Guide: The Right AR Smart Glasses for Your Business

xmreality

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Introduction to your smart glasses guide

This guide will examine smart glasses for Augmented Reality (AR) use. AR smart glasses overlay information in your visual field via light displays. So, apart from seeing the 'reality' in front of you, you can also see objects that are not really there.

We will walk you through the most significant differences between models and other important information you need to know before buying your first pair of AR smart glasses. One thing to remember is that investing in smart glasses is a great choice if you need to operate hands-free, but there is no “one model fits all.”

Are you planning on using them in training situations? Or in a loud environment? For you to be happy with your choice, you need to evaluate the smart glasses depending on the use cases you want to use them for.

This guide includes the most commonly used smart glasses in the industry. Of course, there are other options out in the market - but remember that the models in this guide are top picks for a reason!

This guide starts with an overview of all models we recommend for industrial usage.

To help you narrow down your choices, we also include the top 5 things to consider before deciding on what pair you want to purchase:

1. Tethered vs. standalone
2. Voice command vs. touch control
3. Battery time
4. Noise cancellation
5. Certifications

Finally, you find an FAQ with the most common questions we get from our customers, a technical comparison of the models and examples of using remote visual assistance with AR smart glasses.

Vendors

RealWear
Microsoft
Vuzix
Epson

RealWear

- Easy to use with a hard hat or headband, RealWear has several options you can buy together with the glasses.
- Easy to switch between right or left eye dominance
- Voice-controlled with a high-resolution camera
- Works on WiFi, 3G, 4G or 5G
- Standalone models

When it comes to RealWear, it's essential to wear it correctly to get the best viewing experience from the screen. It will also significantly affect the device's ability to understand your voice commands and utilize the built-in noise reduction. When planning to be several users on a pair, the device may experience difficulty mounting correctly. However, RealWear's latest edition, Navigator 520, is easier to use and less sensitive to wear in a perfect way to see the screen.

Navigator 500

- Rugged and voice controlled with modular design

Navigator 520

- An updated version of Navigator 500 with a bigger and better screen

Navigator Z1

- Intrinsically Safe edition approved for ATEX & IECEx Zone 1 and CSA C1-D1 for usage in combustable environments

Microsoft HoloLens 2

- Standalone solution
- Using browser-based applications
- Shorter operating time compared to many other models
- Simulates having a browser window open, navigated with hand motion in an operating system similar to Windows on a PC
- Holographic display with spatial AR functions

Microsoft HoloLens 2 glasses will provide the most immersive AR experience since they have a holographic display. As a user, you will see 3D holograms overlaid in the real world, and those holograms use spatial AR to remain where you placed them (and yes, that is cool). With that said, they are also more expensive than most other models covered in this guide. The 3D holograms can be very useful in some use cases but less beneficial in others. We know from experience that it's easy to be blown away by the fact that they are cool, but remember to make sure they match your use case.

HoloLens 2 - Standard edition

HoloLens 2 – Industrial edition

Designed and tested to support regulated environments such as clean rooms and hazardous locations

Vuzix

- Use M400 and M4000 with glasses or headband to keep them in place
- Blade 2 also functions as safety glasses
- Controlled with touchpad, physical buttons, or voice commands
- High-resolution camera
- Works on WiFi, 3G, 4G or 5G
- Standalone models
- Install applications on glasses
- Water-resistant

One of the significant differences between the Vuzix models we cover is the so-called waveguide displays on the M4000 and Blade 2. The see-through optic display can show extra information to the user. The M400 has an OLED panel display, and the view you get as a user will be slightly smaller than the M4000, but since it is a covered display, it is more suitable for use outdoors. For the M400 and M4000, Vuzix offers upgraded versions (their extended series) with longer run times and more powerful batteries. The Blade 2 has everything built into the glasses, providing a lightweight and balanced device with good comfort but a smaller, shorter run time.

