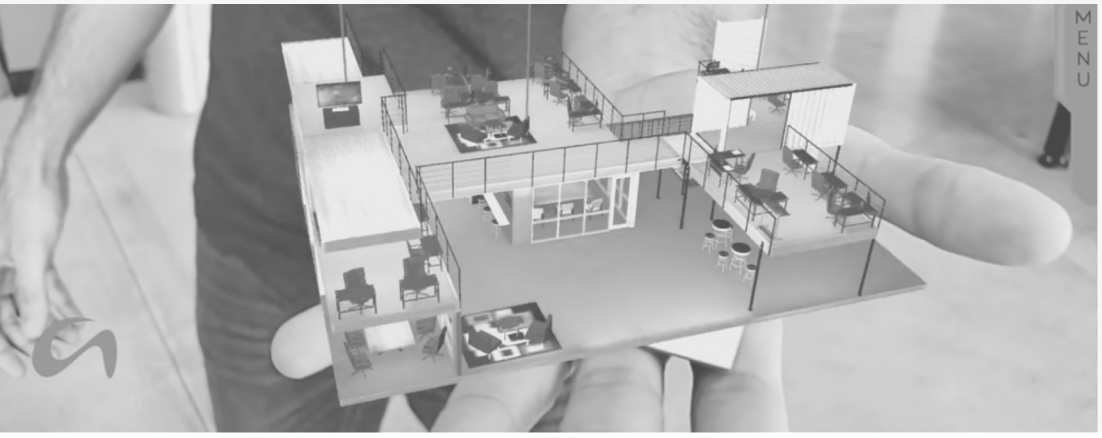
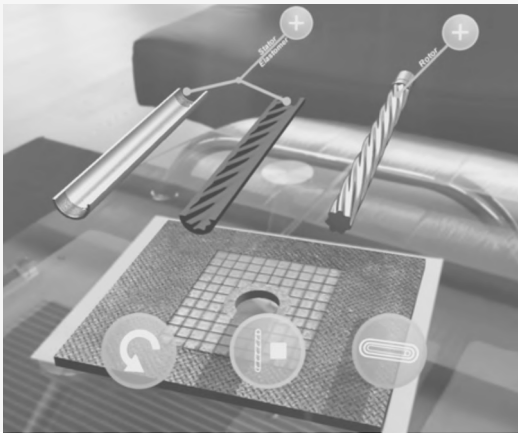




ABSTRACT

VIRTUAL REALITY
AUGMENTED REALITY
SOFTWARE DEVELOPMENT
WORKFLOW OPTIMIZATION
ANIMATIONS

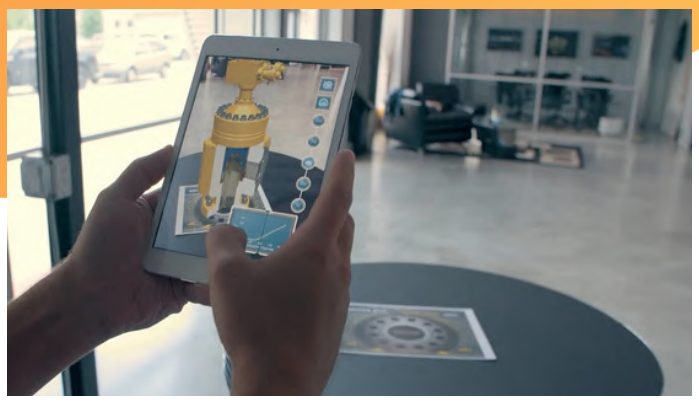
ABSTRACT.TECH

GLOSSARY OF TERMS

The emerging technology field is littered with acronyms and shorthand that often create confusion. There's VR, AR, MR, XR, IR...and if you try to say them all in one breath you may not finish until you're in the ER. Here's a quick breakdown of what the terms mean to us so we're all on the same page.

Virtual Reality (VR)

Immersive training and simulations that place the user in virtual environments and scenarios that cannot easily be replicated in the real-world.
Common hardware: Oculus Rift, Oculus Quest, HTC Vive



Augmented Reality (AR)

Provides a 3D "Holographic" experience through mobile devices and wearables that improve an operational or training process.
Common hardware: Mobile phones/tablets via Apps, Microsoft HoloLens

Mixed Reality (MR)

Combining functionality and technology from AR and VR to offer a combination of immersion and interactions with digital assets in the physical environment. Common hardware: Microsoft HoloLens, HP Windows Mixed Reality

