COMMSCOPE®

Augmented Reality

a historic innovation that bridges the gap between the digital and physical worlds

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CommScope - Recognized Technological Leadership

First was…	Then came…
SYSTIMAX® PDS (1985)	Cat3 (1991)
High-5™ (1993)	Cat5 (1995)
PowerSUM (1996)	Cat5e (1999)
GigaSPEED® (1997)	Cat6 (2002)
DMD & LazrSPEED® 300 (1998)	OM3 (2002)
LazrSPEED 550 (2003)	OM4 (2009)
TeraSPEED® (2003)	OS2 (2006)
GigaSPEED X10D (2004)	Cat6A (2008)
InstaPATCH® 360 (2005)	Method B (2006)
LazrSPEED WBMMF (2015)	OM5 (2016)
iPatch/imVision (2001)	AIM (2016)

VOICE FROM THE MARKET

Augmented Reality is going to change everything.

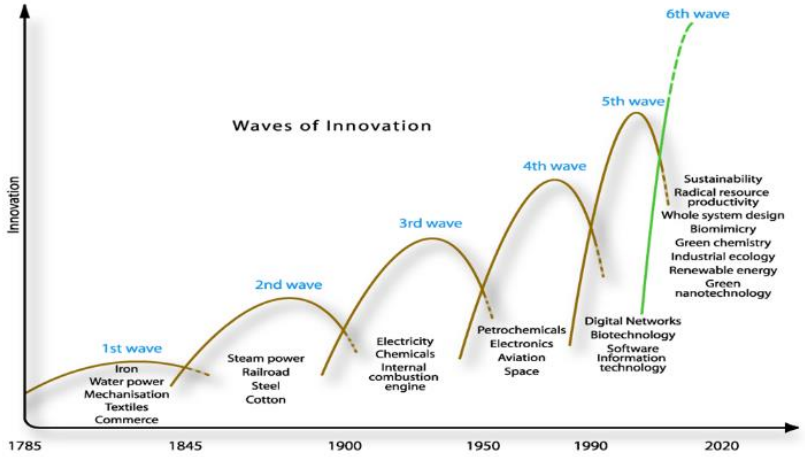
TIM COOK - APPLE

New Innovation Wave

"Every 10 or 15 years, there's an impactful shift in the way people use and interact with technology and data.
After the PC, the internet, and the mobile revolution, mixed reality is going to be the fourth shift, and **it will be as big as each one of those earlier shifts**."

Allan Cook, Deloitte Consulting Managing Director.

Innovation is the central issue in economic prosperity.
Michael Porter, Harvard Business School



Source: The Natural Edge Project
The Natural Advantage of Nations (Vol.I): Business Opportunities, Innovation and Governance in the 21st Century
http://www.naturaledgeproject.net/

While the physical world is three-dimensional, most data is trapped on two-dimensional pages and screens. This gulf between the real and digital worlds prevents us from fully exploiting the volumes of information now available to us.
AR will become the new interface between humans and machines,

Michael E. Porter, Harvard Business School - Institute for Strategy and Competitiveness

Introduction to A/R

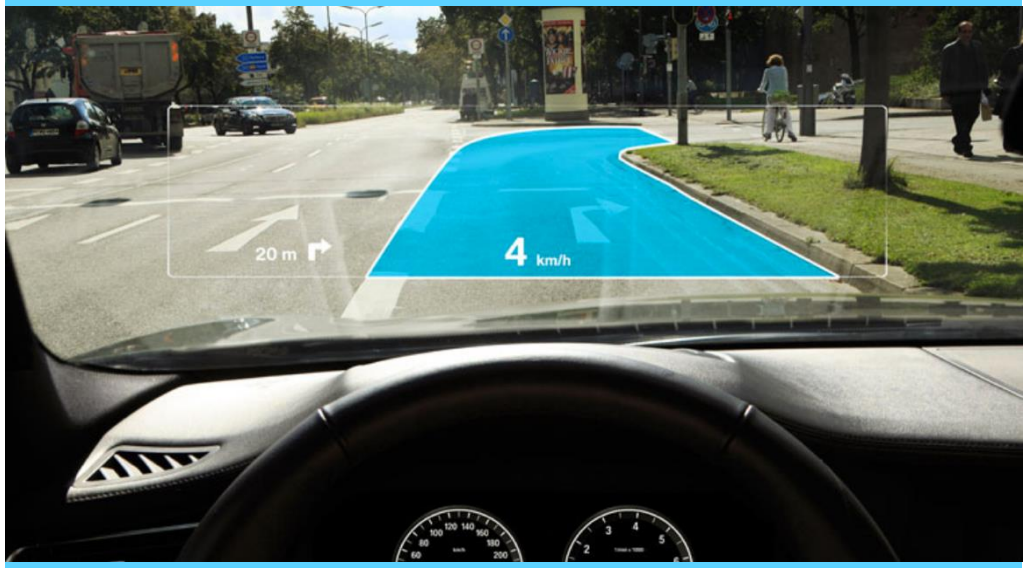
Introduction to Augmented Reality (AR)

