

# TALENTED







# TALLINN

THANKS TO ESTONIA'S CONTRIBUTIONS TO THE CREATION OF SKYPE, MASSES OF TECHNICAL TALENT AND INNOVATIVE E-RESIDENCY SCHEME, ENTREPRENEURS AND INVESTORS THE WORLD OVER ARE FLOCKING TO GET INVOLVED IN ITS ECOSYSTEM

BY JOSH RUSSELL

**NO MATTER WHO YOU TALK TO**, the Estonian capital Tallinn has a serious rep for tech. While there are just 400 startups in the country, with a population of scarcely more than a million people it actually has the third-highest number of startups per capita in Europe, according to the Startup Investment Report Estonia by Funderbeam, the blockchain-based startup stock exchange. Clearly Tallinn has become a startup hub to reckon with. "It's incredible: in the past few years, there has been a startup explosion," says Norris Koppel, co-founder and CEO of Monese, the mobile current account startup. "It almost feels like startups have taken over the city. There have been multiple references now to Tallinn being the Silicon Valley of Europe." ►



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Despite this, Tallinn hasn't always been synonymous with tech startups. "Twenty years back, there weren't any startups in the way we would define them today," says Koppel. In fact, in 1991, the country went through a very jarring rebirth: while the disintegration of the Soviet Union and Estonia's declaration of independence meant the nation regained its sovereignty, it also meant that its infrastructure all but collapsed. "Initially it was very painful: the Soviets left and everything fell apart," Koppel says. "There were no police, no banking system as such, so we had to quickly rebuild everything."

But excruciating though this was, rebooting the country's infrastructure from scratch actually proved to be a blessing in disguise, allowing it to modernise much faster than more well-established nations. "If you start to build a new house today then you use the latest materials and technology available," says Karoli Hindriks, CEO and founder of Jobbatical, the talent-matching platform for international tech jobs. "Whereas renovating a very old castle will be much harder."

Just as the internet age was dawning, Estonia was looking for efficient ways to implement bureaucracy and infrastructure and naturally it made best use of the tools at its disposal. And the result is that, for several decades, the country's bureaucracy has been primarily digital: not only was internet access declared a basic human right in 2000 but citizens have long been able to do things like pay taxes, open bank accounts, secure mortgages and vote in elections online. "The user experience of the country is really easy: setting up a business takes ten minutes online from a cafe," Hindriks says. "You waste so much less time on things, which means you can actually invest that time in building your business."

While this supplied the fuel for Tallinn's tech revolution, the spark that finally ignited it is likely much more familiar to less digitally native nations: Skype. Although the startup was founded by the Swede Niklas Zennström and the Dane







Janus Friis, much of its tech was developed by an Estonian developer base led by Ahti Heinla, Priit Kasesalu and Jaan Tallinn. “Skype’s success showed Estonians that it can be done,” says Koppel. “It doesn’t matter that you’re a tiny country where it’s cold and dark: big companies like Skype can emerge.” And the video-chat app’s meteoric rise and its high-profile acquisitions by eBay and Microsoft have not only inspired a new generation of entrepreneurs but also helped to seed and support the growth of many new startups. “Many people exited Skype with a little bit of cash in their pocket and, eager to do something else with this new money, started their own businesses,” Koppel says.

And Skype’s success didn’t just get budding business people to start taking tech seriously: it also cemented the importance of entrepreneurialism in the eyes of the Estonian government. “It made it really clear to the government that good things will come out of the startup ecosystem if it is nurtured properly,” says Koppel. Not only has the government taken an active interest in promoting Tallinn’s startups on the international stage but it also makes itself far more available to the city’s entrepreneurs to ensure the needs of the ecosystem are heard. “Entrepreneurs can speak to decision makers as and when we want,” Koppel says. “I’ve spoken to

a number of presidents and prime ministers and haven’t had to work that hard in order to get that sort of access.”