Gaming Simulations

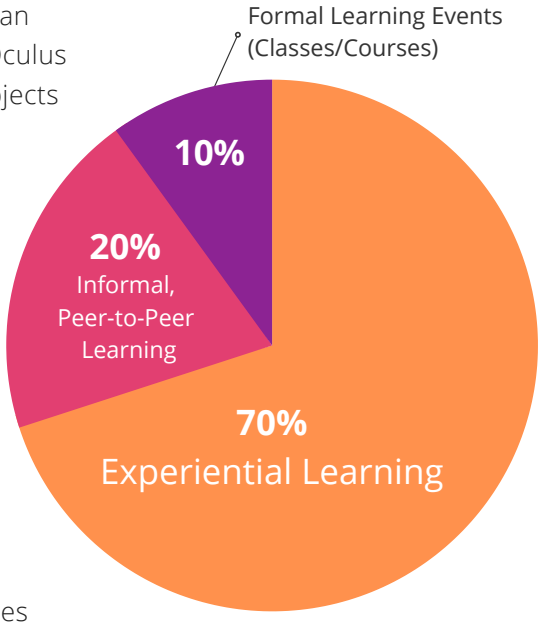
PC based games that entertain, inform, and educate employees for improved knowledge retention and transfer.

VIRTUAL REALITY

Increase employee safety with Virtual Reality Training

Virtual Reality (VR) allows users to enter a virtual environment where they can explore and interact through the use of a VR headset like the Oculus Rift, Oculus Quest, or HTC Vive. Simulations built using VR allow users to manipulate objects or perform a series of actions to complete tasks.

> *"According to the 70:20:10 framework, 70% of learning occurs through hands-on experiences."* [1]



Traditional learning methods like classes, videos, and PowerPoints are "passive", and lack realism and active engagement. Meanwhile in VR, "active learning" scenarios can be randomized, creating unique user experiences not possible in books and videos. Using VR, we are capable of training users in any environment or scenario needed to make them an expert from a safe and remote location.

Processes involving heavy machinery, hazardous materials, or are located in areas that prove difficult and costly to access are prime candidates for VR training intervention. VR environments can be built to allow users to train in realistic yet safe environments where they can see, in real-time, the consequences of their actions.

Increase information retention with Virtual Reality Training

Virtual Reality is changing the way learning material is delivered to employees. It provides the opportunity for learners to get hands-on experience without actually executing on the job. Learning-by-doing not only represents the majority of how we learn, but it is also associated with the highest levels of information retention.

> *"According to Dr. Narendra Kini, CEO at Miami Children's Health System, the retention level a year after a VR training session can be as much as 80%, compared to 20% retention after a week with traditional training.*[2]

VR training provides situational flexibility where other forms of learning cannot address. Adding in features like event randomization keeps the simulation unpredictable, while allowing for aptitude and response analytics which can be tracked and reviewed with HUBxr, our SaaS solution designed to connect emerging technology applications with legacy systems.

For example, a technician could be diagnosing a piece of equipment for errors. Instead of the equipment producing the same error over and over for each simulation, we could randomize the errors they will see. The technician could then be graded on their ability to correct the fault and the system would track information like how much time was needed to complete the fix, how many mistakes were made, etc.

Traditional Learning Methods
Courses, Books, Videos

VS.

Virtual Reality Training
Experiential Learning

Texas A&M University - Distracted Driving Simulator

Problem: Texas A&M's Passenger Safety Initiative is designed to show high school and college students how dangerous texting and driving is. They currently utilize a 360-degree video that shows the risks of distracted driving. While emotionally powerful, it lacked the hands-on experience, personalized metrics, and randomization that can be achieved in VR with a driving rig. In order to drive a higher impact, Abstract designed and created an interactive VR Driving simulator so users could experience firsthand the dangers of driving distracted.

Solution: Abstract developed a Virtual Reality solution in a gaming engine that utilizes a driving simulator rig and the Oculus Rift. In the scenario, the driver must pick up the cell phone and answer a series of text-message prompts with the hand held controller while driving. The driver must complete the actions without crashing into cars, curbs, or any randomized events included in the simulation. The user's head movements are tracked with sensors to tell when they are looking at their phone, versus when they are paying attention to the road.

After a successful first version, Texas A&M decided to continue development on a version two. The update includes a distracting passenger scenario, where an animated character is actively talking to the driver. The second version also includes a highway speeding and braking scenario, designed to illustrate the dangers of following too closely to a vehicle when moving at speed.

