CLEANBOX

SECOND EDITION
2026



COMPREHENSIVE

XR HARDWARE MANAGEMENT GUIDE

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TABLE OF CONTENTS

1. Introduction 04

2. QUICK START GUIDE 05

3. Device Management 06

4. Space Planning 11

5. Scaling Your Pilot Program 15

6. Operational Protocols 15

7. Hygiene & Sanitation Standards 19

8. Cleanbox Solutions & Value 24

9. Material Science and Engineering 35

10. Appendix 36

11. Real World Use Cases: Successful Deployments by Industry 38

GUIDE CONTRIBUTORS

A special thanks to Cleanbox partners, friends and clients whose expertise contributed to this Guide and to our Guide editors, Lorenzo Vallone and Brenda Saltzer.

For a list of Cleanbox solution partners, resellers and distributors, visit https://cleanboxtech.com/partners/

Comprehensive XR Hardware Management Guide
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Cleanbox Technology Inc.
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1. INTRODUCTION

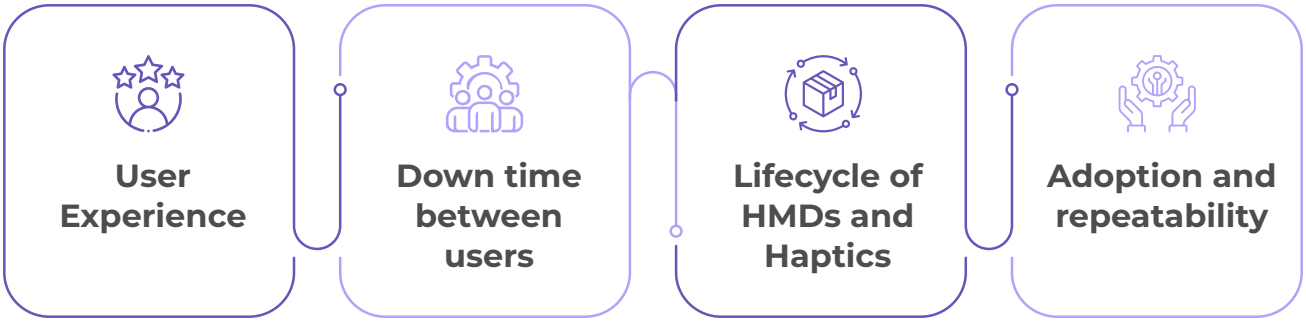
As immersive technology becomes an essential tool across industries—from healthcare and education to enterprise and corporate training, properly managing XR hardware is critical for technology adoption and scalability. Improper hygiene, inconsistent maintenance, and incomplete protocols can result in costly equipment damage, infection risks, and user dissatisfaction.

This Guide is a comprehensive resource designed to equip organizations with the knowledge and tools to effectively set up, manage, optimize and scale extended reality (XR) programs. Grounded in science and **built on best practices developed with industry leaders across the XR enterprise ecosystem**, this Guide offers practical, step-by-step protocols for ensuring smoother deployment, device longevity, user safety, and operational efficiency.

Standardized hardware management and hygiene increase adoption of XR training programs, provide better patient care opportunities and accelerate compliance alignment.

Integrating a successful, proven protocol increases the ease of adoption and lowers burden on staff. Proper set up of your Standard Operating Procedure (SOP) improves user experience and optimizes the process.

Furthermore, effective hygiene protocols for shared devices reduce risk of infection, provide measurable cost reduction, and contribute to better environmental practices.



2. QUICK START GUIDE

HARDWARE PLANNING: Addressing device use, ownership and logistics required for each location.
Pages 26-35

MDM AND IT: Select a mobile device management (MDM) and review IT requirements for both your initial deployment and future expansions, ensuring alignment with scale and growth plans.
Pages 6-10, 36-37

SECURITY CONSIDERATIONS: Minimum security considerations
Page 9

SPACE PLANNING: Real estate and budget parameters, usability requirements including ADA compliance, power, internet access and additional AV or other technical needs.
Pages 10-13

OPERATIONAL PROTOCOL: Create or adopt existing operational protocol for addressing software updates and glitches, using and storing headsets, and proper disinfection of hardware between users.
Pages 14-25

CASE STUDIES BY INDUSTRY
Pages 38-50

3. DEVICE MANAGEMENT:
BASIC SET-UP REQUIREMENTS FOR HEADSETS

Device Set Up

To get started with XR, begin by selecting the right devices for your organization's needs and adding supporting equipment such as carts, chargers, and cleaning tools. Next, determine how you will set up and provision devices, either handling smaller deployments yourself or working with resellers and provisioning partners for larger rollouts. Once devices are prepared, you'll need to install software and content using a device management solution like ArborXR and ManageXR. Finally, explore XR content options by either building your own, partnering with expert developers, or purchasing ready-made content. Additionally, high quality solutions across a wide range of enterprise domains are being created, published and available on a wide range of XR devices.

Reseller and provisioning partners are suitable for deployments with as few as 10 devices. They can ship devices to you that are ready to use out of the box. Procuring devices through resellers and provisioning partners ensures you work with vetted and trained XR professionals from start to finish. Depending on the XR partners you work with, you may wish to choose a third party to provision your devices for you. Once devices are registered with a mobile device management partner such as ArborXR or ManageXR, you can remotely deploy content and settings to your fleet.

Third Party Provisioning

Unboxing a new XR headset feels easy—slice the tape, lift the lid, power on. The real work (and risk) starts right after that. A reliable deployment is a repeatable sequence of enrollment, policy, apps, security, testing, and documentation. Doing this well once is careful work; doing it for 25, 50, or 200 headsets is a project.

Provisioners such as XRenegades who collaborate with enterprise management platforms, streamline this process for organizations.



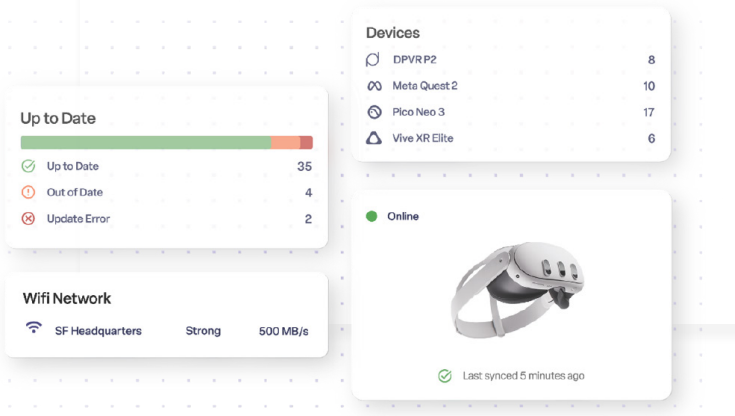
Mobile Device Management

Mobile Device Management (MDM) is a combination of software setup and processes that make it possible to track, secure, and deploy many devices at scale. MDMs are used in almost every industry that distributes devices to its workforce, like businesses, schools, and hospitals. Traditionally, these devices include smartphones, tablets, and computers.

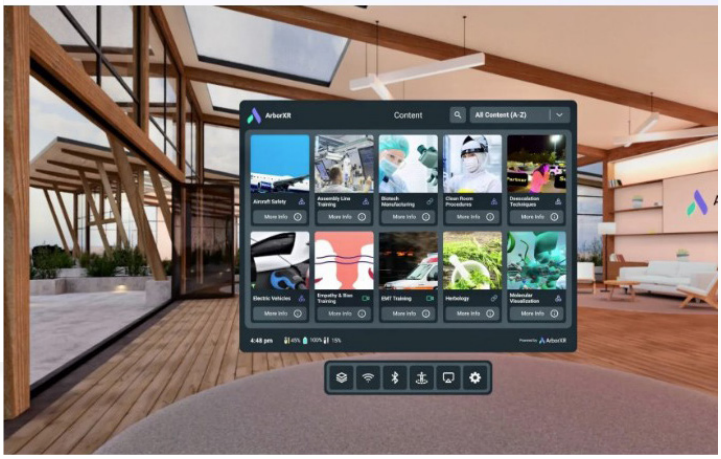
With an MDM for XR devices, you can remotely deploy apps, settings, firmware, and more to your fleet of devices, rather than painstakingly updating each device one by one. Standard mobile device management features include:

- Device inventory and tracking
- Application distribution & updates
- Remote wipe & lock
- Password enforcement
- Application whitelisting and blacklisting
- Data encryption enforcement
- Enterprise WiFi enablement

ManageXR Device Management



ArborXR Kiosk



Example: Meta Quest for Business (HMS) Setup

Meta's Horizon Managed Services (HMS) is the gateway to managing Quest fleets—and it adds specific steps you can't ignore. Admins can enroll devices one-by-one in Admin Center while wearing the headset, or use the Meta Device Setup app for bulk Shared Mode provisioning.

Third-party Mobile Device Managers (MDM)s like ArborXR and ManageXR now integrate through HMS rather than bypass it, which adds a few more coordinated tasks (tokens, third-party enrollment, permissions).

Key Takeaway

> The difference between "plug it in" and "deployment-ready" is measured in dozens of precise steps and hours of repeatable labor. Doing it right—once—saves weeks of disruption later.

Does your business need a provisioner or MDM?

While some businesses may choose to keep device management in-house, or select a single provider such as Horizons, the scope of XR deployment and a businesses' priority on reduction of adoption friction will determine if a company utilize the professional expertise and services of organizations including ManageXR, ArborXR and XRenegades.

See Appendix for 14-step flow for a Meta Quest business deployment and IT discussion Checklist

Why Setup Is Worth Paying For

- Compressed timelines.
- Early standardization that reduces follow-on support requirements.
- Reduction of security and compliance risk.
- Future-proofed fleet: Third-party device setup tools no longer enroll Quests by themselves; you go through HMS, then your MDM. Teams that don't plan for this hit permission walls mid-deployment.
- Cost savings: Remediation is slower than clean initial deployment.

■ SECURITY CONSIDERATIONS FOR AN XR PROGRAM

Because extended reality (XR) is still emerging, addressing security up front helps avoid missteps that can stall adoption. XR headsets are mobile computers with cameras, microphones, and body-tracking sensors, so build on your mobile device management (MDM) program and review the practices below alongside NIST SP 800-124 Rev. 2, Guidelines for Managing the Security of Mobile Devices in the Enterprise.