While it may be easy at first to dismiss this as politics as usual, with politicians paying lip-service to the concerns of the community, it has in fact yielded radical results. In 2014, the country launched its e-residency scheme, a potentially revolutionary innovation that allows entrepreneurs from around the world to become Estonian e-residents and access company formation, banking, payment processing and taxation within the country. “E-residency is doing for countries what startups are doing to corporations,” says Hindriks. By lowering the barriers to establish a company in the country and making it easier for international entrepreneurs to access its infrastructure, it could be argued the e-residency scheme is disrupting the idea of nationality itself. “The openness to taking a risk like that is a very good reflection of the mindset that you see in Estonia,” Hindriks says. “Instead of asking ‘what might go wrong?’, you can see the opportunity of it.”

But while Estonia isn’t afraid of dreaming big, this doesn’t mean that Tallinn’s tech is in any way flighty: in fact Estonia’s entrepreneurs, by their very nature, have a preference for the practical. At a time when much of Europe is struggling to secure the technical skills needed to drive its tech forward, Estonia is widely recognised as producing the highest calibre of coders. Part of the reason for this is that while western nations have started waking up to the importance of strong STEM education, many of Tallinn’s entrepreneurs were raised under an education system where these subjects predominated. “Not that I want to say anything positive about the Soviet Union but the education system ►



**THE USER  
EXPERIENCE OF THE  
COUNTRY IS REALLY  
EASY: SETTING UP  
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TEN MINUTES  
ONLINE FROM A CAFE**

Karoli Hindriks, Jobbatical



had a very strict focus on science and mathematics,” Hindriks says. Inevitably, Estonia’s shift toward being a digital-first society hasn’t tempered this passion for technical skills. “Science and technology are still very important in the curriculum,” says Hindriks. “Kids are taught coding in the first grade.”

And this is reflected in Tallinn’s attitude to entrepreneurialism. “It’s a very pragmatic culture: they’re very down to earth,” says Michael Jackson, ex-COO of Skype and partner at Mangrove Capital Partners, the early-stage VC firm. “You’re more likely to get projects that solve definitive issues rather than do fancy, hipsterish sort of things.” While Silicon Valley obsesses over nailing the next social smash or unveiling the Ubers of umpteen different verticals, Tallinn’s entrepreneurs are focused on delivering much more practical, polished products. In fact, one only need compare the Valley’s beleaguered ride-sharing startup with Estonia’s Taxify to see how in Tallinn firm foundations are valued higher than flash. “The young men behind it are doing very well; they’re very down to earth,” Jackson says. “They’ve got a fraction of the staff of Uber and yet they have decent turnover, are very pragmatic and have grown without a lot of investment.”

Historically, this preference for building more organically may be part of the reality of the Estonian investment landscape, which has taken a while to mature. “In the early days, the typical Estonian investor wanted to invest €10,000 for half of your company,” says Koppel. “But I’m very happy that this thinking has started to change.” With high-profile successes like those of Skype bringing an influx of capital into the country, increasing numbers of homegrown angels are looking to invest in the next generation of startups. Meanwhile, the number of Estonian VC funds is currently exploding: the next year alone will see the creation of multiple seed funds offering around \$30m to \$50m. But perhaps most importantly, thanks to its top-notch tech skills, international funds are increasingly eyeing the



## SCIENCE AND TECHNOLOGY ARE STILL VERY IMPORTANT IN THE CURRICULUM: KIDS ARE TAUGHT CODING IN THE FIRST GRADE

Karoli Hindriks, Jobbatical

Estonian ecosystem and looking to invest in its innovations. “Technical talent and founders from Tallinn are really well known now,” Koppel says. “If you go to any Silicon Valley VC, they know who Estonians are and where they are coming from.”