TEXAS A&M UNIVERSITY

ABSTRACT.TECH

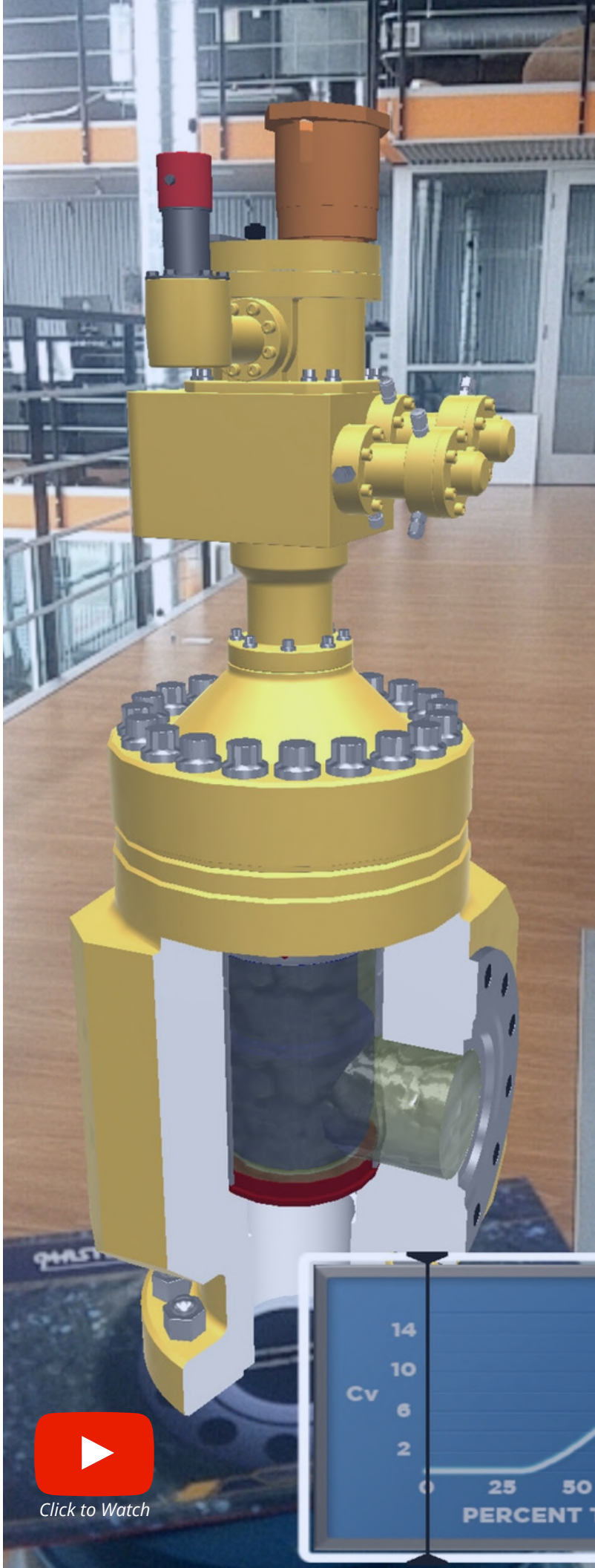
AUGMENTED REALITY

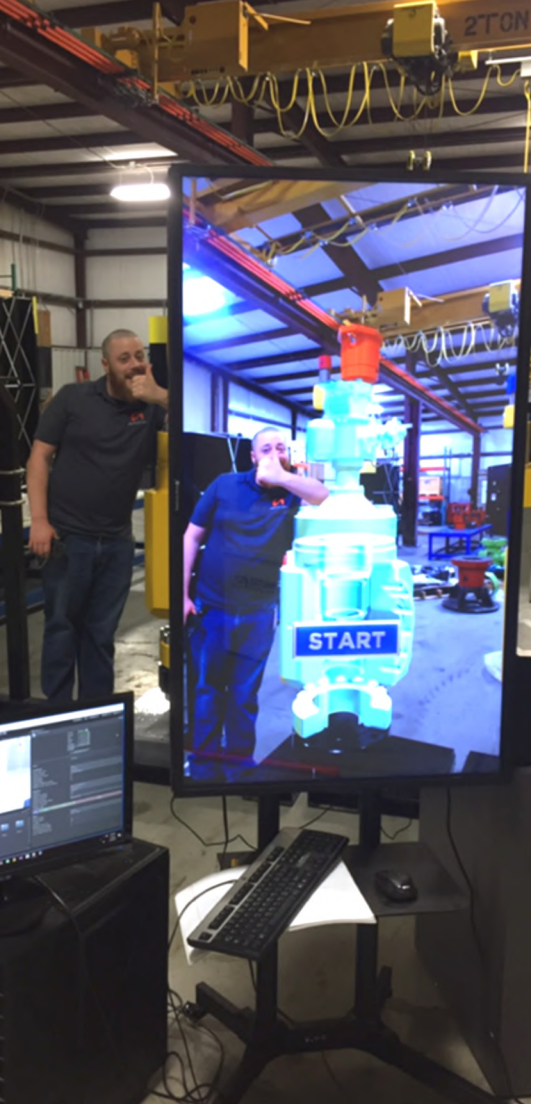
Meshing Reality with the Digital Environment