M4000

- A see-through lens with advanced full-color waveguide projection technology

M400

- Non-see-through lens

Blade 2

- A see-through lens with advanced full-color waveguide projection technology

Epson

- Phone tethered, i.e., needs to be connected to a pocket device, either the Epson Intelligent controller or your smartphone.
- Dual screens, big and clear and responsive view
- High-resolution camera
- Controlled with touchpad mode on controller or phone
- Application installed on phone/controller

Epson offers several smart glasses, but these are the first we think can compete in the industrial market. They have a big, clear dual screen, allowing the wearer to view and focus on details.

Moverio BT-45C

- Headband and helmet mounting options to fit a variety of work attire

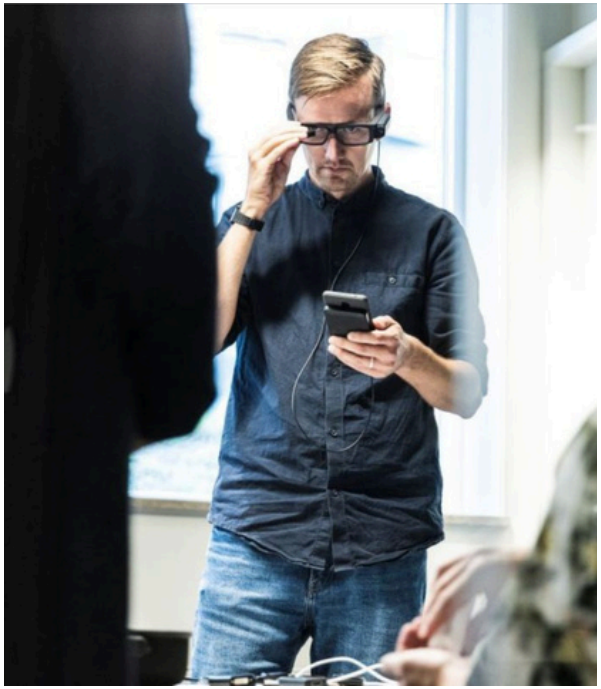
Top 5 things to consider

1. Tethered vs.

First, we'll look at the general setup of the AR smart glasses and how they are intended to be operated. What you need to decide is if you want the smart glasses to be used as a standalone device, or if you want to pair them with a smartphone. So, let's see what both options entail.

TETHERED

Tethered smart glasses need to be connected to a smart device, usually a smartphone. The glasses operate through the connected smartphone, meaning you use your smartphone's interface, internet, and processing capabilities. This requires you to install the application on your smartphone, before you can access it while operating the smart glasses.



One advantage of tethered smart glasses is that the user doesn't need to learn how to navigate the smart glasses but instead uses their phone with a familiar user interface, which lowers the barrier to getting started for many. Another benefit is that there's no need to connect to the internet or download an application on the smart glasses; the applications only need to be available through the phone, which generally makes it easier to stay up to date with the latest app version. However, there can be more physical parts to keep track of when using a tethered solution, as the connection to the phone requires specific cables and sometimes also includes a pocket unit. Epson is an example of tethered smart glasses.

STANDALONE

Standalone means that the smart glasses themselves run the software and hold the operating system within the glasses. Standalone smart glasses are operated directly through the smart glasses, either by voice command and/or touch control.

RealWear, Vuzix, and HoloLens 2 are all standalone smart glasses that don't require additional hardware. On these devices, you can pre-configure the headset with everything needed, so the user only needs to connect the glasses to their Wi-Fi (and preferably read the instructions on how they work). These standalone solutions have their own user interface and operating system within the smart glasses device. One benefit to standalone solutions is that they don't require a phone and, therefore, to a higher extent, can operate while having your hands completely free.

2. Voice command vs. touch control

One of the major benefits of smart glasses is having your hands free when carrying out work. However, you will always need to navigate the glasses and switch between functions, and for some glasses, this is done by touch control and for others by voice commands. If you want to operate your smart glasses completely hands-free, pick a voice-controlled model. Using the smart glasses hands-free is especially handy if you are doing work that requires you to wear safety gloves or similar.