And Estonian entrepreneurs certainly aren’t turning their noses up at this attention from overseas: while Tallinn’s ecosystem is coming along in leaps and bounds, the size of its market means that its startups need to be thinking internationally from their inception. “Estonia’s a tiny country with 1.2 million people; it’s about the size of Bristol,” says Jackson. “They know it’s a small market so if they’re going to introduce a product that’s going to be any use at all, they know they’re going to have to try to move somewhere.” Thanks to this and the role Skype has played in whetting many Estonians’ appetites for entrepreneurialism, for

years many of them have looked to follow in its footsteps by expanding to Silicon Valley or, if not, London.

However, it does seem like attitudes are changing. “The more coverage the country gets in terms of thinking differently, being different and being an innovator, then I think we will see much more VC money but also founders actually coming to Estonia,” says Hindriks. Not only are initiatives like e-residency drawing in founders virtually but the buzz around the hub is motivating them to move there in their droves, with many international entrepreneurs looking to tap its talent and make use of its friction-free infrastructure. “You couldn’t even imagine that happening five years ago or ten years ago,” she concludes. “There’s much more confidence about the future so I think we will see many more people looking to build their company from this corner of the world.” ✕





# Master the metaverse

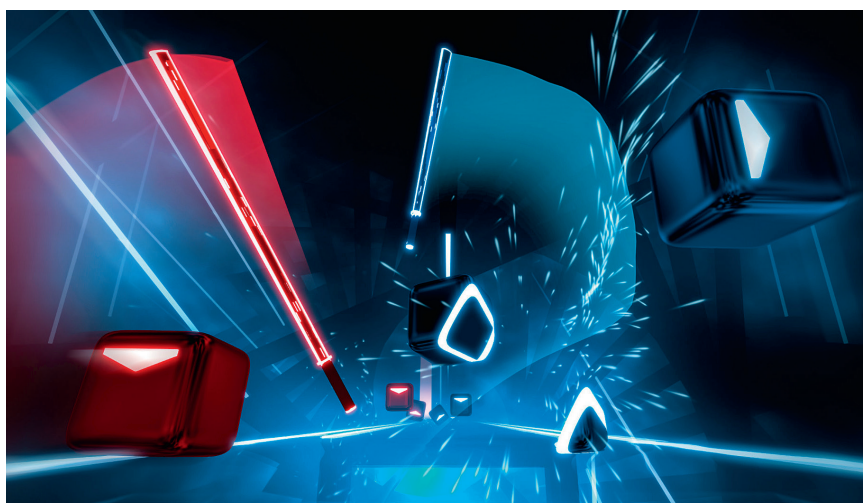
Does the future of humanity lie in an online VR universe?

Words: Louise Blain

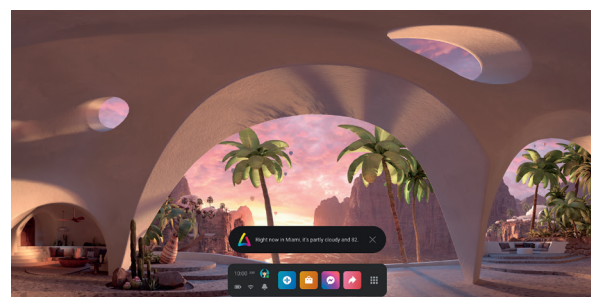


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**ABOVE** Developed by Beat Games, *Beat Saber* is a game that moves to the rhythm of your body  
**RIGHT & BELOW** VRChat allows users to play *Dungeons & Dragons* together or even attend free concerts



**I**t's already one of the key 2022 tech bingo phrases. Alongside NFTs and cryptocurrency, the metaverse has become a buzzword for the future of the internet. But what does it actually mean? Is it really only a matter of time before we're living in a *Ready-Player-One*-style world where we're happier in a VR headset and haptic suit than our own day-to-day lives? It's time to dive into the metaverse for some answers. There are no wires where we're going but don't worry your headset is fully charged.