ACCESS AND IDENTITY. Use multi-factor authentication or single sign-on with role-based permissions. Sign users out automatically after a period of inactivity, set to fit your workflow, and when sensors detect a different wearer, unless the device is configured for shared use.

LOGGING AND ENCRYPTION. Keep tamper-resistant, audit-ready logs of who used which device, when, and which applications they opened. Require encryption such as AES-256, applied on the device before data is stored locally or sent wirelessly.

REMOTE MANAGEMENT AND TRAINING. Use MDM to track devices, push firmware and app updates, restrict apps to an approved catalog, and remotely lock or wipe lost or compromised devices. Back this with an incident response plan, and train users and administrators on approved use and incident reporting.

CAMERAS, MICROPHONES, AND INDICATORS. Passthrough cameras and microphones can capture bystanders, screens, and conversations. Require the ability to restrict or disable them, limit capture to the intended field of view, and show clear recording indicators that are visible from multiple angles and hard to disable.

ZONE-BASED USAGE POLICIES. Designate where XR has full functionality, limited functionality, or is prohibited. For example, allow full use in enclosed training rooms, limit it in open offices, and prohibit it near confidential work or in restrooms.

XR-SPECIFIC DATA. XR generates biometric data (eye tracking, hand and body movement, voice, physiological responses) and spatial maps of rooms and facilities. These can identify people and reveal sensitive information about them and their surroundings. Inventory what your devices and applications collect, turn off what you don't need, and check biometric privacy laws in your jurisdiction, which may cover employees and students as well as customers.

DATA SOVEREIGNTY. Know where XR data, including recordings, telemetry, and spatial maps, is stored and who can access it, vendors included. Where possible, keep it in an environment you control rather than the vendor's cloud.

ONGOING ASSESSMENT. Consider a dedicated XR network. Run regular risk assessments and penetration tests aimed at XR-specific threats, and monitor advisories from CISA, the NIST Cybersecurity Framework, and your vendors. AI and machine learning components add adversarial risks, such as extracting sensitive information, poisoning training data, or manipulating real-time outputs.

ADDITIONAL CONSIDERATIONS FOR HEALTHCARE ORGANIZATIONS

BUSINESS ASSOCIATE AGREEMENTS. Vendors that handle PHI are business associates. Consider prohibiting re-identification and the use of your PHI for the vendor's commercial purposes.

DE-IDENTIFICATION. Apply HIPAA's de-identification methods to XR data wherever possible. Voice, facial imagery, and biometrics can identify patients.

PATIENT CONSENT. Obtain consent before using XR with patients. Explain what data is collected, how it is used, and any physical effects of headset use.

BREACH NOTIFICATION. Define procedures to notify affected patients, HHS, and, when required, the media if PHI is accessed or disclosed without authorization.

MEDICAL RECORD AND RETENTION. Decide whether XR recordings and models are part of the legal medical record, how they are stored in the electronic health record (EHR) and released, and how long to retain them. Consult legal counsel, since these outputs may be a new record category.

STATE PRIVACY LAWS. State protections may go beyond HIPAA.

Beberman, Courtier, and Straker, Journal of Medical Extended Reality (2025), DOI 10.1177/29941520251400039.
Contribution by Rick Beberman, Sira Medical.

IT Integration

Coordinating with IT–Your best friend in XR Deployment

Deploying AR and VR at scale, whether in a classroom, hospital, enterprise training center, or museum, opens up transformative possibilities. However, no matter how compelling your XR content is, none of it can work without a stable and well-configured network. Network issues can be the most significant source of friction in XR deployments and are important to discuss with your IT admin.

After a decision has been made to scale your pilot program, IT may also introduce new requirements, such as security reviews. Some of these requirements can create an unexpected challenge within your organization's time and budget constraints. Starting these conversations early can help you expand your XR program without losing momentum.

Why you need IT involved from day one



Security & Compliance: IT owns data protection, identity/SSO, privacy, and risk. Their approval on device modes (shared vs. individual), passcodes, telemetry, and retention policies keeps you compliant.



Network Readiness: Headsets live on Wi-Fi. IT plans SSIDs/VLANs, bandwidth, roaming, certificates (e.g., 802.1X), and firewall/proxy allowlists so devices actually enroll, update, cast, and sync on your network.



Device Management (MDM): IT determines whether you use enterprise management and/or a third-party MDM, how enrollment happens, how devices are named/grouped, and when OS/app updates are allowed.



Procurement & Lifecycle: Approved vendors, asset tags, inventory systems, charging carts, spares, and warranties all flow through IT/procurement. Aligning early avoids unsupported models and stalled POs.



AV/Classroom Fit: If you plan to mirror XR to a room, IT/AV will standardize casting/recording so instructors aren't improvising on go-live day.

CONTRIBUTORS

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www.managexr.com

www.xrenegades.com

www.arborxr.com

https://work.meta.com/help

4. SPACE PLANNING

How to Think About Your Real Estate and Plan for Mobilization, Impact, and Scale

Before jumping into the metaverse, it's essential to plan the physical space where your XR program will operate. A successful XR environment balances the right equipment with user comfort and accessibility so that every participant can engage safely and effectively. The number one goal should always be an intentional design tailored to the purpose of the space, whether educational, recreational, or multi-purpose.

XR Lab Space Planning Considerations

Effective space planning also requires a clear strategy for how the area will be used, factoring in the number of users and frequency of use. Consider whether the environment is shared— such as a classroom or museum—or dedicated solely to XR, as in a lab or training center. You also need defined processes for how headsets will be charged and disinfected between users throughout the day and securely stored at the end of each day.



1 Intentional Design

- Define who will use the lab (students, employees, customers, engineers).
- Clarify objectives—e.g., simulations, soft skills, technical training, safety drills, gaming.
- Plan for assessment and tracking (integration with LMS, performance analytics).

2 Room Size & Layout

- Recommended allocation of 8x8 ft per VR station (minimum) for safe movement.
- Plan for multi-user setups (collaborative VR) with clear boundaries.
- Include a debrief area with large displays for group reflection.

3 Accessibility (ADA Compliance)

- Wheelchair-accessible stations with 60-inch turning radius.
- Adjustable-height desks and tables for seated or standing use.
- Wide aisles and unobstructed pathways for mobility devices.
- Stations that are usable in seated VR mode for inclusivity.
- Aim to allow for a minimum 10% of all user stations to be ADA friendly

4 Safety & Ergonomics

- Marked safe zones with visual/tactile cues (floor tape, mats, dividers).
- Cable management systems to prevent tripping and device disruption.
- Proper ventilation/HVAC to handle higher occupancy and activity levels.
- Target flooring that limits slips or falls where possible to reduce injury risk.

5 Power & Networking

- Sufficient electrical outlets and power strips at each station.
- Hardwired Ethernet ports for reliability (where Wi-Fi is unreliable).
- Consider power + data floor boxes or ceiling drops to avoid cable clutter.

6 Acoustics & Lighting

- Sound-dampening materials to reduce noise bleed between stations.
- Adjustable lighting (dimmable, indirect) to avoid glare on headset lenses.
- Option for blackout curtains if external light interferes with tracking.

7 Furniture & Equipment

- Adjustable-height workstations for flexible use.
- Storage/charging carts and cabinets for headsets, controllers, and peripherals.
- Consider secure storage for devices and other AV components within common spaces
- Cleanbox hygiene/ sanitization stations at the point of use (so hygiene happens between users, not just at the end of the day)



8 Wayfinding & Signage

- Clear station numbering for organization.
- Directional signage for exits, storage, and hygiene stations.
- Tactile floor markers or contrast striping for accessibility.

9 Observation & Control

- Instructor/Facilitator control area with monitoring software to manage multiple stations.
- Large wall-mounted screens for live session viewing.
- Camera setups for recording or streaming sessions (if part of program goals).

10 Scalability & Flexibility

- Modular partitions/dividers to reconfigure space easily.
- Reserve extra space for expansion (new stations, AR areas, haptics).
- Plan conduit, power, and data infrastructure with future growth in mind.

11 Special Use Areas

- Debrief room with group seating and presentation tools.
- Testing & staging zone for staff to configure and update equipment.
- Quiet space for users who need breaks due to motion sickness

About cabinets with UV

Spectrum recognizes that UVC is a complex science. After seeing a number of UVC products with broad claims and lack of scientific backing reach the marketplace, we trusted to partner with Cleanbox to meet our customer's needs. ***We recognize the expertise in UV science and technology that Cleanbox brings to the table.***

Spectrum Industries

Delta Airlines with LGXR Storage and Charging Carts and Cleanbox Bundle



Did you know?

Without proper cleaning and disinfection, shared devices can pose serious hygiene risks to the end users. Every day, the cold and flu keep 2.5% of the U.S. workforce (4 million people) home. According to the CDC, 80% of communal illness comes from the contaminated surfaces we touch, with contagions transferred through our eyes, nose and mouth. And XR headsets are a much higher risk vector because they come into contact with these points.

CONTRIBUTORS

www.spectrumfurniture.com

www.lookingglassxr.com

5. SCALING YOUR PILOT PROGRAM

Storage, Charging and Disinfection

When deploying a fleet of headsets—whether just one or a thousand—it is essential to plan not only the devices themselves but also the storage, charging, and disinfection systems, along with the spaces and processes that support them.

In most cases, once you have more than ten headsets, they are maintained “back of house” in storage units where they can be securely locked and charged overnight. Only in high-throughput public venues such as museums, entertainment centers, or live events is storage and charging typically placed “up front” at the point of use. This distinction matters, because it requires you to separate the logistics of storage and charging from the hygiene process. Hygiene has to be managed at the point of use—the location where the headsets are worn—so that each unit can be disinfected between every user.

Training Staff and compliance

As your XR pilot gains traction and you prepare protocol for addressing broken headsets or software glitches, to scale, planning these logistics becomes critical. You must establish end-of-day procedures for storage and charging, define a clear process for checking headsets in and out, and ensure you have sufficient backup headsets or replaceable parts such as silicone face covers. Equally important, you need to put in place a reliable, repeatable cleaning and disinfection protocol that is followed for every user, every time. This is a simple process when Cleanbox products replace wipes.