VOICE CONTROLLED MODELS

RealWear's models are, for example, primarily voice-controlled and can be configured to different languages. In comparison, Vuzix's smart glasses are controlled either through voice commands or by using the touchpad and buttons on the glasses.

TOUCH CONTROLLED MODELS

HoloLens 2 provides a large field of view with its augmented reality headset, using hand tracking or voice commands for navigating the user interface. But remember that even if you don't physically need to touch anything to navigate with hand tracking, you still require using your hands (for a person not wearing the glasses, you will appear to be waving your arms in the empty air).

The Epson glasses are a tethered solution, the user can control them through a connected device which can either be their own android device or the add-on controller unit. Regardless the user will need to use a hand to navigate functions during a call.

Note that all models require you to use touch when you turn them on.

3. Operating time

Operating time can be crucial depending on how you plan on using your smart glasses. Will you use it during a consecutive period that lasts for over 5 hours? Then you can exclude some models right away! Battery time can vary between just a couple of hours to an entire work shift, so if you plan for more extended usage or don't want to charge them very often, you should opt for a model with a long battery time.

Vuzix provides a lightweight solution for the M400 and M4000, including a hot-swappable battery for a longer operating time. For these models, Vuzix also has an 'extended series battery' that supports 12 hours of usage, and their standard glasses offer an operating time of around 5 hours. RealWear is another option that works well for longer sessions, and they also have a hot-swappable battery that lasts approximately 6-8 hours, depending on usage.

In comparison, Vuzix Blade 2, with the smaller built-in battery, has a shorter runtime of about 1-2 hours with typical use, and the HoloLens 2 is good for 2-3 hours of regular use. One thing to remember with Epson is that they are tethered, so you must also consider the tethered unit's battery.

One thing which we have discovered is that the devices' listed battery time is a best case scenario, a little like fuel consumption for cars. What activity you are using them for will also affect the battery capacity.

Noise cancellation can be a deciding factor if you use your smart glasses in loud environments, as it's difficult to provide, or get, instructions if you can't hear the other person.

4. Noice cancellation

RealWear provides active noise cancellation that works up to 95/100 dBA, depending on what model you are looking at. It means that you can operate in loud environments and still be able to speak to the person guiding you. The glasses have microphones that filter the audio and reduce the surrounding noise from the call. We tested in a 102 dB environment, and the smart glasses efficiently reduced the machine's noise, making it possible to speak without any trouble hearing the other person.

Vuzix models also have functions that filter the audio and reduce the surrounding noise from the call, and the HoloLens 2 also has four built-in microphones to provide noise cancellation. However, our best tip to ensure that the glasses work in a noisy environment is to test them or talk to someone who has tried them.

5. Safety classifications and certifications

Safety classifications or certifications for AR smart glasses help buyers understand if the model can be used in specific hazardous environments. For example, usage at oil and gas operations, chemical plants, fuel handling, or other environments that require extra caution. In other cases, you can use them in an industrial environment and want to make sure they are not too fragile. So before you choose a smart glasses model, determine if they need to be certified to use in your operations.

ATEX AND IECEx certification

Some glasses have ATEX and/or IECEx certification. It is basically the same, with the difference that ATEX relates to EU Directives and IECEx to international regulations. Both certificates are for electrical and non-electrical equipment used in potentially explosive atmospheres. ATEX and IECEx require compliance with the same technical standards. However, ATEX is only valid in the EU, and IECEx is valid globally.

WATER AND DUST RESISTANCE RATING

Many smart glasses models also have an IP66 rating or above, in other cases, NEMA 4 and NEMA 4X. It refers to the glasses' protective capacity, and IP66, IP67, and IP68 mean that they offer the highest protection against particles (dust) and a high protection against water. IP68 provides higher water protection than IP67 and IP66. However, particle resistance is the same.