The metaverse is difficult to put a precise label on. It's why amidst the technobabble and jargon, it's still easy to ask 'But how?' and not really get a clear answer. The term was first used in a dystopian 1992 novel called *Snow Crash* by Neal Stephenson but don't let that put you off. In it, the metaverse is a shared digital world experienced in 3D via a headset, which isn't terribly far removed from our current generation of virtual reality goggles.

VR is the primary focus of the current ideas around the metaverse. Headsets are seen as a 3D portal to a shared online experience where we can all exist together.

In this world, we would see the same concerts, watch the same movies, and interact in a digital persistent universe. While mini metaverses are already happily in play in various online games like *Fortnite* where live events can be experienced in real time, we're going to be looking specifically at the VR elements of the metaverse.

It's important to note that the metaverse as a concept shouldn't belong to any one company. Facebook might have changed its name to Meta and hired 10,000 staff to build its metaverse future but this shared world can't belong to one tech firm. The metaverse should belong to everyone. Think of a digital high street packed with shops belonging to big tech brands. In

## The metaverse as a concept shouldn't belong to any one company

theory, the metaverse should be the concrete under your feet and the bustle of fellow shoppers. And here lies the first limitation of our current 21st century metaverse experience. We don't really even have a car park.

### A FRAGMENTED METAVERSE

Headsets like the affordable Meta Quest 2 – bye, Oculus, thanks for all the memories – mean that virtual reality has never been more accessible but that doesn't mean VR headsets are commonplace. A 2021 survey of UK internet users found that 4% of people own a virtual reality headset. Within that 4%, 1.7% own a high end headset like a Quest. That's just over one million people in the UK who can get their head directly in the game. Numbers wise, obviously this ownership pales in comparison to something like the 13 million UK Netflix subscribers but that's to be expected in the early days of a new technology. VR Rome wasn't built in a day, after all.

The uphill struggle for the metaverse, though, is that the majority of these VR experiences are disconnected. When most of us put our headsets on, we're in isolation



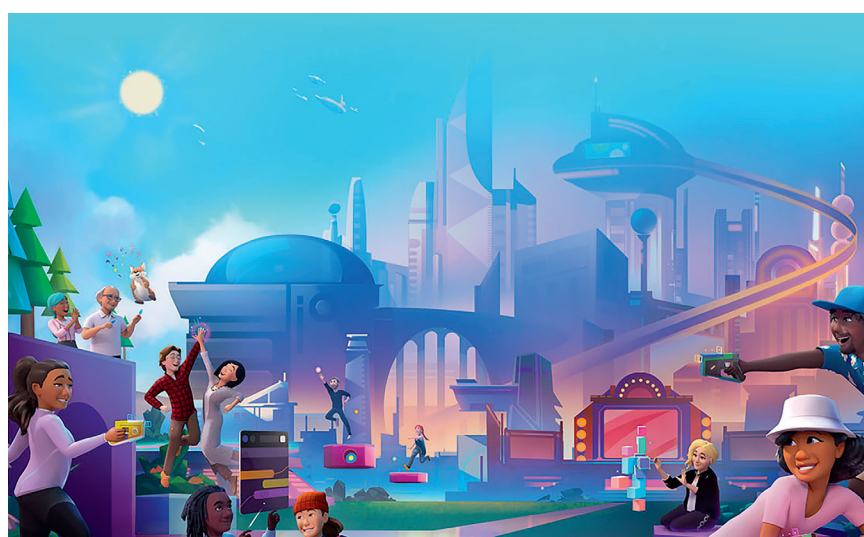






**ABOVE** With Spatial, you can get together with people from all around the world in one virtual space

**RIGHT & BELOW** Quest offers up environments that are nothing like what's ever been seen before



and we stay that way. Whether it's a *Beat Saber* session with the new Lady Gaga pack or the vertigo-inducing *The Climb 2*, a VR experience is largely an isolated one. Even multiplayer games are with small clusters of friends but really aren't like easily jumping into an open VR pub to shoot the breeze with our pals.

