

# What you need to know about Magic Leap One

6 February 2019 | **Augmented & Virtual Reality** | [Michael Sattler](#)

**Reading time:** 8 minutes

**So, there is now a competitor to Microsoft's HoloLens in the market. To Augmented Reality enthusiasts, this is nothing new: For several months now, all the AR-focused media channels and social media have been abuzz with news and reports on the "magical" new darling in AR. I also had a look at the new Magic Leap One.**

Many tech mags and independent experts have given their two cents on the device, on what makes it great, where it falls short and how it compares to HoloLens. Most of these reports have just focused on the technology itself. With Zühlke being a provider of larger industrial solutions, however, I'd like to offer my own take on [Magic Leap One](#) by pointing out how it holds up in industrial scenarios.

## **Making tech more accessible**

From the very first presentations of Magic Leap's new, shiny device, it has become apparent that Magic Leap doesn't want their headset to be just a developer kit for AR experiments. They have pitched their device as the next big thing in Mixed Reality, a leap towards making the tech more accessible and more compelling for everyone. Well, they did make good on some of that promise.



The actual hardware for computation and the battery are stowed away in the “Lightpack”. (Zühlke/Simon Ziffermayer)

Magic Leap’s concept has the user only wearing part of the package on their heads. While the “Lightwear” glasses only contain the visualization and sensors, the actual hardware for computation and the battery are stowed away in the “Lightpack”, which is clipped into one of the user’s pockets. This allows for longer and more comfortable periods of usage. Also, Magic Leap is easy to just pick up and try out. Whereas most first-time HoloLens users struggle with the correct position on their nose and the correct execution of the Air-Tap gesture, Magic Leap is very intuitive to adjust to. Also, the hand-held controller feels comfortable and is easy to get used to.



The hand-held controller is easy to get used to. (Zühlke/Simon Ziffermayer)

The controller also allows for some pretty clever interaction schemes. You no longer have just the direction of your gaze and the position of your hands to work with, but also six degrees of freedom (6DoF) when moving the controller, three buttons (one of them being a system button) and a trackpad. Depending on the situation at hand, your controller becomes a laser pointer, a handle for moving and rotating objects, a phaser gun – the possibilities somewhat resemble what you can find in the hand controllers of VR systems like HTC Vive and Windows MR.

And, yes, from a purely technical point of view, Magic Leap can also hold its ground. [Graphics and audio are at least on a par with HoloLens](#), with the spatial mapping of your surroundings even having a small edge on HoloLens: Even objects with a diameter of about 5 cm are properly tracked.

### **Limitations in industrial environments**

You may already have guessed it, though: Where there is light, there is also shadow. In some respects, Magic Leap's focus on making a consumer-grade device got the better of them and made the device less than ideal for applications used in your workplace instead of your living room.

- Let's start out with the headgear itself. Magic Leap has decided to give the glasses a bulky frame instead of see-through shades like HoloLens. Aside from the fact that this isn't

everyone's cup of tea from an aesthetical point of view, it does limit your field of view significantly. While this may cater to the immersive effect as more of the remaining field of view is filled with augmented content, having limited peripheral vision can be hazardous in industrial environments. Your downward field of view is still unobstructed, so at least you don't trip over stuff. But not being able to look to the side or upwards without turning your head may be dangerous. Also, the lack of peripheral vision can more easily lead to VR sickness than HoloLens's open field of view.

- Additionally, the device's design doesn't allow for wearing prescription glasses while using it, so you need prescription insets, which may be less than ideal if you want to share the headset with your co-workers. To be fair, though, Magic Leap has the advantage of not needing manual adjustment of the pupillary distance when handing the device to another user. Mixed
- The hand-held controller interaction also has some downsides. While it allows for precise and versatile hand input mechanisms, it always has you using one hand for the controller - you cannot just use both of your hands to work on some piece of equipment, at least not without some place to put your controller.
- Speaking of places to put your controller: In industrial environments, you will be limited in that regard, as the controller is magnetically tracked. While this is fine in the average household with most surfaces made of wood or plastic, any magnetic equipment, electric cables and even metal surfaces will interfere with the controller's tracking and make its perceived position move all over the place once you get too close. There is support for voice input and even several possible hand gestures and hand tracking, which could be used to circumvent the controller's shortcomings. Right now, though, nearly all of the available apps and the entire OS are built around the controller, so it remains to be seen how well they are going to work in industrial scenarios.
- Onward to the "Lightpack". Although the pocket-worn design removes some weight from your head, it comes with the risk that you knock the pack against things with your waist in narrow environments. Unfortunately, you can't just put the device inside your clothes to protect it, as for one, it's a little bulky, and also, it needs air for cooling. The rigid pocket-clip design is also not well thought out: The gap into which you slide the fabric of your pocket is stiff instead of flexible, and it's too narrow to even fit over a belt. So, if you're wearing an overall without any pockets or maybe a skirt, you're out of luck. Fortunately, you can get a strap for wearing the Lightpack over your shoulder.
- What's worse, the solid and non-pluggable connection between the glasses and the Lightpack comes with the risk of the wire getting caught. This can lead to strangling yourself, having your head suddenly pulled back or the wire getting torn off from either the Lightpack or the glasses. In the European market, this could potentially cause conflicts with regulatory requirements [such as the EU Low Voltage Directive](#). Needless to say, Magic Leap One does

not yet come with the CE marking.



While the “Lightwear” glasses only contain the visualization and sensors, the actual hardware for computation and the battery are stowed away in the “Lightpack”. (Zühlke/Simon Ziffermayer)

- There is one more issue concerning the system’s performance. While most of it is on a par with or even superior to HoloLens, the head tracking is where the device is lacking significantly. On HoloLens, we’re used to rock-solid motion tracking and perfectly stable holograms, provided by the device’s Holographic Processing Unit (HPU). Magic Leap One on the other hand handles everything in software, and this becomes apparent here. Head tracking works mostly fine, as long as you always keep some trackable environmental features in your field of view. But once tracking becomes unstable, the device has big trouble regaining its bearings, and holograms start jittering and drifting heavily. So, for use cases requiring content being rendered world-locked at high precision, Magic Leap is probably not suitable.

### **Mixed Reality for the consumer market**

Now, isn’t there anything good to say about the industrial capabilities of Magic Leap One? Well, actually, there is. First of all, Magic Leap uses several Waveguides per eye, allowing for two focal distances content can be rendered at. This makes it more comfortable for your eye to look at objects within arm’s reach than on HoloLens, where you’re limited to just one focal distance of two meters. The switch between the focal planes is noticeable as there is a slight deviation in color temperature between the two, but it’s still a great feature.

Also, the speakers pack a lot more punch than the HoloLens’s. In noisy environments they

can be cranked up to very loud volume levels, allowing you to still hear audio from the headset. In day by day usage, the USB-C connectors on both the headset and the controller allow for much quicker charging than Micro USB, so you'll spend more time actually using the device and less time having it sit next to the power socket. And finally, let's not forget that some of the hardware's capabilities are still untapped, such as the eye tracking capability.



Magic Leap One is a pretty great device, with a focus on very different scenarios than HoloLens. (Zühlke/Simon Ziffermayer)

So, at the end of the day, what does all this leave us with? In my opinion, a pretty great device, with a focus on very different scenarios than HoloLens. Magic Leap wants to reach everyone with Mixed Reality, even the average consumer, and their efforts and inspirational marketing in this regard are admirable. It remains yet to be seen whether they'll be successful in bringing the magic of Mixed Reality to the people. But that's also going to depend on us - the developers.