Hoag Hospital, Neuroscience Center, Newport Beach, CA



6. OPERATIONAL PROTOCOLS

BACK OF HOUSE MAINTENANCE

Now that you've outlined your device deployment plan, optimized your real estate, and identified your storage, charging and disinfection volume needs, it's time for training your team on proper process.

Your back of house maintenance includes 1) having enough backup headsets, 2) instructing staff how to properly hang/charge devices (yes, this matters and it's easy to get it wrong!), 3) creating a contact list for hardware and software troubleshooting and 4) instructions on how to deal with a broken device.

Who is managing the hardware? Teachers or students? Caregivers or patients? General public or hourly worker? You will want a plan!

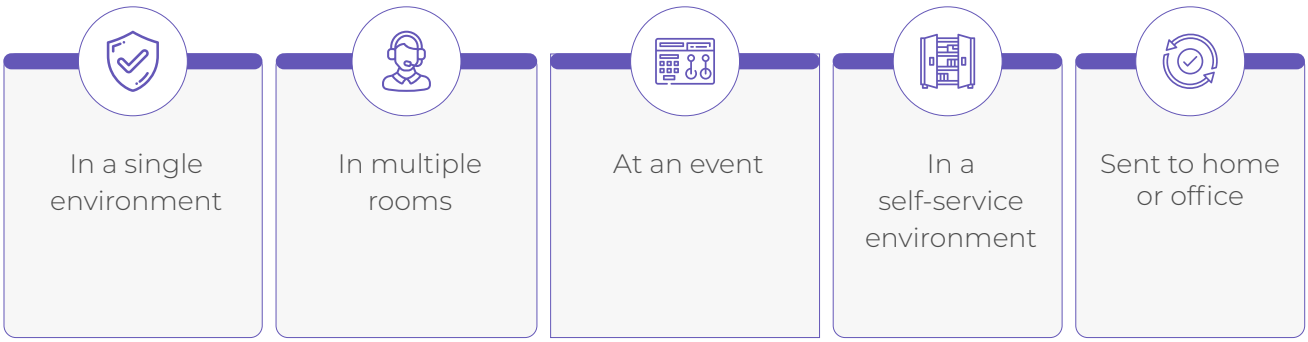
PROTOCOL AT THE POINT OF USE

Sanitation plays a crucial role in the success and sustainability of Virtual Reality (VR) attractions, especially in locations like family entertainment centers and arcades where hardware is shared among many users, and where large groups of people interact. It's vital to integrate sanitation practices into your overall floor routine of these attractions. This integration is not only about maintaining cleanliness but also about ensuring that these practices are visible and noticeable to the guests, resulting in greater use of the technology and longer life of the headsets. Cleanbox products are designed to make this a simple process.

https://uvsolutionsmag.com/articles/2024/helping-businesses-meet-corporate-sustainability-goals-with-uv/

Provide staff with clear steps on how to handle common operational issues including the repair or replacement of broken devices, IT and software updates, device charging, and content glitches.

Various ways XR Hardware is shared:

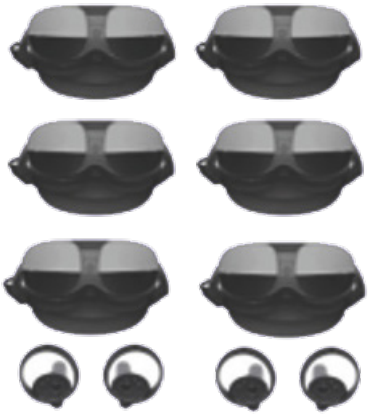


INTEGRATING STORAGE, CHARGING AND DISINFECTION.

STEP 1: Disinfected headsets and controllers are stored and charged in the cabinet overnight.

STEP 2: The fully charged and disinfected headsets and controllers are removed from the cabinet and provided to the guests. Using Cleanbox devices, the XR headsets are disinfected between every use.

STEP 3: After the last session of the day the headsets and controllers are disinfected using Cleanbox and placed back into the storage cabinet for secure charging and storage







Reusable or shareable items worn on a face or head should be cleaned and disinfected between users.

The way an operator handles the cleanliness of VR headsets and equipment can significantly impact the guest experience, not to mention the health and safety of the users and the operators. If a guest notices that the equipment is visibly dirty, smells unpleasant, or seems to be in disrepair, it could deter them from repeating the experience – or even from trying it the first time. Just as important, providing a clean headset for every user helps protect the operator from liability associated with easily spread contagions.

DEVELOPING YOUR STANDARD OPERATING PROCEDURE (SOP)

Assessment: Assess your current disinfection protocol–do you have one and is it effective and scalable?

Create or Adopt an Existing Hygiene SOP: Create an SOP that outlines every step of the cleaning and disinfection processes. This should include types of cleaning agents and materials to be used; Specific instructions for cleaning different parts of the VR equipment; Frequency of cleaning (e.g., between each user, end of the day); Procedures for handling and storing equipment post-cleaning. **For a simple one-minute process of drying and disinfection, integrate Cleanbox products to make it easy for staff to adopt.**

Training Staff: Ensure all staff are thoroughly trained in the SOP. Regular training sessions can help maintain high standards. If using Cleanbox products, it's as easy as pushing a button.

Documentation: Keep records of cleaning schedules and procedures for accountability and continuous improvement.

Make your SOP public: Post your Hygiene Protocol where guests can see it, so they know you are taking the best care of them, and providing a premium experience.

IMPLEMENTING THE PROTOCOL

Visible Cleaning Stations: Set up visible cleaning stations where staff can clean equipment in view of clients, reinforcing the venue's commitment to hygiene.

Regular Monitoring: Regularly monitor the cleaning process to ensure adherence to the SOP.

Feedback Mechanism: Implement a feedback mechanism to gather insights from both staff and clients on the effectiveness of the hygiene protocol.

Communicating with Clients: Use signage and other forms of communication to inform clients about your hygiene practices.

Transparency: Be transparent about your cleaning methods and frequency to build trust and reassure clients about their safety.

CONTRIBUTOR

ww.cleanboxtech.com

7. HYGIENE & SANITATION STANDARDS

WHY YOU MUST CLEAN AND DISINFECT BETWEEN EACH USER

Building trust, customer satisfaction and reducing liability

A clean VR environment directly contributes to a more comfortable and enjoyable experience for your customers. Remember, XR experiences require user to put equipment onto their face and touch controllers that all of your other visitors have used before them. Make cleanliness a hallmark of your venue to establish trust with your customers, ensuring they perceive your venue and its VR offerings as clean and safe. Regular and thorough cleaning also reduces the risk of spreading germs and extends the lifespan of your VR equipment.

Cleaning is not Disinfection

Cleaning refers to the removal of dirt, organic matter, and other detritus from the surfaces of an object. Cleaning does not kill microorganisms but only reduces them by physically removing contaminants. Disinfection is the process of using heat, chemicals or UVC to inactivate or destroy microorganisms. A non-chemical wipe is helpful for removing visible detritus. Disinfection must occur between users.

There is a time component required for every kind of disinfection—and the leave-wet time required with wipes—4-10 minutes—is not practical or scalable and adds to environmental waste.

Did you know?

More than 60% of Americans describe themselves as germaphobes! While they may not openly admit feeling uneasy when handed a VR headset that was just worn by someone else, the lack of visible or assured disinfection will register—consciously or subconsciously—and shape their overall experience. It is already a significant leap to ask users to put on an XR headset, requiring a level of openness and trust that many may hesitate to give. Failing to properly disinfect the headset between every use introduces an additional barrier—one that can quickly become a blocker to broader adoption.

REDDIT COMPLAINTS ABOUT DIRTY HEADSETS

Do I have to the new VR training

I got to reasons I don't want 1 I do not want to be I the middle of the personnel office with people walking in and out while I can't see it just doesn't make me comfortable I know logically it would be fine but still. And 2 I don't want what someone put on there face on my face. I'm just wondering what would happen if I said no or if anyone else has been like yeah no I'm not doing that

Delonce • 1y ago

I just refused to use the vr headsets for the simple reason that I don't want anything strapped to that gets put on everybody else in the store and doesn't get cleaned. No thank you.

142 Reply Share ...

7 more replies

xRompusFPS • 1mo ago

Yes, so many people don't want to touch the vr headset that nobody touches it, leaving it immaculately clean. Ironic lol.

2 Reply Award Share ...

Legman94722 • 1mo ago

Yes, but I just do it on the computer cause I see to many co workers walk out of the bathroom without washing thier hands.

2 Reply Award Share ...

Delonce • 10mo ago

I just refused to use the vr headsets for the simple reason that I don't want anything strapped to my head that gets put on everybody else in the store and doesn't get cleaned. No thank you.

142 Reply Award Share ...

HeyListens • 6y ago

I just don't want everyone else's face touching my face!

9 Reply Award Share ...

3 more replies

High Traffic Events requiring constant cleaning

At high-traffic events such as busy tradeshows, there is often a temptation to skip proper cleaning in order to keep lines moving quickly. But this is a poor practice—no different than a restaurant choosing not to wash dishes during its busiest hours.

Use your cleaning process as an opportunity to engage visitors: explain why you are disinfecting, and share a bit about how the process works. Far from resenting the short wait, most users will appreciate the care and will feel more confident and grateful knowing you have made their safety a priority.



XR experience at the Dian Fossey Gorilla Fund in Rwanda with Habitat XR



VETTED CLEANING AND DISINFECTION PROTOCOLS: BASIC CLEANING AND DISINFECTION BETWEEN USERS

Clean Contact Surfaces

After each use, clean all surfaces. Use new wipes each time. Remember this step is only to remove visible debris, not to disinfect.

Recommended Cleaning Materials

Use skin-safe, non-toxic wipes, ideally biodegradable.

Cleaning lenses - Always avoid alcohol or other chemical contact with lenses. Follow manufacturer guidelines but most recommend using dry microfiber cloths for smudge removal.

KEY CONSIDERATION: Disinfectant wipes require the surface to remain WET for 4–10 minutes to work, or they are not effective at disinfection and only remove residue. Chemical and alcohol wipes may also damage plastics, fabrics over time and will damage most lenses if there is contact. If you choose to use wipes to disinfect, consider the time, cost, waste, and limited disinfection achievable on porous materials. See the Cleanbox ROI section for full details.