- Augmented reality brings aspect of the virtual world into the real world.
- AR does this by layering virtual information and/or graphics on top of a user's view of a real world scene.

Separated Physical and Digital Information

Need to mentally transpose image onto the road ahead – **demanding/prone to errors**

Converged Physical and Digital Information



AR eliminates a need for transposing image - **reduces mental effort/errors**

Source: "Why Every Organization Needs AR Strategy", HBR, 2017

Introduction – Mixed Reality Spectrum

Reality	Augmented Reality (AR)	Virtual Reality (VR)	Mixed Reality (MR)
			
What is …	**Digital content on top of the real world**	**Full immersion into the imagined world**	**Digital content interacts with the real world**

Source: "Why Every Organization Needs AR Strategy", HBR, 2017

AUGMENTED REALITY VS VIRTUAL REALITY

VR can put you anywhere,
AR can bring anything to you.

CLAY BAVOR - GOOGLE

Introduction – AR Cloud

- A real time spatial map of the world, the AR Cloud, will be the single most important software infrastructure in computing
- The AR Cloud is a shared memory of the physical world and will enable users to have shared experiences
- According to Google, over 50% of searches are done on the move (searched locally). There is a growing need to find information right there where you need it, in the now
- The AR Cloud will serve as a soft 3D copy of the world and allow you to reorganize information at its origin, in the physical world.
- With the AR Cloud, the how to use of every object, the history of any place, the background of any person, will be found right there, on the thing itself

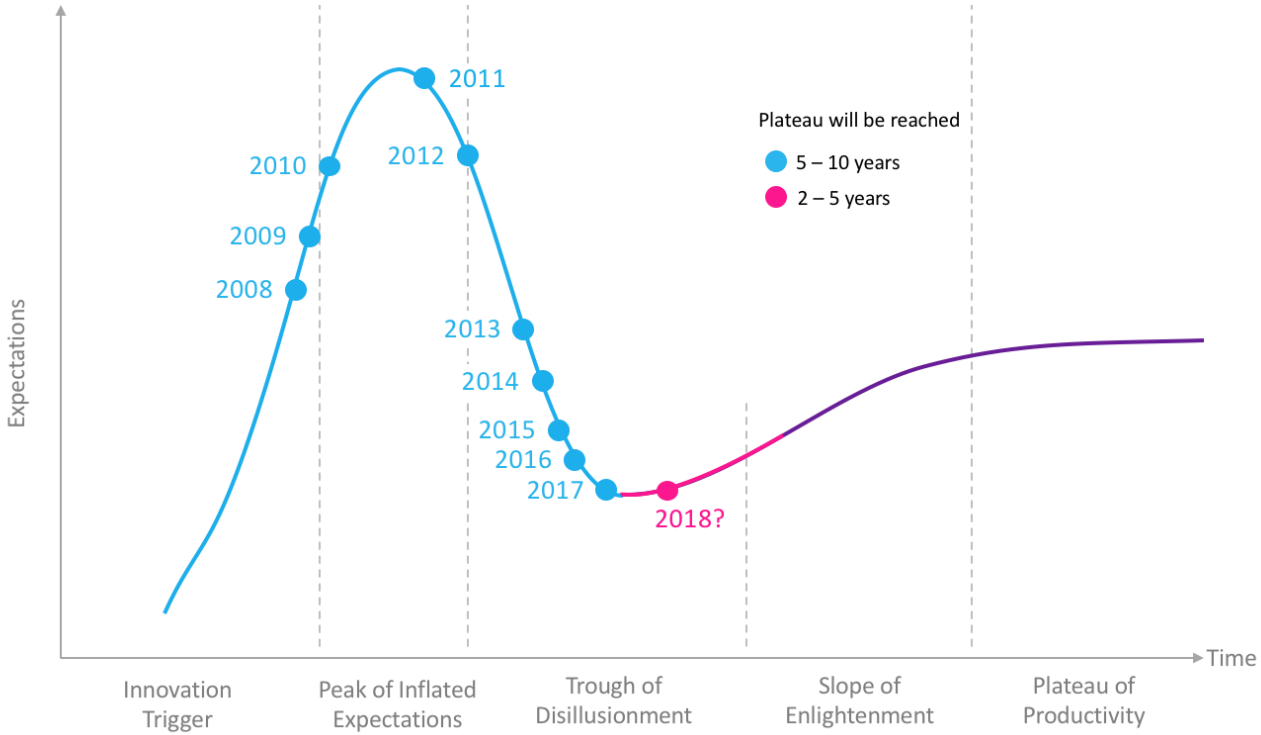
Source: The Search Engine of AR, by O. Inbar, January 2018, Forbes