The early days of the internet are an easy comparison; disparate individual uses of a technology that lacks a common infrastructure or a language to tie things together. It doesn't mean that a VR metaverse is dead in the water – in fact, quite the opposite – but until we cohesively tie these threads together across multiple headsets, platforms, and points of entry, a full metaverse might feel like something of a distant dream.

Given that cross platform play between Xbox, PlayStation and PC has only just become a reality in a limited number of games specifically built for this functionality, it's easy to see the kind of hurdles facing a true metaverse. Those throwing around the prospect of the technology meaning that you can take weaponry between your favourite

videogames have probably never even tried to download a cloud save.

## STATE OF PLAY

But that doesn't mean there aren't places to have a taste of what could come. Many of these individual, what we might call 'mini metaverses' are a great way to see the potential in a more open online world. The push for more shared experiences means that we can see what it's like to rub digital shoulders with fellow goggle wearers and the biggest apps work across multiple headsets. VRChat, one of the most popular, can be accessed from the majority of headsets and allows users to just play *Dungeons & Dragons* together or even

attend free Jean-Michel Jarre concerts with binaural audio.

VRChat was even used by the Venice Film Festival in 2021 to build virtual worlds to host its VR competitors. Millions have been spent on the VR elements of global film festivals over the last few years. With creators working in immersive VR, AR and mixed reality spaces, festivals like SXSW have created online portals to let as many people as possible interact with this innovative new content. The dream metaverse would give us open virtual cinemas to load up to experience these creations but individual apps are doing the heavy lifting for now.

Plus, with working conditions over the last few years shaped by the pandemic, shared productivity apps have also thrived. Quest has its own proprietary Horizon Workrooms app and there's also Spatial on Quest, which also works with iOS, Android, and PC. This lets you create a 3D avatar to spend time with fellow app users. Spatial has a park to hang out with friends – well, the top half of them at least – and you can go to organised events in custom spaces and even NFT art galleries. Spatial and Horizon

## Millions have been spent on the VR elements of global film festivals





Workrooms, as well as apps like Arthur and Immersed, are only the tip of the iceberg when it comes to experiences geared towards sharing digital spaces with whiteboards even when you can't get together in person.

### GAME ON

There is still a very clear delineation between the visual quality of VR gaming experiences and those of proposed metaverse content. Load up an app like VRChat or Spatial and you might be surprised at the Second Life or PlayStation-Home-ness of it all. Avatars are often basic and painfully rudimentary, which feels ironic in a world where games like *Half Life: Alyx* exist. Quest's shared Horizons app feels a little gentler and cosier but still alien enough to be, well, alien. But that doesn't stop these experiences from feeling layered with potential. There's something here once we get over waving at each other and apps like Horizon deliver innovative creation tools.

Truthfully, the current metaverse space feels perhaps what it should at this point in time; experimental and strange. VRChat doesn't feel so much like a futuristic city as a mash up of consciousness with various

bizarre avatars running around, and it's easy to be left feeling cold. The best way to experience the idea of a shared VR universe still might be in closed groups with friends, ironically. Working out together in *Beat Saber* or *FitXR*, or gathering a group for a game of something like *Star Trek: Bridge Crew*. Bonding across VR platforms is a perfect example of how this tech can work in a satisfying way. Suddenly your in-game hands feel like they have purpose and built-in microphones aren't just for obscurities. It just isn't quite *Ready Player One*.

### THE FUTURE

Then how does the future look? Well, complex but exciting. VR has never been

more accessible and the addition of more headsets at multiple price-points mean that onboarding shouldn't always be too painful. It's also useful that the majority of the new headsets have access to shared platforms such as SteamVR to prevent further fragmenting. Yet this means that specific companies will always have control. Valve holds the keys to SteamVR and Meta's Quest content is carefully cultivated for its own headsets. Using the analogy of the shopping street again, we still don't have that neutral ground from which to browse.