Disinfect

Disinfect using Cleanbox's UVC LED disinfection systems, with its independent lab-validated demonstration of disinfection efficacy. If using an alternate UVC device that uses UVC bulbs, be sure to check for independent lab validation and equipment safety. Ensure the system is certified and designed for safe use on electronics and can provide consistent results. Verify any special handling requirements.

Cleanbox devices do not require any special handling, and are guaranteed safe for lenses as well as for all other parts of a device. Cleanbox UVC LED is the only UVC engineering that guarantees it will not damage plastics, fabrics, electronics and lenses even after thousands of hours of exposure.



Provide a Dry Headset

Before handing the headset to a new user, make sure it is completely dry. If using a microfiber cloth, the cloth must be clean.



Sanitize Hands

Operators should sanitize their hands before and after cleaning.



Prepare Backup Equipment

Maintain backup devices or cleanable face masks to ensure uninterrupted user flow.



Store Headsets in Sterile Conditions

Use sealed or sterile storage units or cabinets to keep headsets clean after sanitation.

Supporting Data

Request a copy of Cleanbox's BSL-2/3 lab testing. All testing is independently verified using appropriate methodologies for bacterial and viral reduction. Email info@cleanboxtech.com.

Liability

https://www.twisdalelaw.com/part-3-critical-importance-of-proper-equipment-cleaning-series-vr-industry/

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https://dl.acm.org/doi/10.1109/TVCG.2025.3549130

https://pubmed.ncbi.nlm.nih.gov/38674759/

Liability and Compliance

Compliance with these hygiene guidelines is not just about cleanliness—it's also a significant legal consideration. Without a proper XR hygiene program, you increase the risk of:



Legal complaints



Negative visitor reviews



Damage to your facility's reputation

CONTRIBUTIONS, STANDARDS AND GUIDELINES:

www.coin-op.org/vr-connect

www.cleanboxtech.com

www.astm.org

www.xra.org/research/xr-industry-guide-to-device-cleanliness/

CLEANBOX HYGIENE PROTOCOL:
3 EASY STEPS TO SAFELY AND FULLY DISINFECT ANY XR HEADSET IN LESS THAN 90 SECONDS

XR Headsets make contact with the major contagion transfer points around the face/eyes/nose/head/ears. Not fully disinfecting headsets between each use exponentially increases the risk of disease transference. Equally important, the perception of dirty headsets makes people feel less safe and reduces the desire to use XR. Lastly, cleaning with antibacterial wipes becomes expensive and time consuming. Leveraging Cleanbox will reduce waste and ensure consistent results.

Remove Visible Debris from Dirty Headsets using 1 Wipe:

When a user finishes using an XR headset, the operator uses a single wipe to quickly remove any visible debris. The operator is only removing debris, not disinfecting.



Disinfect the Headset Using CLEANBOX in 1-Minute:

The “dirty” headset and controllers are disinfected in a Cleanbox for 1 minute to achieve 99.999% disinfection. The operator cleans their hands with antibacterial hand liquid after placing the headset or controllers in the Cleanbox



Headset is Safe for Next Use:

After the Cleanbox disinfection cycle is complete (1 minute), the user opens the Cleanbox door, applies antibacterial liquid to their hands, and collects the headset or controllers. The device is ready for the next use.



Hand Sanitizer

Cleanbox UVC LED light destroys the RNA/DNA structure of contagions on surfaces, making them unable to replicate. UV disinfection is a line-of-sight technology and Cleanbox products are engineered to ensure consistent and shadow-free disinfection on targeted surfaces.

CLEANING AND DISINFECTION REFERENCES
METHODS OF DISINFECTION

UV: TYPES OF UV (UVA, UVB, UVC), HOW TO USE UV, FORM FACTORS AND SAFETY

https://cleanboxtech.com/wp-content/uploads/2020/11/UVC-Light-Defining-the-Facts-Debunking-the-Myths.CleanboxCollabWhitePaper.Aug2020.TOPUBLISH-1-2.pdf?srsltid=AfmBOoqV9NSvHY5_q_tA-W5iwG2TqJ2rSFHCGA3pr_B0DYqL50pz-Y8W

https://gamma-sci.com/2021/09/01/electromagnetic-spectrum-101-ultraviolet/?srsltid=AfmBOopbIhSAyaqi6iswAlZ42W3cm3DQa8WmIB3HVR70gJnVesMXcenW

https://www.boselec.com/wp-content/uploads/Linear/Violumas/ViolumasLiterature/UV-101-Overview-of-Ultraviolet-Disinfection-White-Paper.pdf

WIPES: TYPES OF MATERIALS, LEAVE-WET TIME, MATERIAL AND OTHER IMPACT

https://multimedia.3m.com/mws/media/1679462O/hard-surface-vs-soft-surface-disinfection-tech-talk.pdf

https://business.oculus.com/support/665720147270975/

https://www.journalofhospitalinfection.com/article/S0195-6701(24)00169-5/pdf

https://pmc.ncbi.nlm.nih.gov/articles/PMC8014262/

https://www.cidrap.umn.edu/antimicrobial-stewardship/groups-call-actionable-steps-address-antimicrobial-resistance





eXeX using Cleanbox Omniclean

8. CLEANBOX SOLUTIONS AND VALUE

Cleanbox Technology offers comprehensive solutions for XR Hardware Management with simple, proven, and cost-effective products for all aspects of charging, storage and disinfection. In addition to comprehensive hygiene, effective management of XR Hardware from a storage and charging perspective is critically important to running a successful XR environment.

Cleanbox has taken the best practices of many of its customers and provided Storage and Hygiene Protocol for Front and Back of House that can be shared, printed, posted and used by any venue.

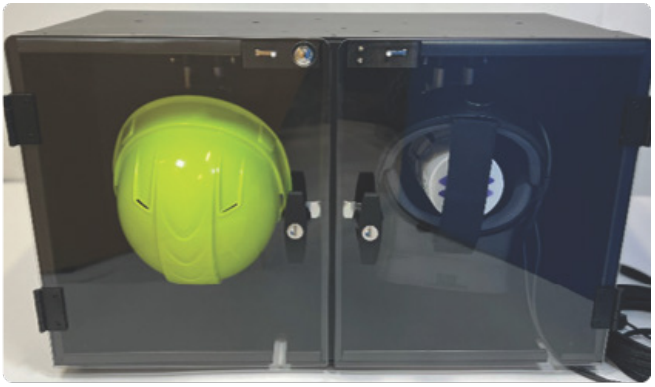
The Powercart is used to store and charge clean headsets and a Cleanbox CX1, CX2, or OmniClean ensures that each XR headset is fully and safely disinfected between each use and prior to being stored at the end of the day.

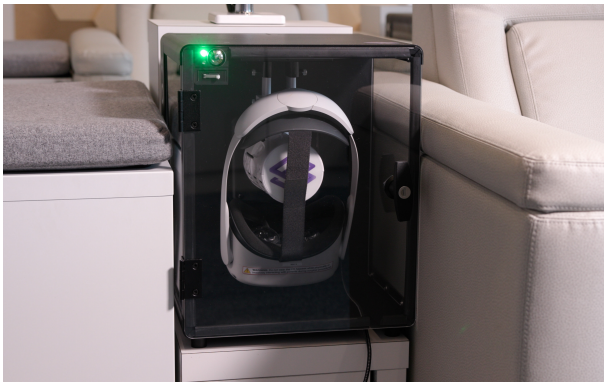
Ask AmyAI anything about Cleanbox!

https://cleanboxtech.com/cleanbox_uvc_led_ai_agent/

CLEANBOX UVC LED
DISINFECTION SYSTEMS

1 CX Series





The CX series is designed to disinfect and dry any shared device that is head-mounted including any Virtual and Augmented Reality headsets. Cleanbox also has adapters for your XR haptics and controllers.

All Cleanbox UVC LED disinfection systems are lab-validated to reach 99.999% disinfection in 1 minute cleaning cycles.

THE CX SERIES IS IDEALLY DESIGNED FOR:



Meta Quest 3



HTC Vive Focus 3



Pico 4 Ultra



Apple Vision Pro Spatial Computer



Varjo XR4



Pimax Crystal Miro Super OLED



Sonetics Earphones



RealWear with hardhat

2 Omniclean



The Omniclean is the only product of its kind, providing full 360-degree shadow-free UVC disinfection with specialty reflective surfaces and a rotating quartz plate. The Omniclean's patented engineering provides complete disinfection on all surfaces of any object that fits in the product's 12"x12"x7" space.

The Omniclean disinfects anything including XR headsets, phones, tablets, microphones, earphones, earbuds, battery packs, eyeglasses, watches, wallets, keys

All Cleanbox UVC LED disinfection systems are lab-validated to reach 99.999% disinfection in 1 minute cleaning cycles.

THE OMNICLEAN IS IDEALLY DESIGNED FOR:


















CHARGING, STORAGE & DISINFECTION CABINET BUNDLES

12-HEADSET STORAGE FOUNDATION BUNDLE

12-Headsets Storage and Charging Mobile Cabinet

CLEANBOX CX1 to clean 12 headsets in 15 minutes based on 1-minute cleaning cycles



24-HEADSET STORAGE FOUNDATION BUNDLE

24-Headsets Storage and Charging Mobile Cabinet

CLEANBOX CX2 to clean 24 headsets in 15 minutes based on 1-minute cleaning cycles



CLEANBOX BUNDLE BENEFITS:

- Easy storage with mobile disinfection
- Cost-effective
- Protects equipment
- Space efficient

CLEANBOX charging, storage, and hygiene bundles are the foundation organizations need to safely, consistently, and cost-effectively scale from a few to a few thousand XR headsets.

WELLNESS AND CUSTOM CARTS

Compact mobile charging, storage, disinfection, and hand hygiene. Customizable with CX1 or Omniclean.