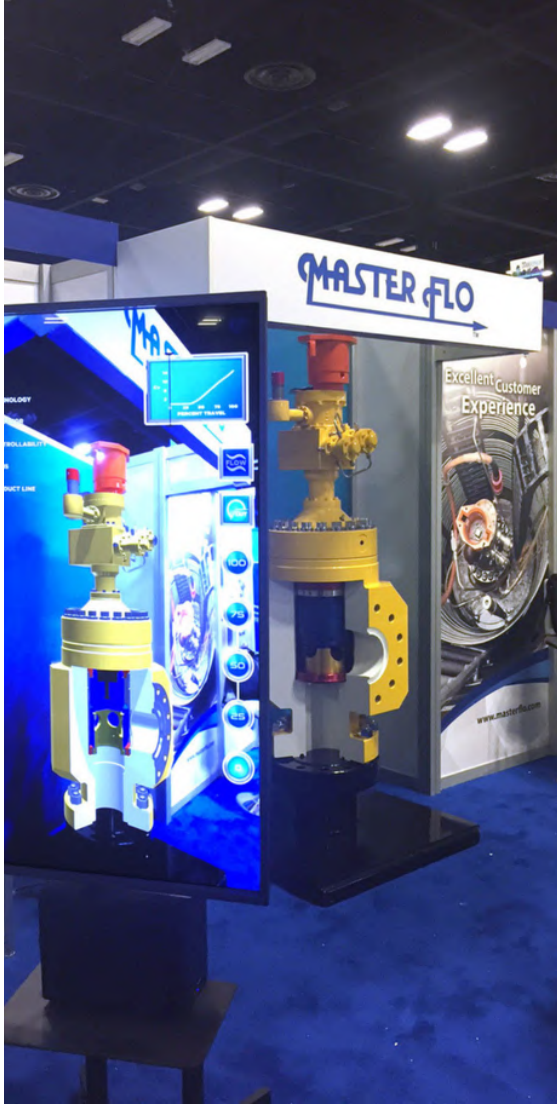
Augmented Reality (AR) is an interactive experience where digital information is overlaid into a real-world environment, creating the sense that the digital object truly resides in the user's field of view. Mixed Reality and Augmented Reality are often used synonymously to describe the seamless meshing of the real-world and digital items displayed within it.

When viewed through a smart phone or wearable device (think Microsoft HoloLens or Google Glass), an entire oil rig, shipping vessel, or a piece of heavy machinery can be digitally transported anywhere and accessed by scanning a special design called an AR marker. Similar to a QR code, it will scan the image for digital points, and once mapped, can display a 360-degree digital model or 2D content in a real environment. This model can then be manipulated to show product information, operational movement and even sales/inventory information when integrated with an ERP system and our powerful software solution, HUBxr. AR can be activated using wearables for hands-free experiences, or accessed with a mobile device and a downloadable app, making it an incredibly cost-efficient and scalable solution.

The overlaid digital information can either be constructive (adding to the natural environment), or destructive (masking of the natural environment). The example to the right is a "constructive" example, as it "adds" a digital 3D model on top of a physical marker when scanned with a mobile device or wearable. "Destructive" AR can be equally useful, as it can be used to digitally cast an X-Ray-like vision on an object to view internal components by giving the impression that the object is transparent, and can be synced to reflect real-time data for more powerful equipment management.







Master Flo - Choke Valve Interactive AR Experience

Problem: Master Flo needed a unique and interactive way to showcase their Choke Valves at their Subsea Tieback and Offshore Technology Conference exhibits.

Solution: Abstract created a robust Augmented Reality experience, designed to educate attendees, engage clients, and create a memorable experience on the show floor that could be leveraged across sales and marketing channels.

Using AR, we overlaid a digital model of the valve onto a 7 foot, physical version of the actual valve using a separate monitor and camera within the exhibit space, providing an X-Ray-like vision to show clients and attendees a working view of how the valve functions. When viewed from the interactive monitor, informational hotspots were displayed to highlight the key benefits and features of the Choke Valve. The solution was also made available as a standalone, mobile application for use beyond these events. In the mobile app, users are able to touch and rotate the Choke Valve, giving them a holographic 360-degree view.