Introduction – Market Adoption

2017 survey by Deloitte of 500 executives found:

- 67% of mid-market executives said they are experimenting, building, or have developed mature applications of mixed reality technology
- 53% of mid-market executives reported that their companies have AR/VR pilot projects in the works o already underway
- 33% have mixed reality projects in deployment

Gartner AR Hype Cycle – 2018 Inflection ?



Source: 2017 mid-market technology trends report, July 2017, Deloitte

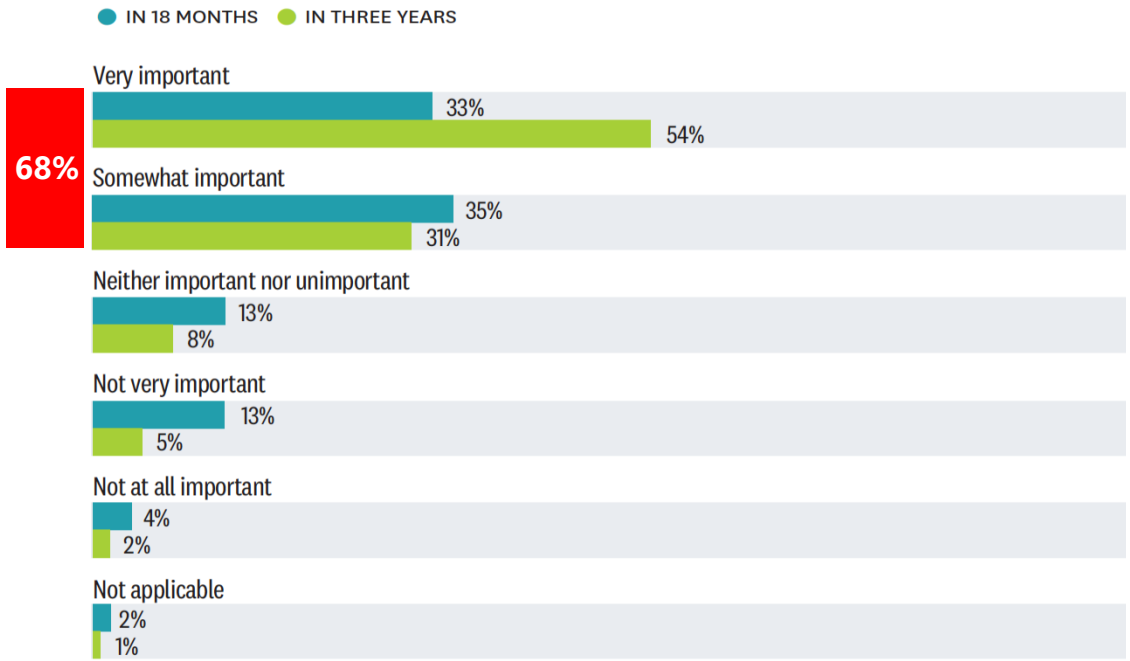
Source: Top Trends in the Gartner Hype Cycle for Emerging Technologies, August 2017

Importance of AR to Business and Who is Investing

The Importance of Mixed Reality

Enterprises view mixed reality as imperative for business success.