MEDICAL GRADE CART BUNDLE OPTIONS

- Roll-out drawers (x2) with flexible hardware dividers, hand hygiene station, and side accessory holders.
- Storage & Charging for 12 headsets. Each drawer supports up to 6 VR headsets or 20 phones, or 10 tablets, or a configuration of headsets & battery packs.
- Drawers and Cleanbox units have physical locks. Wheels are lockable.
- Custom “Standing” working carts, ruggedized, extra security, add computers and additional customization.

Individual healthcare and tech carts customized for space and mobility





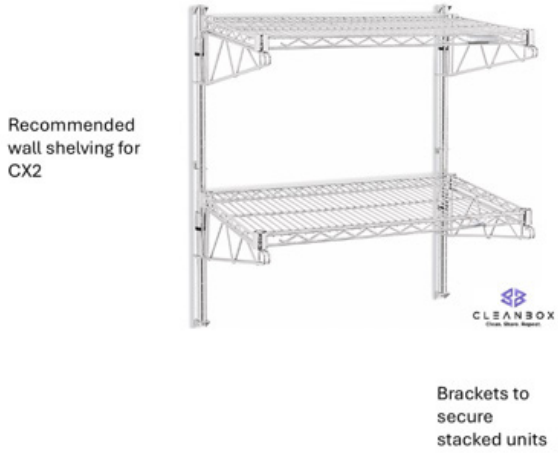


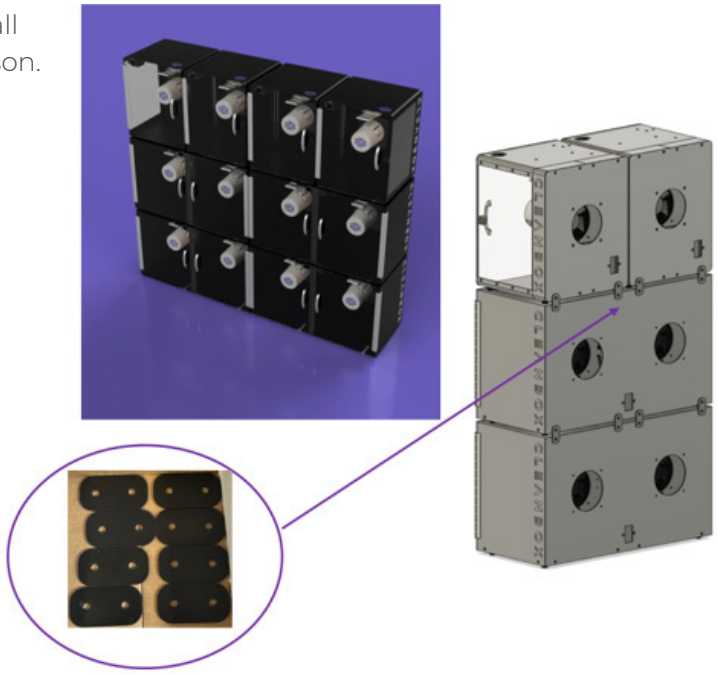
STACKING AND SHELVES

Options for stacking CX1s and CX2s, wall mounting, bracketing

- Wall Racks for 1 CX2 or 2 CX1s/wall
- Back brackets to secure floor-stacked units

For information on building units into the wall or other furniture, please contact a sales person.





The Cleanbox Charging, Storage and Hygiene bundles offer the following benefits:

Storing and protecting expensive XR hardware from damage or theft.

Moving headsets safely and efficiently using rolling features of the cabinets.

Charging headsets and controllers without individual power cords.

Keeping the disinfected devices clean in a closed cabinet.

Ensuring full disinfected between uses with a Cleanbox.

CLEANBOX RETURN ON INVESTMENT (ROI) EVALUATION

Cleanbox Products are the only solutions that can achieve 99.999% disinfection in a 1 minute cycle without damaging plastics, fabrics, lenses, or electronics



VALUE:
CLEANBOX devices deliver a massive ROI compared to the use of wipes while reducing the environmental impact of wipes and significantly improving user health & safety.



EFFICACY:
CLEANBOX patented UVC LED technology offers important advantages over UVC bulbs for rapid, highly effective disinfection of devices and objects.



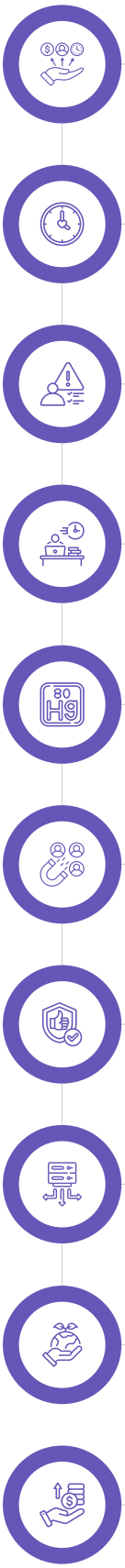
SCALABILITY:
By combining CLEANBOX Hygiene Solutions with our Charging and Storage Mobile Cabinets, CLEANBOX enables organizations to safely, easily, and cost-effectively scale.

SAMPLE RETURN ON INVESTMENT SUMMARY (4 YEARS)

METRIC	ANTIBACTERIAL WIPES	CLEANBOX UVC LED DISINFECTION SYSTEMS	NOTES
Cost Over 4 Years	$110,592.00	$12,250.00	Cleaning costs comparison over 4 years. Cleanbox devices deliver a minimum of 4-5 years of maintenance-free operation without any bulb-replacements even under the heaviest use.
Cost Savings Over 4 Years Using Cleanbox		Save $98,342	Savings based on comparing the cost of cleaning with antibacterial wipes versus the one-time cost of Cleanbox.
Return on Investment Using Cleanbox		803%	The ROI is based on the cost savings generated using Cleanbox versus the one-time Investment.
Payback Period of Cleanbox Investment		5.3 months	Cleanbox delivers 48-60 months (4-5 years) of maintenance-free operation, even under the heaviest use. Cleanbox offers a free recycling program at the end of life.
Time Required to Disinfect 10 XR Headsets	80 minutes using Antibacterial Wipes, including 5 minutes wet contact time per headset	1.5 minutes using Cleanbox	Cleanbox will disinfect 10 XR headsets in 3 minutes using the 1-minute protocol or 1.5 minutes using the 30-second protocol. Manual cleaning with antibacterial wipes will require 80 minutes.
Manual Labor Savings		Save 1,200 hours of manual labor	Calculated based on manual labor savings of 3 minutes per manual cleaning with antibacterial wipes.
Environmental Waste Reduction		Avoid waste of 276,480 antibacterial wipes	Calculated based on saving 3 antibacterial wipes per manual clean. It does not include the acquisition, storage, and disposal cost of antibacterial wipes.
Maximum Disinfection	99.9%	99.999% (100X more effective than antibacterial wipes)	Cleanbox error-free UVC LED disinfection systems deliver 100 times higher risk reduction compared to even the most meticulous application of antibacterial wipes.

CLEANBOX UVC LED VS. BULB-BASED UNITS

10 REASONS WHY CLEANBOX UVC LED OUTPERFORMS UVC BULBS



Energy Efficiency: UVC LEDs are highly energy-efficient, requiring less power to operate compared to UVC bulbs.

Lifespan: UVC LEDs have a longer lifespan, typically lasting for thousands of hours, while UVC bulbs require replacement.

Size and Form Factor: UVC LEDs are compact and offer more flexibility in design and integration, while UVC bulbs are bulkier.

Instant On/Off: UVC LEDs are instantly turned on and off, providing immediate disinfection, whereas UVC bulbs require warm-up and cool-down time of as much as 10 minutes, making rapid disinfection impossible.

Mercury-Free: UVC LEDs do not contain mercury, making them safer for the environment and easier to handle compared to UVC bulbs

Heat Generation: UVC LEDs produce less heat during operation, minimizing the risk of damage to nearby components.

Durability: UVC LEDs are more durable and resistant to shocks and vibrations, whereas UVC bulbs are fragile and prone to breakage.

UV Output Control: UVC LEDs offer precise control over UV output, enabling better customization for specific disinfection requirements, while UVC bulbs have limited control.

Environmental Impact: UVC LEDs have a lower environmental impact due to their energy efficiency and mercury-free composition, compared to UVC bulbs.

Cost: UVC LEDs are generally more expensive upfront, but their longer lifespan and energy efficiency can result in cost savings over time, while UVC bulbs can have a lower initial cost but higher maintenance costs.

Category	Cleanbox UVC LED Systems	Mercury Bulb Units
Wavelength	265-270 nm (peak germicidal)	254 nm (fixed)
Performance	Instant on/off	Requires warm-up and cool-down
Longevity	10,000+ hrs, minimal loss	20-40% loss in 1 yr, replacements based on quality
Safety	Mercury-free, no ozone, controlled	May contain mercury or produce ozone; heat impact possible
Design Flexibility	Modular LED arrays, shadow-free	Tube design, shadowing issues
Maintenance	None	Bulb replacement & hazardous disposal
Operational Efficiency	1-min cycles, consistent dose	Variable output, declines with age
Total Cost of Ownership	Lowest	Higher (consumables + labor disposal)