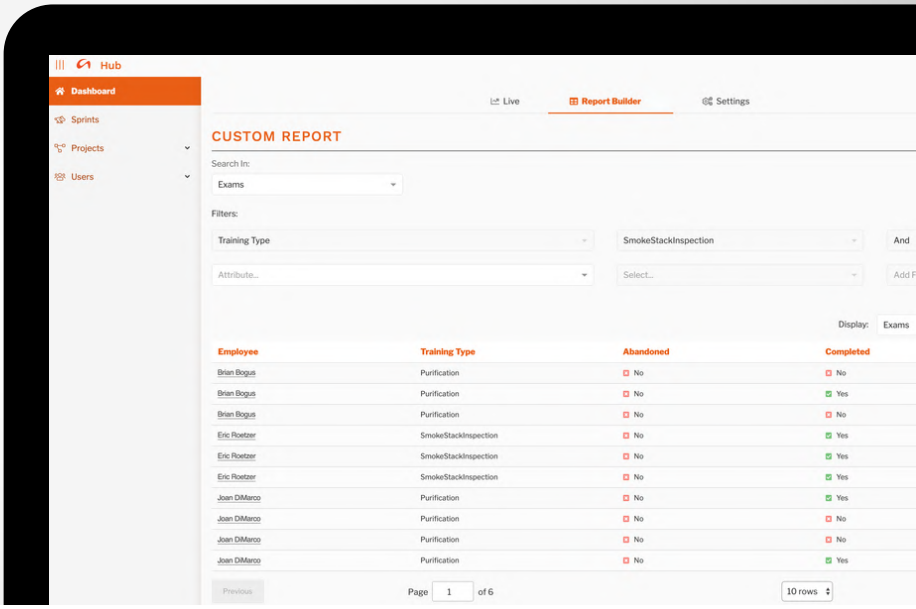
MASTER FLO
The leader in choke technology ™

Print this page, download the app and scan the AR Marker above to experience in AR.

Available on iTunes | GET IT ON Google Play

Click to Download

HUB XR
POWERED BY ABSTRACT



The Bridge between Emerging Tech Solutions & Legacy Systems

Virtual and Augmented Reality, Object Recognition and similar emerging technology solutions help increase efficiency, effectiveness, and safety amongst the people who use them. The issue is, many legacy systems do not easily communicate or integrate with emerging technology. If the company cannot compile useful data from these VR/AR/OR solutions when training or assisting employees with workflow inefficiencies, how can leadership make business decisions based on their effectiveness?

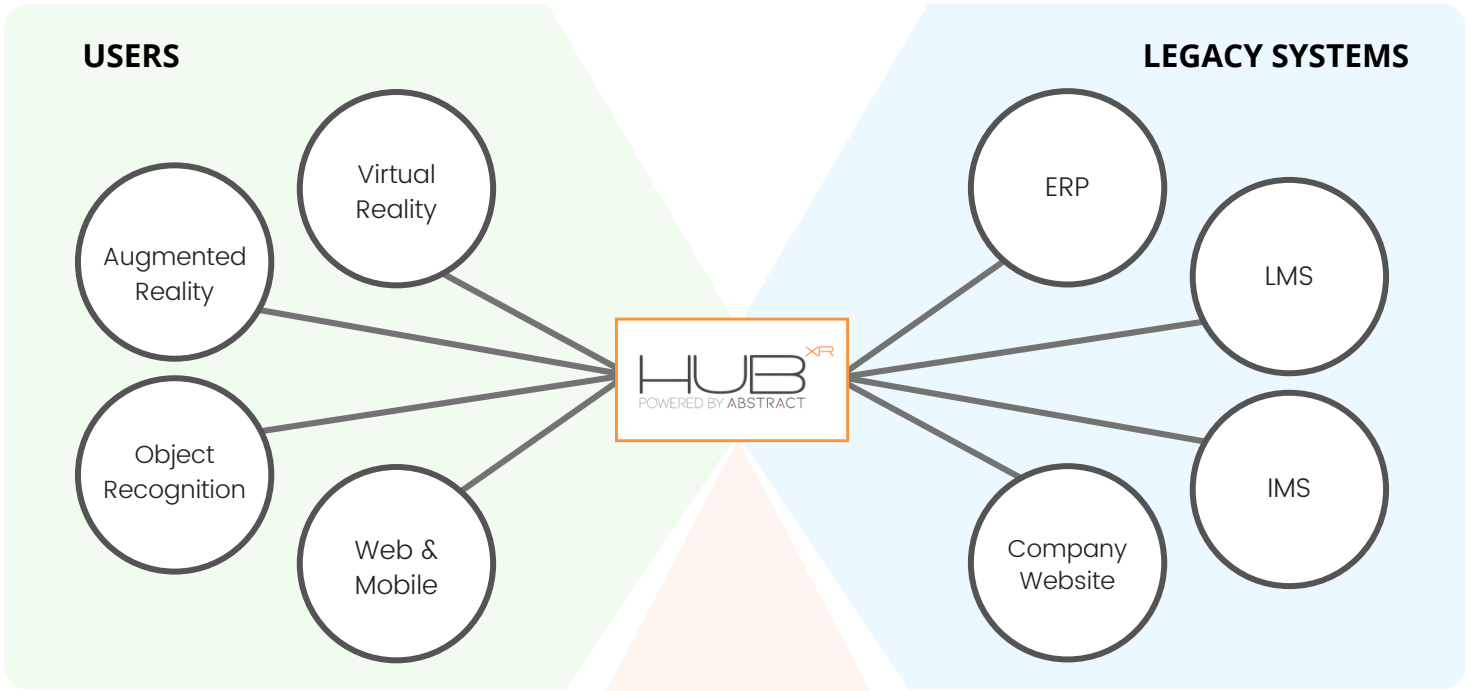
Traditionally, data compiled from Emerging Tech solutions and Legacy Systems remain siloed.