Please rate how important mixed reality technologies are, or will be, in helping your organization achieve its strategic business goals in the next 18 months/three years.

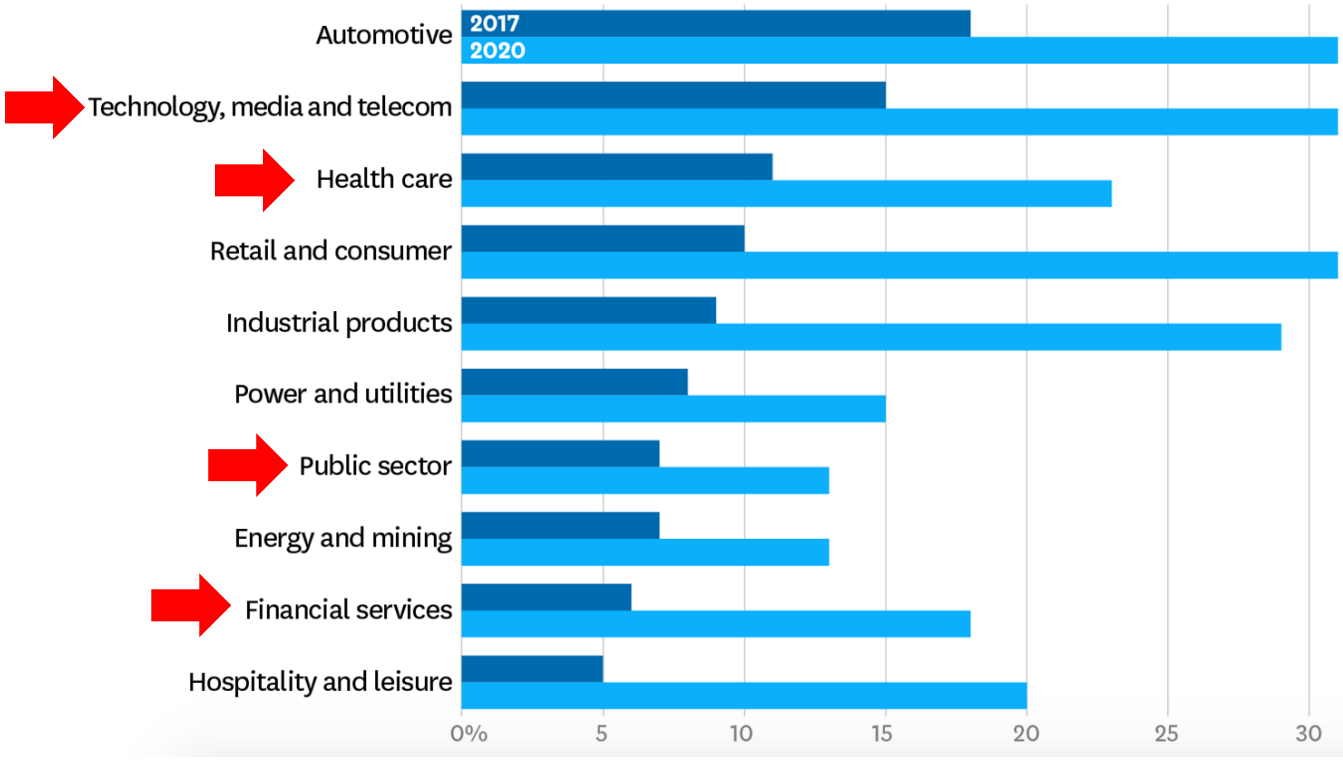


SOURCE: HARVARD BUSINESS REVIEW ANALYTIC SERVICES SURVEY, MARCH 2018

384 Respondents, 2018

Who Is Investing the Most

Percentage of executives in each industry who say they are currently making substantial investments in AR, and percentage anticipating substantial investments in three years



