develop a process to compress and encode the VR action coming from a PC, then decode that information on a Quest. The biggest compression point that the team could work with wasn’t a full-scene shrinking of resolution—that would introduce obvious pixel blur within a VR game or app. Instead, Oculus opted for a custom version of foveated rendering. The center portion of any Oculus Link video signal will be closer to a 1:1 resolution compared to the PC version, Oculus says, while the outer radius is shrunken on the PC side with a downscaling of pixels *and* a fish-eye effect. When that’s decoded on the Quest side, that information is re-stretched and upscaled.

Soon after the presentation, I strapped into an Oculus Quest connected to a PC via Oculus Link, and I played the upcoming adventure game *Asgard’s Wrath* for 10 minutes. I devoted most of my demo time to wildly moving my head and hands around while squinting at the Quest’s peripheral, outer-radius pixels. I went searching for obvious artifacts in the region that I’d been told was most compressed. I spent my time in a colorful “hub” restaurant full of large characters and

lighting effects, and I honestly couldn't perceive significant issues with corner-radius pixels.

That might be because Oculus' official line might undersell how much compression is applied to the *entire* Quest panel, not just its outer radius. Though Quest comes with an appreciably high-res OLED display, rated at a 2,880 x 1,600 resolution, any Link-driven image appears to come with a mild-but-noticeable smoothing effect. Ultimately, it looked more detailed than native Quest content, but I could anecdotally confirm that a neighboring Oculus Rift S game station looked noticeably sharper, even though its LED display is rated at 2,560 x 1,440.

That sense of improved smoothness might be due to Rift S running at a slightly higher refresh rate of 80Hz, compared to Quest's refresh maximum of 72Hz. There's also the matter of movement latency, which Oculus Link researchers confirmed was a problem that needed solving before Link could go live. The researchers' solution was to break down the required encoding-and-decoding transfer from PC to Quest in a process they call "sliced image transfer." Basically, each frame of visual data is sent in horizontal strips, one on top of the next, to be decoded and displayed, instead of doing that process for one discrete frame at a time.

Smooth: That's how we do it

That sounds like a recipe for "screen tearing," in which different parts of a screen's image slam together as broken-apart strips. But I didn't perceive anything of the sort in my demo. However, when using this week's test version of Quest Link, there are clearly an extra few frames of latency between when I wave my hand or press a button and when that happens in the VR world in kind. That irregularity is perhaps on par with the latency found in wireless systems like the HTC Vive Wireless Adapter or maybe a hair faster than those. I'll need

more time to test before feeling confident on that call.

But as I've already reported, Oculus Quest's built-in array of sensors is solid, and my natural head and hand movement didn't get lost just because I'd switched from a Rift S to a Quest. That's promising.

I also conducted my test with the official Oculus Link Cable (seen in an above gallery), which is fiber optic and runs five meters long. I agreed with the Oculus call that this cord is designed specifically to distribute its extra plastic bulk in a way that barely feels noticeable, as opposed to a standard, sticking-straight-out Type-C cable you might buy from Monoprice. But Oculus hasn't announced a price for this cable, which doesn't inspire confidence. (Hopefully Oculus didn't hire someone from Monster Cable to pick a price.)

The Quest Link presentation ended without a Q&A portion, so I didn't get to ask questions about compatibility with other VR software platforms like SteamVR. The good news is that the Quest Link connection wholly emulates a standard Rift S headset, and that hardware already works great with existing SteamVR software. So I'm optimistic.

There's always a chance that my test experience from this week will be superseded by more tweaks and updates to Quest Link before its November launch. Even so, I left my demo feeling confident in two things. First: Oculus clearly went to engineering trouble to make this work without any additional hardware. That's great news for existing and future Quest owners, in terms of future-proofing its device to some extent.

Second, Quest Link introduces obvious, acceptable compromises, and that means anyone who prefers PC-VR and ponied up for a dedicated computer VR system should chill out on their buyer's remorse. Quest Link is cool in a pinch, not the ultimate PC-VR option.

Quest hand tracking: Fine as a free update, not yet a game-changer

- Zuckerberg announces the first official hand-tracking product from Oculus, coming to Quest in “early 2020.”
- A brief demo video includes footage of how hand tracking may look in an Oculus Quest game.
- Another peek at how Oculus Quest’s camera array translates hand and finger data.
- Whoosh, analyze those hands, Oculus.

Oculus also invited me to test two implementations of its first-ever hand-tracking solution, coming to Oculus Quest in “early 2020” without any additional hardware. That’s the kicker: Quest’s version of tracking real hands in VR isn’t good enough to recommend paying additional money. But as a wholly free option, it’s pretty darned good.

The best news about Oculus Quest hand tracking is that, when it works, it’s nearly instantaneous. Hold your hands out, flip them around, wiggle your fingers, and make common hand gestures—and they’ll appear as remarkably accurate representations in the VR world. So long as your hands aren’t touching each other, Oculus Quest’s inside-out array of tracking cameras (“Oculus Insight”) models them quite well.

My first test was to flip the bird, which the Quest modeled correctly. (Meaning, Oculus isn’t actively censoring your silliest gestures.) But I was more intrigued by how well Quest modeled my fingers when they pinched or clenched. This kind of gesture—in which fingers come together like a bird’s beak, faced outward—could be difficult for Quest’s built-in cameras to perceive. But Quest never stumbled in that respect; its sensors always understood my desire to pick things up. I could never say the same thing about the LeapMotion add-on for standard VR headsets.

The catch? Neither app I tested allowed me to pick up, carry, or drop objects in VR. One of them was an incredibly simple training app with Farmers Insurance branding, and it simply had me point to “water damage” spots in a kitchen and determine whether they looked like something to repair or something to mop up. It was as mild of a hand-tracking experience as they come. (I suppose it also throws more evidence onto the research pile that video games are actively training our children to become… insurance adjusters.)

The second app, *Elixir*, was far more impressive, even though it, too, didn’t include true “physics” interactions with VR objects. Instead, I could put my hands into various pools of water, lava, poison, or electricity, and then my virtual hands would transform with strange mutations. The best one made my hands resemble those of X-Men’s Wolverine; when I clenched my fists into a ball, claws bolted, “fwwwwsh”-style, out of my knuckles. As my hands mutated, they exploded with visual effects *and* made convincing sound effects. Without the haptic rumble of a controller, that audio-visual feedback was crucial in selling hand tracking as an immersive VR experience.

But, again, I couldn’t put my hands together. That’s when they’d vanish. Quest hand tracking constantly scans for some sort of skeletal pattern, and it likely punts the touching-hands conundrum to lighten its processing load. I’m happy to concede that for the sake of VR usability, but the larger current issue is that the Oculus Insight tracking system struggles to keep track of hands outside of a central visibility point. Take either hand outside of your forward-vision cone and it vanishes pretty quickly; worse, that hand requires nearly a half-second to reappear in VR once it’s back in the cone.

Should Quest hand tracking continue to suffer from this vision-cone issue, that will likely nix it as a reliable control option for active video games. (It’s a good thing Oculus Touch works so darned well, in terms of tracking and

speed.) But I’m hopeful that the features that *do* work in this early stage—occluded finger tracking, high-speed hand recognition, and grabbing and pinching—are paid forward with apps on the education, training, communication, and accessibility fronts before long, especially as a Quest default. (Say it with me: sign language as a built-in VR standard.)

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