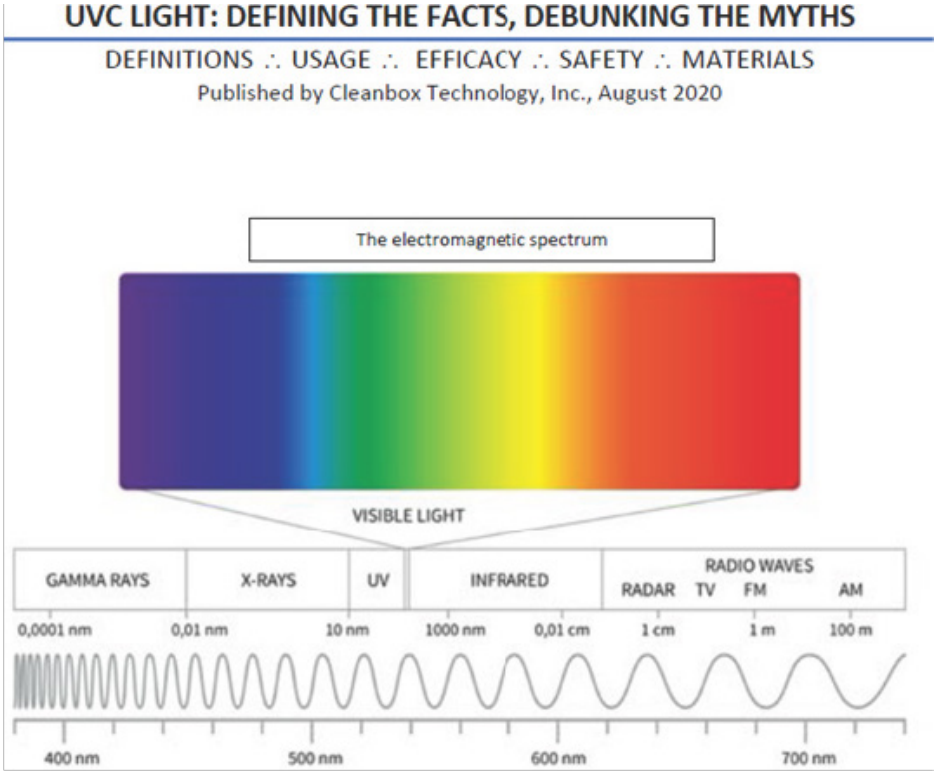


UV Bulb vs. UV LED grid

9. MATERIAL SCIENCE AND ENGINEERING

HOW CLEANBOX UVC LED DISINFECTS SURFACES

Cleanbox UVC LED light destroys the RNA/DNA structure of contagions on surfaces, making them unable to replicate. UV disinfection is a line-of-sight technology and Cleanbox products are engineered to ensure consistent and shadow-free disinfection on targeted surfaces.



Quartz racks prevent UVC shadowing (vs. metal racks)

Since UV disinfection is a line-of-sight technology, barriers such as metal racks, will create shadows where the light cannot reach and cannot disinfect For more information, read our white paper:

https://cleanboxtech.com/whitepaper-download/?srsltid=AfmBOopdnHmEuVVshRFCk94UG1sPFZo0V68Q1ReqCwb9ldGiTqdIlh8G

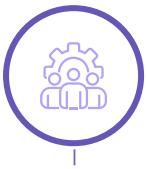
PTFE reflective liners offer optimal performance (vs. polished aluminum and other “reflective” surfaces)

Like all light, UV follows the inverse-square law, dissipating from the source of the light. Reflectivity is often integrated into UV disinfection products to enhance performance. However, some materials like aluminum may seem highly reflective but have little reflectivity impact and react differently to different wavelengths of light. For more information on reflectivity, read our article in UV Solutions:

https://uvsolutionsmag.com/articles/2023/designing-for-surface-decontamination-with-uv-c-leds-a-review-of-uv-reflectance-materials/

10. APPENDIX:

IT DISCUSSION CHECKLIST



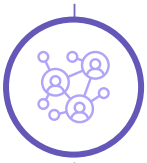
Use cases & users:

Who will use XR, where, and how often? Shared devices or assigned?



Headset models & counts:

Confirm supported models, accessories, and timelines.



Management approach:

Enterprise management and/or third-party MDM; enrollment flow; naming conventions; grouping strategy.



Identity/SSO:

IdP (Entra/Azure AD, Google, Okta), group membership, role mapping.



Network requirements:

SSIDs/VLANs, certificate needs, DNS/NTP, firewall/proxy rules, content filters, bandwidth targets



Updates & maintenance windows:

When OS/app updates are allowed and how they're staged.



App catalog & kiosk behavior:

Store vs. private apps, sideloading policy, versions, and launcher/lockdown expectations.



Security posture:

Passcodes, telemetry/privacy, camera/mic restrictions if required.



Casting/recording expectations:

Approved mirroring methods and storage location for recordings/screenshots.



Hardware logistics:

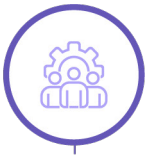
Charging/storage, sanitization workflow, labeling/asset tracking.



Support & documentation:

Quick-start guides, troubleshooting steps, and who handles what.

A TYPICAL 14-STEP FLOW FOR A META QUEST BUSINESS DEPLOYMENT



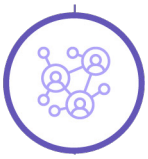
Prep the tenant

Verify HMS org, admin roles, and device management settings in Admin Center.



Decide device mode

Individual vs. Shared Mode (affects user model, sign-in, and policies).



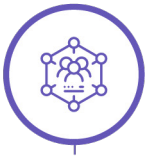
Network prerequisites

Collect SSIDs/VLANs, certificates, proxy/firewall rules, and SSO details (with IT).



Create groups/profiles

Define naming, tags, and policy sets for different cohorts (e.g., Nursing vs. OT lab).



(If using 3rd-party MDM)

Generate HMS third-party enrollment(s) and match to your MDM groups.



Stage content plan

Map required apps (Store/private), versions, configs, and kiosk/ launcher behavior



Physical unbox & inventory

Record serials/IMEIs, label devices/ cases, charge batteries, update ledger.



Initial device setup

Power on, follow in-device prompts, and connect to org (not the consumer mobile app).



Enroll to HMS

Enter device code in Admin Center or enroll in bulk via the Meta Device Setup app (Shared Mode).



Link to MDM (if used)

Complete ManageXR/ArborXR enrollment and grant required permissions.



Apply policies

Passcodes, privacy, update windows, Guardian, casting restrictions, data/telemetry preferences.



Deploy apps & content

Push Store titles, private APKs, or bundles; handle sideloading where applicable.



Kiosk/launcher config

Pin the experience, lock UI as needed, and verify session behavior in chosen mode.



QA & documentation

Test tracking, audio, controllers, content launch, casting; export a ready-state checklist for IT and faculty

11. REAL WORLD USE CASES:
SUCCESSFUL DEPLOYMENTS BY INDUSTRY



Hospital System
Hoag Hospital



Campus XR Lab
Madison College



Pediatric Cancer Care
XR Impact- Pediatric Cancer



First Responders Training
XpertVR



Creating a complete kit:
Knox Labs Nursing Kits



Education XR Lab
Conestoga College at Waterloo



Senior Living & Veterans Care
Mynd Immersive



Aviation Safety Training
KLM Engineering & Maintenance



Creating a complete kit
CleanMynd Wellness Cart



High throughput public venue
Van Gogh Musee d'Orsay

HOSPITAL SYSTEM
HOAG HOSPITAL

hoag.

Client and Purpose of XR

Hoag Healthcare began an extensive XR pain management program in 2016, extending use of XR across its healthcare system for multiple applications including pain management, pre-and post-procedure patient prep, surgical practice and other advanced surgery.

Deployment of Cleanbox products for hardware management and hygiene

Initially for hard-to-disinfect VR devices that are in contact with the face and head (eyes, nose, mouth, skin, hair). Such devices cannot be exposed to heat, chemicals, or liquids.

Requirements: Reduction of single-use disposables, non-damaging to equipment or devices being disinfected, equal efficacy to legacy disinfection methods, ease of use without special handling, adoption by staff

Testing: Various methods of independent testing were performed. UX was also evaluated.

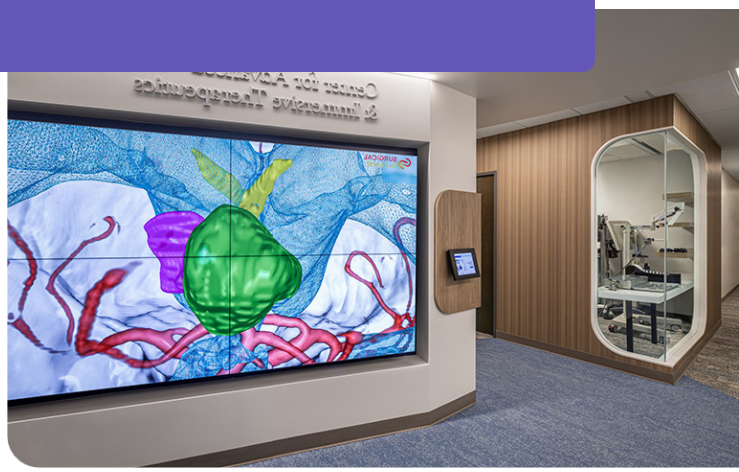
Adoption: Across multiple divisions and facilities within the healthcare system

Standardization: Cleanbox UVC LED products used for surface disinfection of staff instruments and patient care products:

Success stories

Today the use of XR has been deployed in multiple locations including:

- Birthing Centers
- Neuroscience Center
- Patient VR Therapy programs: Pain treatment, post-natal
- Advanced Surgery VR programs





Under the leadership of Robert Louis, M.D., Chief of Neurosurgery and the Empower360 Endowed Chair in Skull Base and Minimally Invasive Neurosurgery, Hoag has established a national reputation in the use of XR technology for advanced surgery, pain and stress management, patient education and maternal care.

The center includes three dedicated spaces to research, develop and implement XR. The Therapy Treatment Room is open to all Hoag physicians, ranging from neurologists to psychologists to cardiologists.

The third space is the Experiential Theater, in which patients and their family members can “fly-through” a doctor’s surgical plan to see exactly what the surgeon is planning before undergoing a procedure. This helps patients and their families better understand what they will experience.

EDUCATION XR LAB
CONESTOGA COLLEGE AT WATERLOO

CONESTOGA
VIRTUAL AND AUGMENTED REALITY LAB





Client and Purpose of XR

The Virtual and Augmented Reality Lab (VARLab) is an applied research innovation lab at Conestoga College, a leading Canadian Polytechnic Institute. The VARLab builds Digital Learning Simulations enabling learners to access immersive learning content, remotely and on-demand, bridging the gap between campus resources and individual learning. **With a strong focus on our Trades and Health Sciences programs, the VARLab is a full-stack development shop that builds custom solutions and uses off-the-shelf tools for rapid development.**

Working from our “Pedagogy-First” vision, our success is built on achieving strong learning outcomes enabled by leading-edge technology in the service of our students.

Success stories

The lab develops learning solutions particularly for Trades and Health Sciences programs, solutions for industry partners and conducts applied research to innovate teaching methods.

The EDUCAUSE 2024 Horizons Report identified Conestoga as a postsecondary institution that incorporates educational practices with technology in meaningful ways. Conestoga College offers a one-year Graduate Certificate in VR production.