SOURCE PWC 2017 GLOBAL DIGITAL IQ SURVEY, TAKEN BY 2,216 BUSINESS AND IT EXECUTIVES FROM 53 COUNTRIES

2216 Respondents, 2017

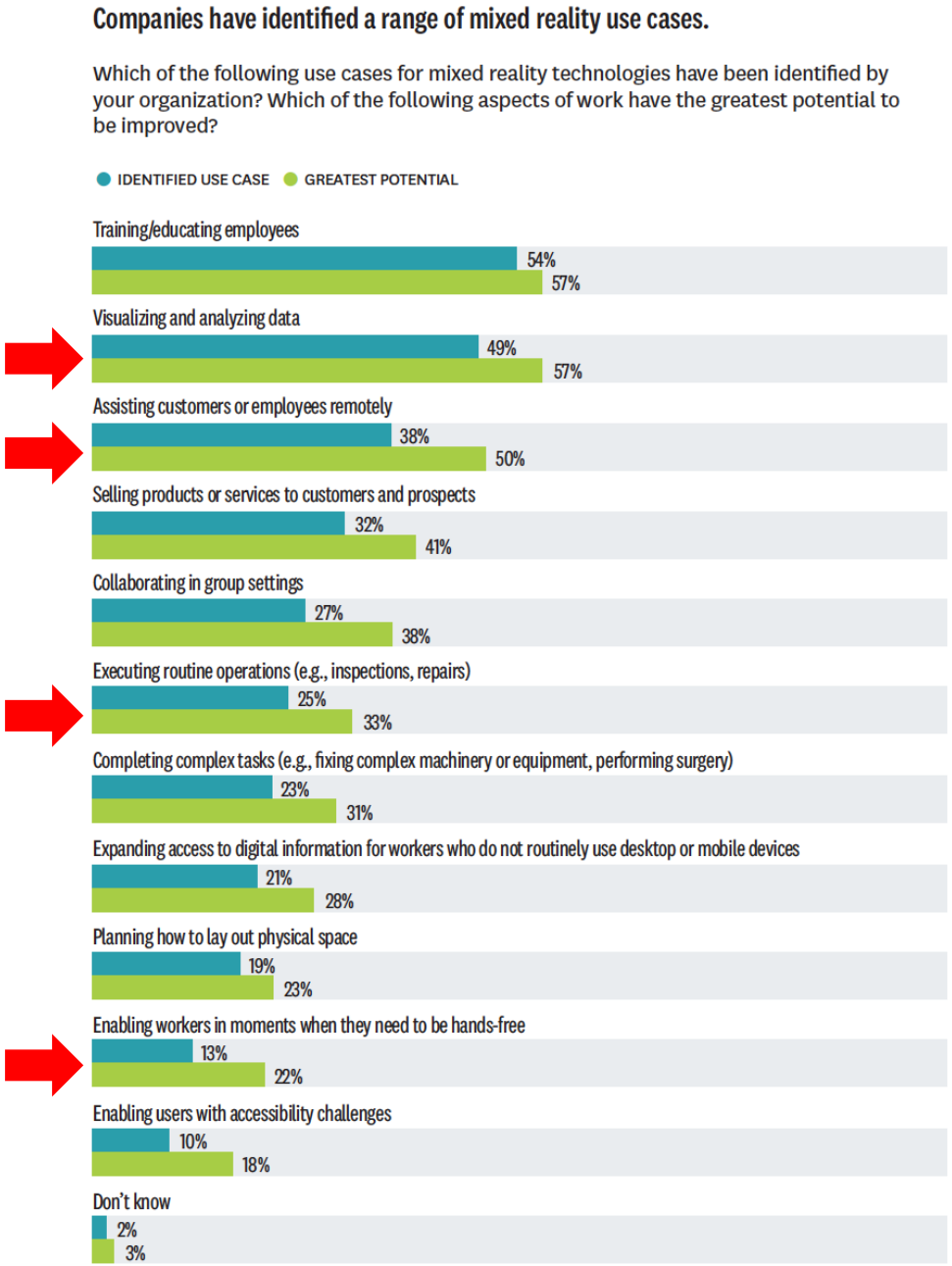
Categories of Use Cases
HBR AR Study/Survey – March 2018

Visualizing and Analyzing Data

Assisting Customers and Employees Remotely

Executing routine operations (like inspections/repairs)