What is HUBxr and what can it do?

HUBxr serves as either the bridge or central *hub* of an organization, tying together legacy systems like Enterprise Resource Planning (ERP), Learning Management Systems (LMS), and Inventory Management Systems (IMS) with VR/AR/OR solutions and mobile applications.

Out-of-the-box SaaS offerings generally provide a solution for 80% of the problem, but what about the last 20%? Conversely, custom development provides a 100% solution, however it is both costly and resource intensive to execute and maintain. To bridge the gap, we built HUBxr as a lightweight, flexible, and scalable solution that is complimentary and non-intrusive to an existing system's infrastructure. With HUBxr's constantly growing content library, we're able to add or remove modules with minimal customization to reduce cost and deployment time, helping to get you a 100% solution for your emerging technology needs.

HUBxr is equipped to manage a company's website, documentation and equipment, or product information while tracking real-time insights - all within one application. It can also be used operationally to handle inspection checklists, procedural step-by step instructions, visual and auditory records for liability and compliance, and more depending on the use case.



HUBxr

Efficiently and Effectively Integrates with Legacy Systems

HUBxr supports emerging technology, and helps "bridge the gap", allowing systems new and old to connect seamlessly without disruption to your current infrastructure.

Increase Training/Operational Efficiency

Audit VR/AR training assessments and operational processes in real-time with HUBxr's Heartbeat Monitor. Assess decisions in scenarios, monitor trainee's progress and operational procedures, LIVE.

Drive Business Decisions with HUBxr's Insights Reporting Dashboard

Track user activity, equipment usage, or view operational data from training and live environments for process completion, component selection and more.

Automatically Create PDF Reports for Inspections and Procedures

When coupled with VR/AR training or to aid an inspection process using Object Recognition, HUBxr can generate automatic PDF reports based on key metrics and information documented from the user.

Amplify Your Employee's Efficiency and Effectiveness

Emerging tech gives your workers access to key data and interactive tools, providing improved working conditions while embracing your legacy system's data.

Access Product Information More Efficiently Through AR Markers

Deliver key information to workers faster than ever by utilizing on-location tags and the help of wearable tech and/or mobile applications.