CAMPUS XR LAB
MADISON COLLEGE





Client and Purpose of XR

Madison Technical College – Virtual Reality Center. A new XR lab was founded based on VR use in their EMS, Nursing and Respiratory coursework, with goals to expand the XR use across campus.

Program Goals

Spectrum Industries helped the college design and outfit the physical space around their curricular needs, focusing on user experience and mobility. The spatial layout used physical dividers to delineate individual VR zones (not for soundproofing). Space was fitted with adjustable-height tables and wired peripherals to keep it both adaptable and cost-effective. Incorporated Cleanbox UV systems to maintain hygiene for shared headsets.

Hardware management

12 individual VR Bays: 30 Quest 3 Headsets

The lab transitioned from HP Reverb G2 to Meta Quest 3 for improved field-of-view, pass-through safety, and dual functionality (PC and standalone). Hardware is stored in secure Spectrum charging carts designed for the Quest 3.

Cleanbox systems were chosen for disinfecting headsets.

Success stories

After the lab was funded and launched around curriculum for 3 programs, within the first year of being operational, 27 different departments were able to incorporate XR into their curriculum and utilize the space:

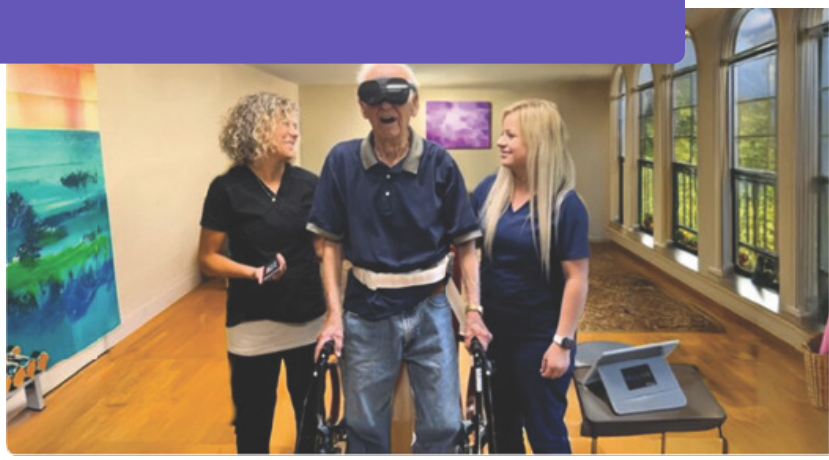
Programs utilizing XR

Nursing	DRS	Architecture
EMS	Spanish	Women's Basketball Team
Dental	ESL	Soccer Teams
RT	Marketing	Volleyball Team
CNA	3D Art Open Brush Color Space	Meteorology
HVAC	Electrical Engineering Solid Works	Biotechnology
Vet Tech		Career Services
Botany	Mechanical Engineering	Chemistry
Interior Design	Academic advancement	Automotive

SENIOR LIVING & VETERANS CARE

MYND IMMERSIVE

Mynd Immersive



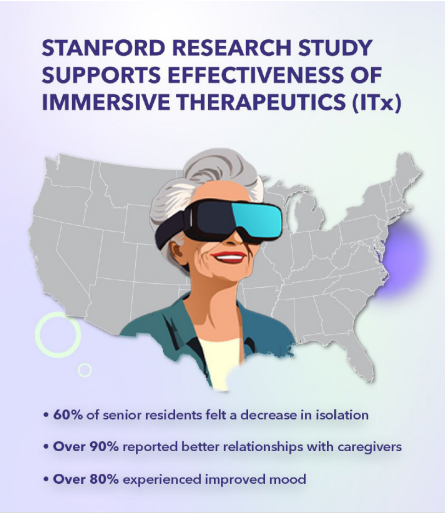
Client and Purpose of XR

Mynd Immersive partners with the **U.S. Department of Veterans Affairs (VA), State Veterans Homes, and hospice and palliative care providers to bring therapeutic virtual reality to Veterans.**

The purpose of XR deployment is to reduce pain, stress, anxiety, PTSD symptoms, and isolation—while supporting VA Pain Management and Opioid Safety (PMOP), Whole Health, and Recreation Therapy initiatives. Programs are active across more than 49 VA locations with expansion into Veteran homes and mobile outreach efforts.

Program Goals

The program equips Veterans with immediate access to immersive therapeutic experiences that provide relief from pain, anxiety, depression, and loneliness. In clinics, Mynd Essentials supports staff with tools that align with Whole Health and PMOP strategies, including non-pharmacological pain management. The Veterans At Home program eliminates barriers to access by offering a self-contained, offline, gaze-based system that is ready to use right out of the box—requiring no downloads or complex setup.



Hardware management

Headsets are stored in CleanMynd Carts or secured charging/storage units, depending on the site. Cleanbox disinfection stations ensure medical-grade sanitation between uses.

In Veterans At Home, kits are shipped directly to Veterans with a quick start guide and support hotline. Clinic deployments designate staff (Recreation Therapy, PMOP, or Whole Health champions) for daily sanitation, content selection, and weekly coordination with IT for software updates.

Success stories

VISN 4 Pilot: 91% of Veterans reported reduced stress and improved mood after VR sessions.

- VA Palo Alto: Veterans experienced a noticeable drop in perceived stress within 10 minutes of VR immersion.
- State Veterans Homes: Residents report “feeling alive again” after traveling virtually, visiting meaningful places, or engaging in calming meditations.
- Clinician Feedback: Staff noted increased patient engagement and improved morale, with VR becoming a trusted tool to reduce reliance on medication.



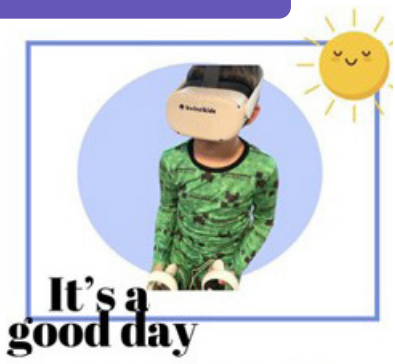
PEDIATRIC CANCER CARE

XR IMPACT & MAGGIES WIGS 4 KIDS

Maggie's Wigs 4 Kids of Michigan
Helping the self-esteem of children

XR IMPACT NETWORK





Client and Purpose of XR

Maggie's Wigs4Kids has supported over **5,600 Michigan children across 58 counties for 23 years,** providing wigs and support services—including therapeutic VR—to children ages 3–18. Each child receives a wig and access to classes, social activities, field trips, counseling, and wellness programs at no cost to their families in a non-medical setting.

The VR 4 Kids Program has enabled the center to extend their services to include VR, in collaboration with VR pediatric initiative.

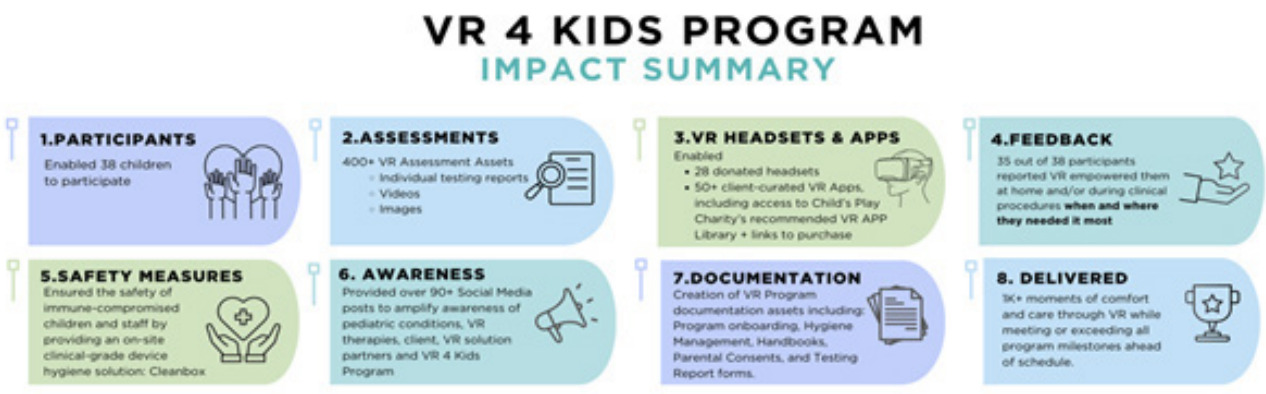
Hardware management

VR headsets are used at the facilities and sometimes sent home with the patients. While at the facilities, the kids themselves are aware of proper sanitization and charging procedures to protect the next person. They utilize Cleanbox's CX1 and Cleanbox Omniclean for 360-degree disinfection of headsets, controllers and other hardware, protecting their immunocompromised community.

Success stories

Program participants express increased levels of happiness, reduced anxiety, and a renewed sense of hope. Families report a positive shift in the overall quality of life for their young ones, underscoring the significance of an untapped opportunity that exists for VR in the healing process.

> *Witnessing pediatric cancer pilot patients like Bree and Maddox, faced with an unending road of distressing moments, put on a headset and experience immediate awe, relief or distraction amidst life's most agonizing circumstances, is the single most compelling reason to continue the work required now to ensure more people will be helped.*
>
> **Beth Savoldelli, Founder, XR Impact Network**



AVIATION SAFETY TRAINING

KLM ENGINEERING & MAINTENANCE

DESIGNING CONSEQUENCES | CHRIS KOOMEN

Use Case

Staff had been trained on emergency procedures, but KLM needed to understand how they would act on that training during a real emergency. How would they use that knowledge when the actual situation around them had changed. There wasn't just one way to leave the hangar, there were several. But in an emergency, the route that looks perfectly reasonable isn't necessarily the safest. Knowing the emergency procedure was only part of the right decision.



Exploring human behavior during an emergency In the VR training, KLM allowed multiple exit routes in different simulated emergencies. In the event of a fire in an airport, if someone wanted to take the elevator, they could. The doors would close, the elevator would start moving and then come to a stop. Slowly, it would begin to fill with smoke. The experience continued long enough for them to understand the impact of their choice.

Other choices were less obvious. A large hangar opening could look like a sensible way out, while emergency vehicles were approaching it. A route through the paint area could expose someone to toxic fumes without the visible flames they associated with danger. Even going upstairs to collect a coat could become a problem if the way back changed.