Enabling workers in moments when they need hands-free



Benefits
HBR AR Study/Survey – March 2018

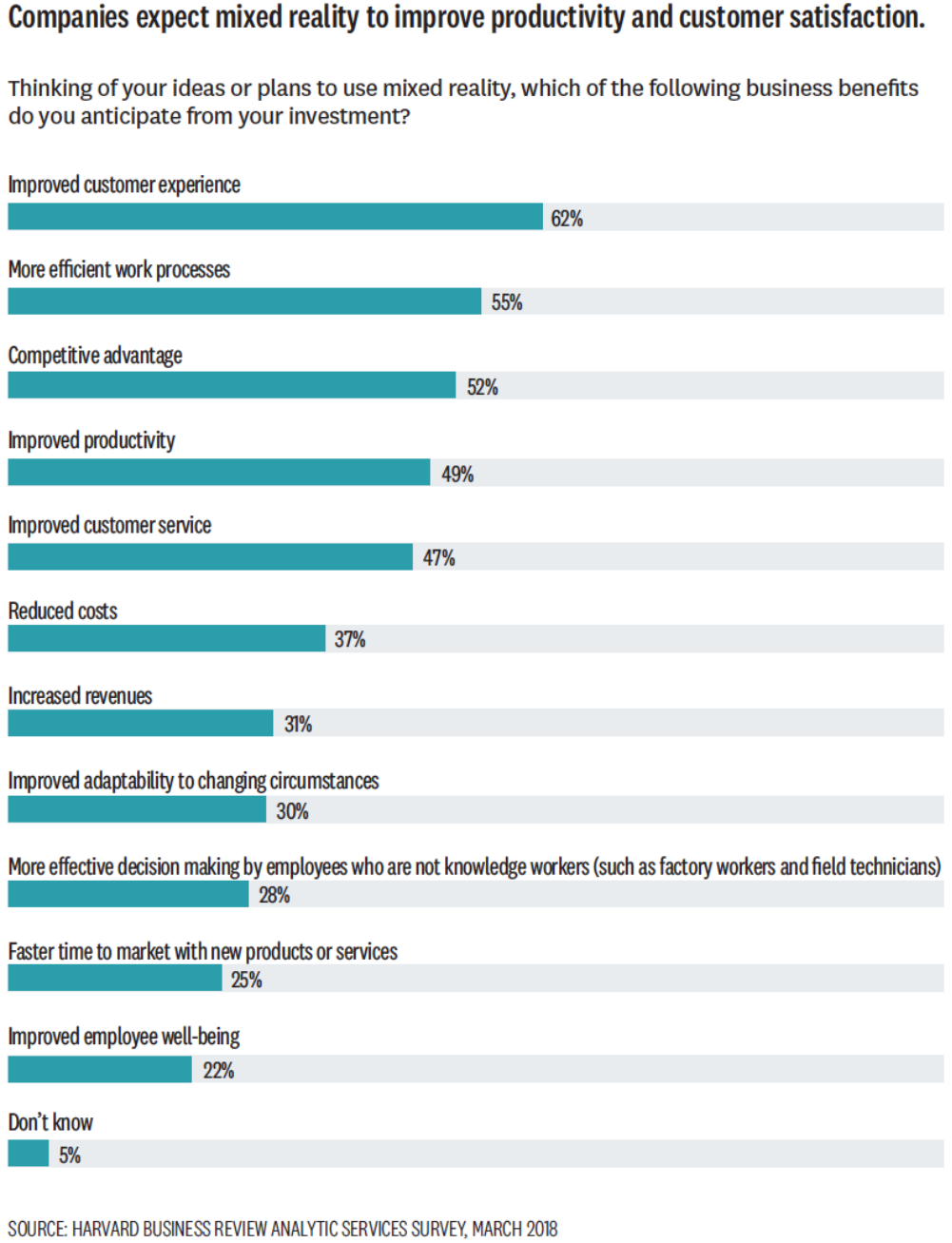
More Efficient Work Process

Competitive Advantage

Improved Productivity

Reduced Costs

More Effective Decision Making by Employees



AR Use Cases

AR use cases – Consumer Market

Tourism/Sightseeing:

- Travelers may use AR to access real-time informational displays linked to geographic locations regarding its features, and comments or content provided by previous visitors
- Interpret the foreign text on signs and menus and, in a user's augmented view, re-display the text in the user's language. Spoken words of a foreign language can be translated and displayed in a user's view as printed subtitles