Effectively Communicate Updates

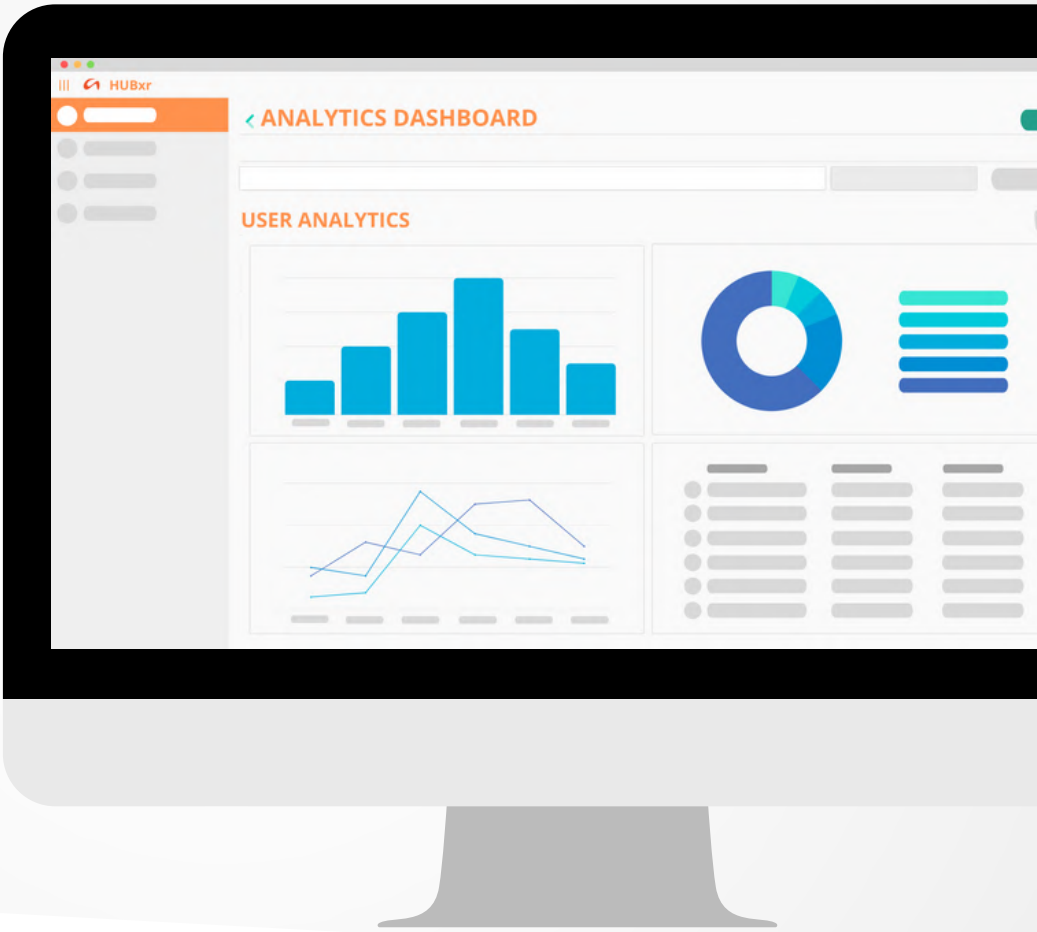
HUBxr eliminates outdated versions of documentation, ensuring everyone in your organization - from users in the field, to salespeople and clients - always have the most accurate data.

Predictive Maintenance Visualization

By integrating your real-time data, utilize object recognition to show a technician what component will need maintenance before an incident occurs.

INSIGHTS REPORTING DASHBOARD

Support operations with user trends/analytics in the Insights Reporting Dashboard



HUBxr Insights Reporting Dashboard

Gain insight into users' behavior with our integrated *Insights Reporting Dashboard*. Here you'll find detailed analytics on your products, documentation and trends, providing you the real-time information you need to find more opportunities to improve operations.

When paired with VR/AR/OR interactive training and operational solutions, the dashboard can also be used to view aggregated data on topics like course competency, time in environment, areas of weakness, areas of strength and much more. Depending on the integration, we can even provide a user-facing view via mobile device, desktop or wearable technology.

HUBxr Heartbeat Dashboard

One of the newest features of HUBxr is our Heartbeat Dashboard. The dashboard shows a live-scrolling feed of data collected from any Abstract application. This new analytics feature is especially useful in training applications where trainers can view and track the trainee's choices and decisions while they are actively being assessed. Trainers can gauge user's reaction times when faced with a dangerous situation, and evaluate their decisions to real-life, emergency scenarios from the safety of a virtual environment.

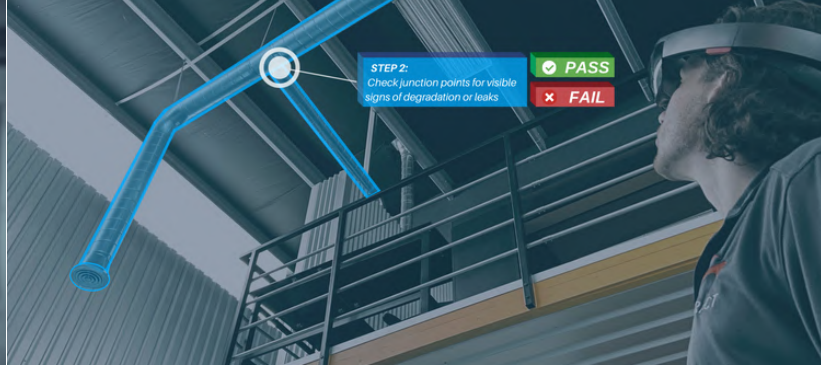
IdentifiAR

Access Information on-the-fly with IdentifiAR

IdentifiAR utilizes Augmented Reality through a wearable device or mobile application to allow customers and employees access to key information, documentation and procedures. IdentifiAR is used in tandem with the HUBxr. HUBxr can be a self-sufficient platform, used to house all the necessary data required to run the application. For more robust performance, it can be integrated with existing Enterprise Resource Planning (ERP) or Inventory Management Systems (IMS) to deliver real-time information.

These markers can be used to access multimedia files including images and video, product documentation and spec sheets, and can even display real-time data from equipment to show operating statuses and system faults.