There's also the affordability of this digital world to consider. Cheaper headsets will be good onboarding for specific experiences but Panasonic's MeganeX, the Valve Index and the majority of HTC Vive's offerings demand a high-performance PC. With the constant increase in graphics card pricing, room scale VR set-ups now cost thousands of pounds to build. Add in the latest in haptic accessories and a metaverse future isn't cheap but it does feel exciting. Even in a fragmented state, the possibilities feel endless as long as we are happy under the control of big tech firms such as Meta. But that truly free future might still be a sci-fi dream.

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## Bonding across VR platforms shows how this tech can work in a satisfying way

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# VR HEADSET ROUNDUP



1

## META QUEST 2

Take away the Oculus name and all of a sudden existing Quest owners already own a little bit of Mark Zuckerberg's future metaverse tech. The standalone Meta Quest 2 continues to be the VR gift that keeps on giving with an ultra-attractive price point and no need for additional tech other than your smartphone. Plus the stratospheric success of the system means that the Quest doesn't suffer from a lack of dedicated apps. There are hundreds of games and experiences to make the most of the improved screen, speedy processor, and eternally impressive Touch Controllers with individual finger tracking. If you're looking to play on PC, you can always just plug in for games like *Half Life: Alyx*.

From £299, [oculus.com](https://www.oculus.com)

2

## PLAYSTATION VR2

There's no release date, pricing or even visuals just yet – hence the image of the original PSVR above – but Sony has revealed it isn't leaving VR behind. The PlayStation VR2 and Sense Controllers will, unsurprisingly, be exclusive to the PS5 and use cameras on the headset to track your hands in real time. A 4K display with 2000 x 2040 pixels per eye was a predictable upgrade but less so are what Sony is calling 'sensory features'. We'll be experiencing haptics through the new controllers but also directly through the headset thanks to a built-in motor. This means feeling character heartbeats and even the whoosh of near misses. With eye tracking confirmed as well, the PSVR2 is an exciting proposition.

£TBC, [playstation.com](https://www.playstation.com)

3

## LYNX R-1

Why choose between AR and VR when you can do both? The Lynx R-1 mixed reality headset was a resounding Kickstarter success last year and is aiming for true versatility. This also means that as well as AR and VR it also works in both wired and unwired forms. The Lynx R-1 has an impressive 1600x1600 pixels per eye and runs on a speedy Snapdragon chip that can stream Steam VR over Wi-Fi. It's got an SD card slot for upgradeable storage, as well as built-in speakers and microphones, and a unique headband-like design to suit mixed reality experiences. If you want to solely use it for VR though, you'll want to buy the add-on Facial-Interface to block out the rest of the world.

£438, [lynx-r.com](https://www.lynx-r.com)



**4****PANASONIC MEGANEX**

Maybe those Steampunk cosplayers were onto something... Panasonic's Meganex VR goggles from its Shiftall division are ultra-compact and make the most of OLED micro-display tech. This means there's no messing around with fidelity: the Meganex delivers an incredible 2560x2560 pixels per eye, meaning it offers 5.2K imagery with HDR functionality, and a smooth 120Hz refresh rate to boot. Weighing in at just 250g, this headset unsurprisingly needs to be connected to a PC and we haven't seen the controllers just yet. Panasonic has confirmed that these goggles will work with SteamVR games and apps, making this officially the lightest and graphically detailed way to play. **£TBC, [panasonic.com](https://panasonic.com)**

**5****HTC VIVE**

Why choose one VR solution when you can have them all? HTC Vive's suite of consumer and professional headsets is so unique that we're ignoring T3 convention and mentioning three different ones. The Vive Flow is an ultra light set of VR goggles with a built in cooling system for on-the-go VR with a focus on wellness and relaxation, while the HTC Vive Focus 3 is a professional all-in-one equivalent of the Quest 2. Vive is known for its superior room-scale tracking and that's now left to the high-end Vive Pro 2 with base stations. Also essential is the unique Viveport subscription that includes a Gamepass-style collection of titles to save you spending even more on games. **From £499, [vive.com](https://vive.com)**