Retail:

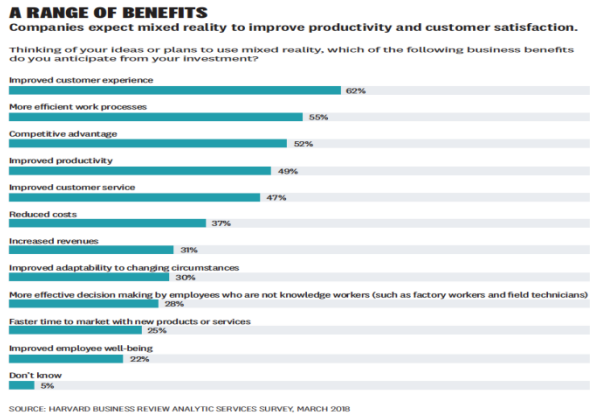
- Displaying "virtual" furniture, home decorations, etc. placed in the real setting
- Virtually trying out clothes, cosmetics

Navigation:

- Information can be displayed on an automobile's windshield indicating destination directions and meter, weather, terrain, road conditions and traffic information as well as alerts to potential hazards in their path

Video Games:

- Augmented reality allowed video game players to experience digital game play in a real world environment

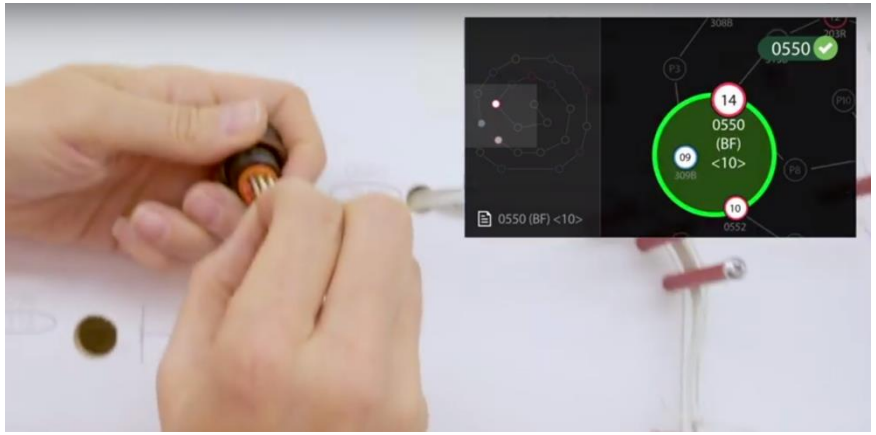


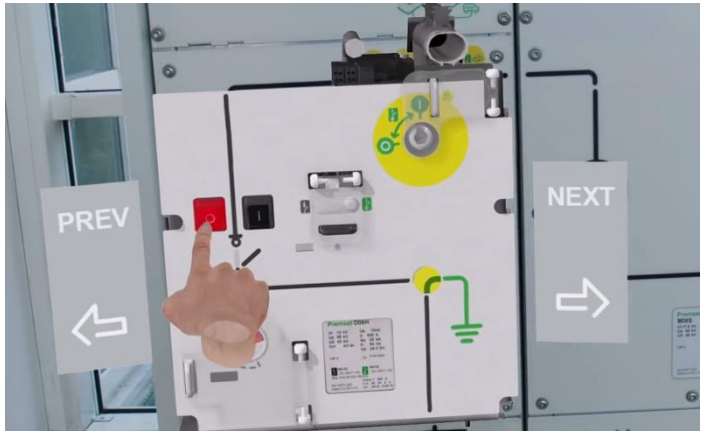
AR use cases – Enterprise: Manufacturing/Maintenance

- Visual instructions can be overlaid on the real-world view of technicians to aid them in the work.
- AR can deliver just the right information the moment it's needed to factory workers on assembly lines, reducing errors, enhancing efficiency, and improving productivity.