Learning through debrief

Post-experience conversations allowed staff to identify the assumptions behind their choices. This VR training allowed us to address the gap between proper procedural training and how staff made real-time emergency decisions

Operational detail

The scenarios drew on operational observations and input from the fire service. Virtual colleagues also moved toward an unsuitable exit, testing whether a participant would follow them or trust their own assessment.



“Give people plausible choices, make the consequences credible and leave room for a proper debrief.”

Case account supplied by Chris Koomen, UnitedVR

FIRST RESPONDERS TRAINING

XPERTVR

XpertVR

Client and Purpose of XR

Each year, a large Ontario-based college trains 50–60 pre-service fire recruits through multiple VR sessions before live burn exercises. Beyond firefighting, hundreds of students in policing, environmental management, and other disciplines use the VR lab each semester. The XR initiative provides pre-service fire students with realistic, repeatable high-stakes training without the risks or limitations of live exercises.

The lab began as a focused pilot and grew into a fleet of 100+ headsets, with Pelican cases for classroom and satellite transport. Instructors from policing, environmental programs, and other departments book the lab regularly, boosting utilization and strengthening the college's cross-disciplinary learning model.

Hardware management

High throughput required a hygiene workflow the entire faculty could trust. The main lab operates with four Cleanbox CX1 units, with additional units at other locations. Headsets are routinely placed in a Cleanbox for UVC disinfection and, when in the lab, remain plugged in and stored so they're sanitized and ready for the next group. The college's lab team and IT department jointly manage sanitation cycles, charging, and software updates.

This predictable, repeatable process removed a major adoption barrier for instructors who were initially hesitant about face-worn devices.





Success stories

Students arrive at live burns more prepared and capable than in 13+ years of past cohorts, with instructors attributing performance gains to added reps, immediate feedback, and scenario control enabled by VR. Equally important, the lab's hygiene and logistics model sustained a high-frequency training cadence across programs without compromising safety or device readiness.

Growth & Future Plans

The program is now a model lab for XR deployment across the college, demonstrating high-throughput device management and seamless sanitation practices, and informing collaborations with fire departments across North America, including San Diego Fire and the Ontario Government.

Curricula includes Search & Rescue – immersive multi-room fire response with instructor controls; and Crime Scene Investigation – forensic training for justice and policing programs.

CREATING A COMPLETE KIT
CLEANMYND WELLNESS CART

The CleanMynd Wellness Cart is the most compact and complete mobile XR station on the market.

Clients and Purpose of XR

Cleanbox Technology and MyndImmersive have long partnered to serve the U.S. veterans community. Drawing on years of XR deployments, the companies listened to feedback from nurses, physicians, hospital and care center operators, and administrative staff.

The message was clear: for XR to be adopted and scaled in clinical settings, staff needed a practical, all-in-one solution. And so they worked with First Health Products to design the perfect turnkey cart.

Solution: The CleanMynd Wellness Cart

- Compact, modular storage, charging, and disinfection in one unit
- XR headset kits delivered ready to operate
- Mobility to move the entire “XR Station” between care centers
- Flexibility: Configurable for XR headsets, phones, tablets, or battery packs roll-out, lockable and adjustable drawers charge up to six devices at once
- Compliance with infection-control requirements, ease of use, and organizational standards

Success stories

The CleanMynd Wellness cart has been deployed to U.S. hospitals, VA medical centers, and leading medical universities.



CREATING A COMPLETE KIT

KNOX LABS NURSING KITS

KNOXLABS



Client and Purpose of XR

Knox Labs Nursing Kits are **pre-built for schools, colleges, universities, and hospitals/health systems that want a classroom- and unit-ready solution for simulation—without piecing together hardware, carts, disinfection, and accessories from multiple vendors.**

We partnered with Meta, UbiSim, Cleanbox Technology, and Looking Glass XR to design a complete VR kit for nursing education and workforce training.

Number and type of headsets

We designed this kit because our customers' individual XR programs required us to provide solutions that were simple, durable, and ready-to-go on day one. We listened! We were advised by real nursing education customers and now ship three proven options — 6, 12, or 24 headsets — plus a configure-your-own kit if you need something larger or specialized.

Hardware management

- Your kit arrives pre-built and tested.
- Headsets are set up for shared use. Devices provisioned (set up with software) and organized for class cohorts or unit teams.
- Charging & storage solved. Portable cases (6) or rolling carts (12/24) keep everything powered, locked, and mobile.
- Fast disinfection. Cleanbox UVC LED delivers lab-validated 99.999% disinfection in a minute—no heat, liquids, or chemicals.
- Help when you need it.

Success stories

60+ peer-reviewed scenarios across Fundamentals, Medical-Surgical, Pediatrics, Obstetrics, Mental Health, and tutorials. Our kits are already in use at Community college programs, large public universities and medical universities.



HIGH THROUGHPUT PUBLIC VENUE
VAN GOGH EXHIBIT AT THE MUSEE D'ORSAY

A collaboration between:
Vive Arts, Lucid Realities Studio, Unframed-Collection



Client and Purpose of XR

The Van Gogh VR experience was **launched at the Musée d'Orsay as part of a high-profile Van Gogh art exhibition.** Designed as an add-on feature, the VR installation was integrated seamlessly with the exhibit layout, guiding visitors fluidly from the main art hall into the VR experience room. Its purpose was to deepen art appreciation by offering an intimate glimpse into Van Gogh's mind and the personal journey behind his works.



Because of the exhibition's visibility and expected popularity, the operations team anticipated consistently long queues and minimal turnaround between users, managing thousands of visitors each day in a controlled environment inside a globally renowned public institution.

Success stories

The Van Gogh in Auvers-sur-Oise exhibition at the Musée d'Orsay **drew a record-breaking 793,556 visitors over just four months.**

The inclusion of immersive VR and AI experiences was widely credited with helping to attract these unprecedented crowds, setting a new benchmark for museum attendance and demonstrating the artist's lasting appeal.

HOW THE EXHIBIT HANDLED HIGH VOLUME THROUGHPUT

Number and type of headsets

Note: This methodology can scale to XR events with very large numbers of guests. For the purposes of this illustration, the following event parameters are applied:

1. Sessions of up to 12 guests in the XR experience at a time.
2. A 15 to 20-minute XR experience
3. Wait time of no more than 5 minutes between each session.

Venue chose to have extra headsets (Vive Pro) and extra silicon face pieces. Each face piece was replaced between each user. Operators disinfected several face pieces in an Omniclean at once (1 minute) and had a surplus of disinfected face pieces in a “clean” box for quick access, with a “dirty” box holding used face pieces awaiting disinfection. This allowed the operations team to keep up with uninterrupted queuing, while disinfecting between every user, and disinfecting the entire headset several times throughout the day.





Hardware management

BEFORE FIRST SESSION OF THE DAY:

1. Ensure the 24 face gaskets have been disinfected in the OmniClean and are stored in the “clean” area. 3-4 face gaskets may be placed in the OmniClean at once (to avoid overlap). Run the 1-minute disinfection cycle. Approx 8-10 minutes total time for 24 face gaskets).
2. Ensure each headset has been disinfected in the OmniClean and are stored in the “clean” area. One to two headsets may be placed in the OmniClean at once (to avoid overlap). Run the 1-minute disinfection cycle (Approx 8 minutes total time for 12 headsets).
3. Place clean face gaskets on each of the 12 clean headsets and deliver to the guest area for the first XR session.

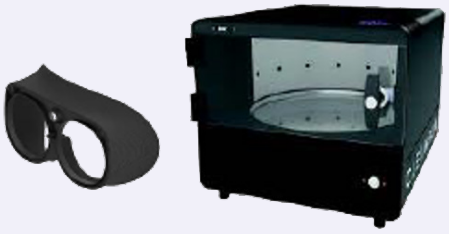
WHILE A SESSION IS RUNNING:

1. Disinfect 12 “used” face gaskets in the OmniClean and store them in the “clean” area. 3-4 face gaskets may be placed in the OmniClean at once (to avoid overlap). Run the 1-minute disinfection cycle. (Approx. 4-5 minutes of total time)

AFTER EACH XR SESSION:

1. Immediately collect the 12 headsets and bring them to the cleaning area.
2. Remove the face gaskets and place in the “to be cleaned” area.
3. Inspect the headset and use an appropriate antibacterial wipe(s) to remove any visible debris from the headset frame. Follow manufacturer recommendations and use caution around the lenses.
4. Place a clean face gaskets on each of the 12 headsets and deliver to the guest area for the next session.

DAILY PROTOCOL FOR HIGH VOLUME PUBLIC VENUE



DAILY

DISINFECT FACE GASKETS BETWEEN EVERY USER:

Place 3-4 face gaskets in the OmniClean, without overlapping and run the 1-minute disinfection cycle. If the face gasket has visible debrис such as hair or makeup use an antibacterial wipe to carefully remove as much as possible before disinfecting in the OmniClean.



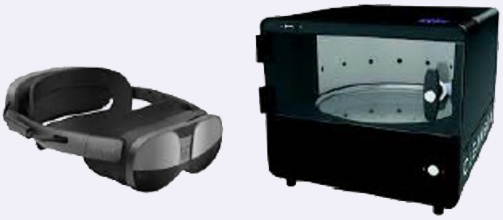
WIPE HEADSET BETWEEN EVERY USER

Wipe the headset frame (carefully avoiding lenses) with an antibacterial wipe (follow manufacturer guidelines) between every user session. While this process does not disinfect the headset frame, it assists to remove visible elements such as hair, makeup, etc.



OPERATOR HAND HYGIENE:

Event operators are strongly encouraged to clean their hands regularly, especially after handing used face gaskets and headsets and before handling clean face gaskets and headsets. This is important for operator health & safety and to avoid contamination of clean headsets and face gaskets.



DAILY OR AFTER EVERY USE:

After using a wipe to remove visible debrис, disinfect the headset (with or without gaskets) in the OmniClean. Place up to 2 headsets in the OmniClean. Be sure they do not overlap. Run the 1-minute disinfection cycle.

For more information, contact us at
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CLEANBOX

www.cleanboxtech.com