**6****VALVE INDEX**

It's easy to forget that Valve has its own dedicated SteamVR hardware and that's at least partly down to the pro-level price-point. It is possible to buy elements standalone but the full Valve Index set up includes a headset, two Index controllers, and two base stations with stands. You're tethered to your PC – and a wall power adapter – but the cable is 16ft, giving you plenty of leeway for full room scale VR. The headset delivers a smooth 120Hz experience but the true winners here are the intuitive Index controllers with finger tracking. Even compared to the Quest 2 controllers, the Index feels surprisingly natural. You haven't played *Half Life: Alyx* until you have played it on an Index. **£919, [store.steampowered.com](https://store.steampowered.com)**





# ACCESSORIES



1

## OWO HAPTIC VEST

Bullets entering and leaving your body... insects crawling... free fall... no, we're not just writing random words. These are among the many *feelings* that the OWO Haptic Vest can deliver. Each sensation can be fully customised with an app and the OWO works across VR, PC, console, and mobile, so no one can miss out on the as-yet-unpriced touchy feely fun. **£TBC, owogame.com**

2

## HTC VIVE WRIST TRACKER

The latest wrist-worn HTC Vive tracker unveiled at CES 2022 has been designed for the Vive Focus 3 headset. Not only can it be worn but you can also attach it to other accessories like sports gear for full 3D tracking. Plus, if it's on your wrist but not in direct view of the headset, it can still predict movements thanks to advanced kinetic modelling. **£119, vive.com**

3

## PROXIMAT FITNESS EDITION

Staying safe in the real world while your head is in a virtual one is essential. To save any unfortunate controller meets wall incidents, the ProxiMat Fitness Edition mat is specifically for keeping your feet in place while playing *Beat Saber* and *FitXR*. The textured foam is a tactile reminder to stay in place while you're working out. **£25.75, proximat.net**

4

## SHIFTALL HARITORAX

Let's face it, hand tracking isn't quite enough for full metaverse immersion. The Shiftall Haritorax is a body tracker for both your torso and legs to fully upload yourself. Thankfully there are no wires to make things tricky and the battery lasts up to ten hours at a time. And while you will need a PC to make the most of it, it's fully compatible with SteamVR. **£197, en.shiftall.net**





5

**BHAPTICS TACTGLOVE**

Consumer versions aren't coming till the end of 2022 but the bHaptics TactGlove quite literally *feels* like future VR tech. With an actuator in each finger for the precise sensation of touch, these stretchy gloves are compatible with existing hand tracking headsets like the Quest 2. With built in batteries, they even have a washable liner to keep things fresh.  
£219, [bhaptics.com](https://bhaptics.com)

6

**NEW ALIENWARE AURORA**

If you're not going for a standalone headset, you're going to need a gaming PC that can keep up with the graphical demands of the metaverse. The New Alienware Aurora comes with an i7 processor and the blisteringly powerful Nvidia GeForce RTX 3080 with a mere 10GB of RAM. Fittingly, the case looks straight out of Area 51.  
From £2,899, [dell.com](https://dell.com)

7

**ANKER CHARGING DOCK FOR QUEST 2**

Anker's charging station solves two Quest problems in one stylish go. Not only does it actually give you a dedicated place to store and charge your headset but it comes with rechargeable AA batteries and custom wireless charging controller covers. So no more rummaging around for spare Duracells, thankfully.  
£99, [oculus.com](https://oculus.com)

8

**LOGITECH G PRO GAMING HEADSET FOR QUEST 2**

To truly block out the analogue universe you're going to want proper gaming headset drivers. These official Logitech G cans come with a shorter cable and velcro strap for smooth integration with the headset. The memory foam headband and earpads mean serious comfort even for long VR sessions.  
£84.99, [logitech.com](https://logitech.com)