Of course, several subgroups to these certifications and some smart glasses have other classifications. The most important thing for you as a buyer is to understand if there is a need for extra safety classification. If you are hesitant if the glasses match your needs, you should talk with the producer to ensure they comply.

The technical comparison on pages 17-19 shows each model's certifications.

(We have chosen to look at safety certifications in this guide, but many of the glasses also have other certifications, such as CE certification, which we have decided not to cover in the comparison in this guide.)

Apart from the five previous things you should consider, we will briefly cover some common questions we get about AR smart glasses.

CAN SEVERAL PEOPLE USE THE SAME GLASSES?

The short answer is yes; they don't need to be personal. However, if multiple people within your company plan on sharing the smart glasses, we recommend you pass them around and change the user. How easily this is depends on the software you plan to run with them. At the end of the guide, we will give you more info on using XMReality with smart glasses.

HOW LARGE IS THE SCREEN?

RealWear and Vuzix operate through a smaller screen closer to one of the user's eyes. To understand how big this type of screen feels for the user, you can think of a 7-inch screen (similar to a mobile phone's) held at arm's length. That's roughly the size of RealWear's screen. Vuzix M4000 is slightly bigger, and the M400 and Blade 2 are marginally smaller.

Microsoft HoloLens 2, on the other hand, provides an immersive user experience, an outstanding field of view, and a powerful experience by completely taking over your entire picture. It makes them a perfect fit for training scenarios.

The Epson also provides a clear screen with a field of view of 34°. Both the Epson and the Hololens have dual screens, which makes focusing on what you see in the glasses easier.

CAN I USE THEM WITH REGULAR GLASSES?

You can use the RealWear models, HoloLens 2, Vuzix M400, M4000, and Epson with regular corrective eyewear. Some Vuzix models offer the possibility to switch to corrective glass lenses, but for this to work, the glasses must be personal.

CAN I USE THEM WITH PROTECTIVE EQUIPMENT?

Working in an industrial environment might mean wearing safety equipment such as hard hats and protective glasses. In those cases, it's important that the glasses can be worn together with that equipment. Most models are designed with this in mind and offer add-on protective equipment optimized to work with the glasses.

IS THERE ANYTHING ELSE I NEED TO CONSIDER?

When choosing smart glasses, it is essential to know who will use them, for what purpose you will use them, and where you will use them.

For instance, different models have different kinds of screens. Some have transparent screens, like Vuzix M4000 and HoloLens 2, while RealWear and Vuzix M400 have covered screens. The devices with covered screens are generally easier to see in bright conditions, like outdoors. The devices with see-through screens do typically not obstruct your field of view to the same extent. But that varies from model to model. Additionally, some devices with see-through screens have clip-on “sunglasses” to make it easier to see the screen in bright surroundings as a workaround.

Technical Comparison

	Vuzix M400	Vuzix M4000	Vuzix Blade 2	Epson Moverio BT-45C
TYPE	Standalone	Standalone	Standalone	Tethered
CAMERA	12.8 MP	12.8 MP	8 MP	8 MP
VIDEO	4k @ 30fps	4k @ 30fps	Yes	1080p @ 60fps
SCREEN TYPE	Full color OLED panel display. Outdoor visible	DLP. See-through waveguide optics	Waveguide-based see-through optics Vibrant full color display	Si-OLED. See-through binocular OTG
FIELD OF VIEW	16.8°	28°	20°	34 °
BATTERY LIFE	5-12 hours depending on battery model	5-12 hours depending on battery model	1- 2 hours with typical use	Depends on the tethered device
PPE* COMPATABILITY	Yes	Yes	Yes	Yes
WATER/DUST RESISTANCE	IP67**	IP67**	No	IP52
CERTIFICATIONS	-	-	ANSI Z87.1 certification, safety glass	
WEIGHT	214g	246g	90 g	550 g headset + 183 g controller
NOISE CANCELLATION	Yes, 3 microphones	Yes, 3 microphones	Yes, dual noise cancelling	No
FLASH LIGHT	Yes	Yes	No	No
ZOOM	Yes	Yes	Yes	No