In the banner image above, the device is seen scanning an Augmented Reality marker. Once scanned, the user can interact with the app to view more information on the piece of equipment, or physical object that was scanned. If using analytics in HUBxr, it will record who scanned the object and when and where it was scanned. This information can then be compiled to support sales, marketing, operations and training efforts by displaying who looked at the piece of equipment, what information they viewed, whether they viewed additional pieces of equipment and more.



OBJECT RECOGNITION

*Note: the UI shown above is a Proof of Concept and used for demonstrative purposes only.

Streamline Technical Processes & Liability Tracking with 'OR'

For humans, recognizing objects in their field of vision requires minimal effort. Understanding an object from various distances and angles also presents us little difficulty. Digital cameras allow us to emulate vision through a computer, but they do not have the natural ability of discerning objects from one another in their field of view. Using Object Recognition (OR) technology, we can help computers "see" more effectively by searching the area to identify objects in a real environment.

There are multiple ways to visualize objects for scanning. We have found an overlay to be a popular solution for our clients. First, the AR application will scan the environment to locate the item being scanned. Then, once it recognizes the target object's geometry, the application casts a digital overlay which can provide information specific to areas, components, or the whole piece of equipment. A second visualization method is through single component selection, where one specific object is being searched for in the area. Once the component is found, it will confirm that the item selected is correct, and proceed to the next component as shown in the image above.

The use cases for OR are vast. Use it for troubleshooting or identifying components of complex machinery, or to show the internal workings of a system with an X-Ray view utilizing real-time data. Even expedite equipment audits, where a technician can take images and audio recordings to document the status and condition of the equipment. This information can then be saved and stored for liability purposes and referenced at any time.

FILTERING APPLICATION

Filter for Products, Documentation, Real-Time Data and More

Abstract's Filtering Application was designed to deliver key information, documentation, and procedures to customers and employees no matter where they are located. Similar to IdentifiAR, the Filtering Application is used in tandem with HUBxr. HUBxr can be a self-sufficient platform used to house all the necessary data required to run the application. For optimal performance, it can be integrated with existing IMS or ERP systems to deliver information that is always up-to-date. For instance, a supervisor of a drilling rig with access to real-time equipment data could filter through the application to a specific piece of equipment, and view the technical data right from their mobile device wherever they have internet connection.

While there are many use cases, the solution was initially developed to reduce the amount of incorrect data circulating internally and externally. This often occurs due to changing product inventory, specifications and documentation among companies with large product counts. This solution is designed to ensure salespeople and engineers always have access to the most up-to-date information possible, even when offline.

The application's information can be stored entirely in the cloud or on the device, or a hybrid of both. The hybrid version caches certain data locally and it attempts to pull down the most recent information when it has connectivity. For example, if a sales representative or engineer is in an area without internet connectivity, the application displays the most recently cached data so the user still retains valid information. Once they re-enter an area of connectivity, and if there are any updates, they are pushed the most recent information to their device.

COMPANIES WE'VE WORKED WITH

Rolls-Royce

EATON

ارامكو السعودية
Saudi Aramco

Anadarko
Petroleum Corporation

Schlumberger

Dyna-Drill

Texas Children's Hospital®

MASTER FLO
The leader in choke technology ™

TEXAS A&M UNIVERSITY

MAERSK LINE

ABOUT US:

Born at the end of 2011, Abstract began with the goal of creating eye-catching visualization tools that improve a company's brand image and sales. Today, Abstract has evolved into an interactive media and software development firm, focused on optimizing corporate training, operational workflow and communication through emerging technology solutions.

Abstract has developed a suite of software solutions including HUBxr, IdentifiAR, and our Filtering Application. We work with some of the top companies in their respective industries and continue to branch out into uncharted territory with our unique approaches. We are growing at a rapid pace, and continue to work on new and exciting projects, many of which have never been attempted before.

Our commitment to quality, communication, and accountability are at the heart of everything we do, and that extends to our people as well. We've assembled an amazing team of talented individuals, with wide-ranging fields of expertise in the Virtual Reality, Augmented Reality, Object Recognition, Software Development, and Workflow Automation spaces.

Our team is a group of creative architects that utilize the latest technology to generate visual assets that will leave your jaw lying ever so gently on the floor. Our open work environment allows free thinkers and creative masterminds to create works of art for every industry — we'd love to have you over and show you around our creative space.

Many say we are the perfect cocktail between engineers and digital artists, but to us, that's just Abstract.

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Source:
[1] https://trainingmag.com/impact-and-potential-virtual-reality-training-high-consequence-industries/
[2] http://fortune.com/2015/08/17/virtual-reality-hospitals/

ABSTRACT