*PPE, Personal Protective Equipment

**Up to 1 meters depth

	Microsoft HoloLens 2	RealWear Navigator Z1	RealWear Navigator 500	RealWear Navigator 520
TYPE	Standalone	Standalone	Standalone	Standalone
CAMERA	8 MP	48 MP	48 MP	48 MP
VIDEO	4k @ 30fps	1080 @60fps	1080 @30fps	1080 @60fps
SCREEN TYPE	See-through holographic lenses (waveguides)	24-bit color LCoS, outdoor visible	24-bit color LCD, outdoor visible	24-bit color LCD, outdoor visible
FIELD OF VIEW	54°	24°	20°	24°
BATTERY LIFE	2- 3 hours active use	8- 10 hours with typical use	6-8 hours with typical use. Hot swappable	6-8 hours with typical use. Hot swappable
PPE COMPATABILITY	Some models	Yes	Yes	Yes
WATER/DUST RESISTANCE	N/A	IP66	IP66	IP66
CERTIFICATIONS	-	Atex Zone 1, IECEx Zone1 and C1/D1	-	-
WEIGHT	566g	383g	272g	274g
NOISE CANCELLATION	Some models	Yes, 4 microphone, up to 100 dBA	Yes, 4 microphones, up to 100 dBA	Yes, 4 microphones, up to 100 dBA
FLASH LIGHT	No	Yes	Yes	Yes
ZOOM	No	Yes	Yes	Yes

XMReality on AR smart glasses

Now, you have a better idea of how to evaluate which model fits you and your company best. But the most critical question remains: what software do you intend to run on the glasses?

Smart glasses on their own are not that powerful - but pair them with third-party software, and you have vast possibilities. One type of software is remote visual assistance solutions with AR functions, just like XMReality.

So, let's take a quick look at how you can use XMReality with smart glasses.

XMReality is a remote visual assistance software designed to connect people and help them collaborate through a shared video feed. The person wearing the smart glasses joins an XMReality call and gets guidance from the other person(s) who will see the camera view from the smart glasses. In a call, you have access to several smart functions to make it easy to guide the person wearing the glasses, such as on-screen drawing and other augmented reality features, pausing the video feed and taking snapshots.

INTERNAL SUPPORT

The most common use case for AR smart glasses in combination with remote visual assistance is supporting a college within your organization. The typical scenario is when a service technician receives support from an expert within the company, with the technician out in the field and needing both hands to solve a problem. It makes receiving help from a more experienced college easier, shortens the onboarding period, and allows for faster learning. XMReality on smart glasses has also proven very useful when solving edge cases and critical issues faster, where every second counts by immediately bringing all the people needed together to solve the problem.

TECHNICAL SERVICE AND SUPPORT TO CUSTOMER

XMReality on smart glasses is also being used to support end customers if any issues occur with their machinery. The supplier can easily and immediately connect with their customer through service agreements that include smart glasses. When a problem occurs, the customer can receive immediate help by just putting on the smart glasses, receiving instructions through an XMReality call, and following them without limiting the ability to fix the issue by freeing both hands. It minimizes both downtime and cost.

TRAINING

XMReality on smart glasses is a great fit for product training and knowledge transfer. It can help new employees better understand how to solve problems and shorten their onboarding by having internal experts guide them without being on-site themselves. It also allows the expert to onboard multiple people simultaneously from the comfort of their office. Another training scenario where XMReality comes in handy is the training on a newly installed machine. The supplier can provide remote training through XMReality, allowing for faster start-up.

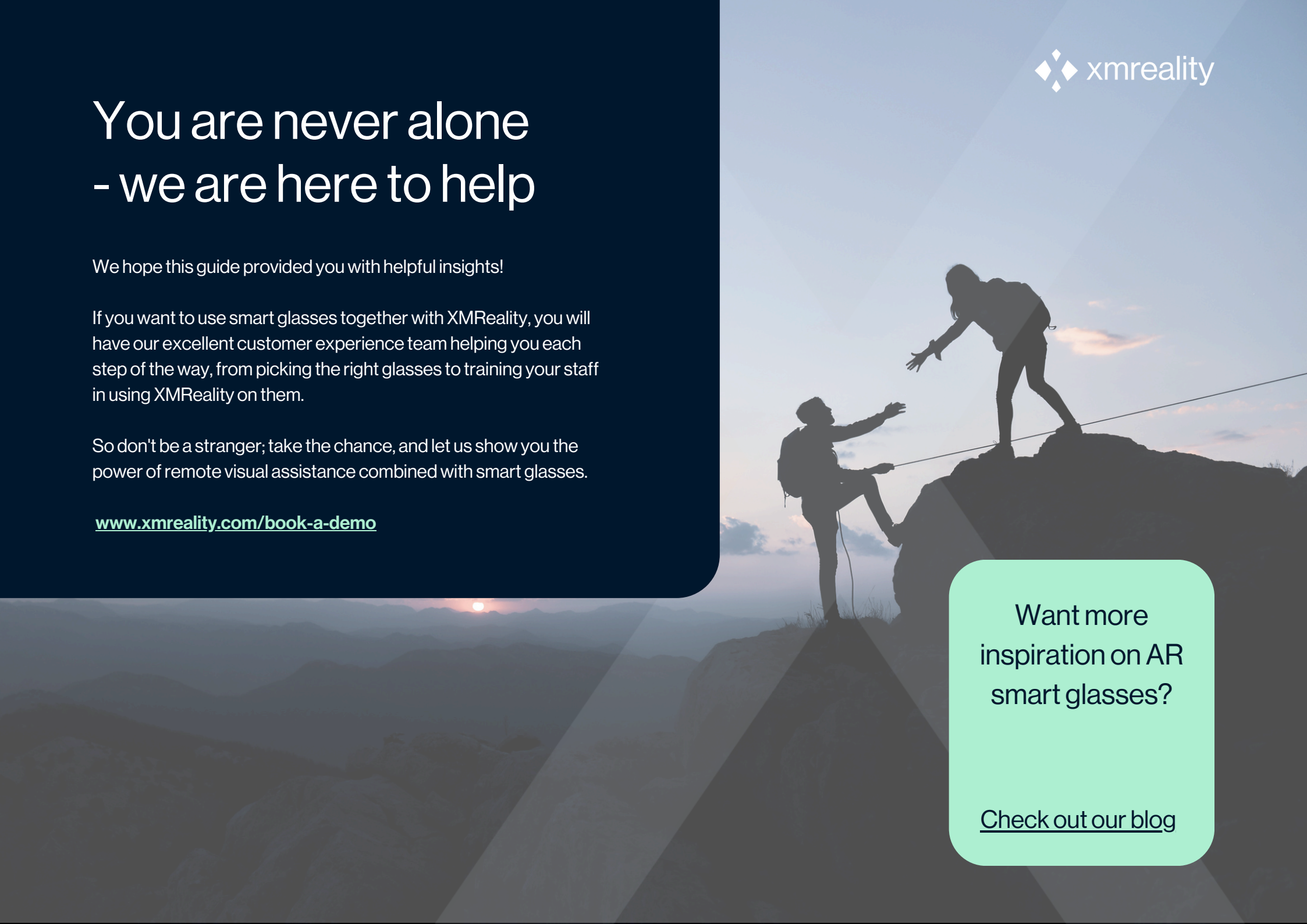
You are never alone - we are here to help

We hope this guide provided you with helpful insights!

If you want to use smart glasses together with XMReality, you will have our excellent customer experience team helping you each step of the way, from picking the right glasses to training your staff in using XMReality on them.

So don't be a stranger; take the chance, and let us show you the power of remote visual assistance combined with smart glasses.

www.xmreality.com/book-a-demo



Want more inspiration on AR smart glasses?

Check out our blog