Case Study: Boeing reduced production time for building wire harnesses by 25% using Google Glass

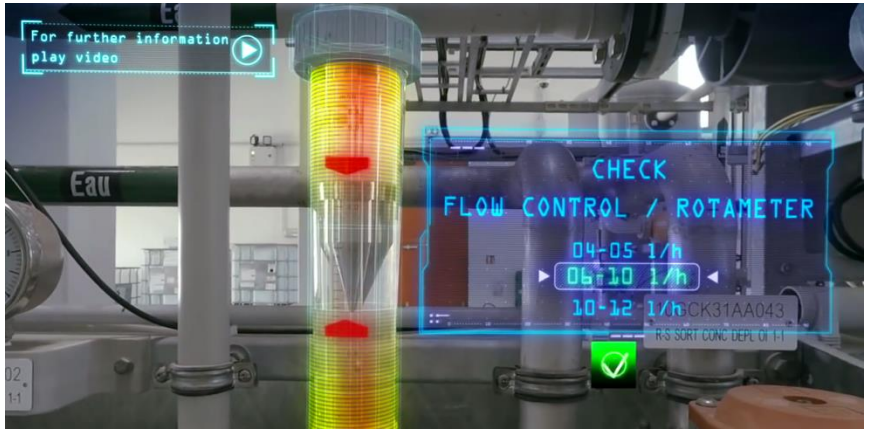
Case study source: Upskill, 2017





AR use cases – Enterprise: Operations/Maintenance

- AR can capture information from automation and control systems, secondary sensors, and asset management systems and make visible important monitoring and diagnostic data about each machine or process.
- Seeing information such as efficiency and defect rates in context helps maintenance technicians understand problems and prompts factory workers to do proactive maintenance that may prevent costly downtime.

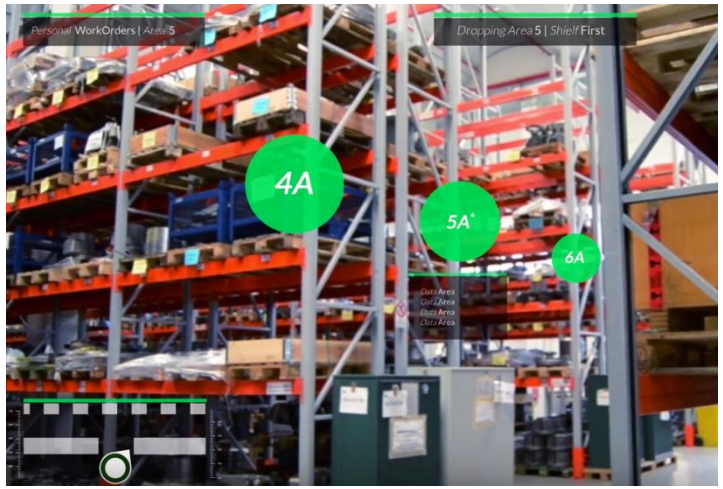


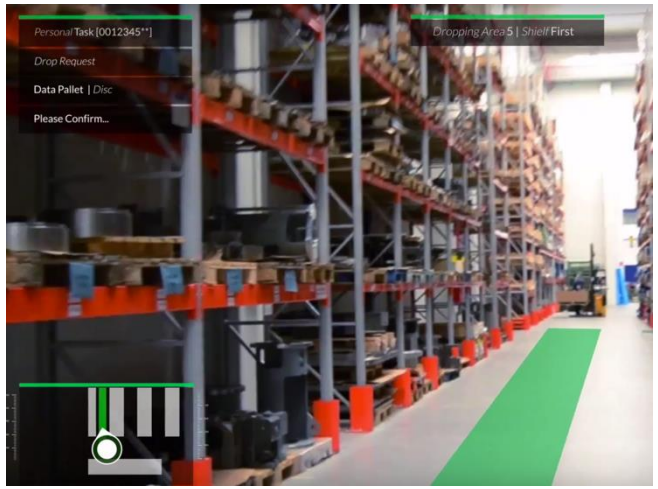
AR use cases – Enterprise: Logistics/Warehousing

- Picking items from shelves represents up to 65% of warehouse costs.
- Workers still perform picking task by using slow and error prone a paper based documentation.
- AR enhances the efficiency and accuracy of the picking process. AR instructions direct workers to the location of each product to be pulled and then suggest the best route to the next product.

- **Case study**: Intel is using AR in warehouses and has achieved a 29% reduction in picking time, with error rates falling to near zero

Case study source: A Manager's Guide to Augmented Reality, November 2017, HBR



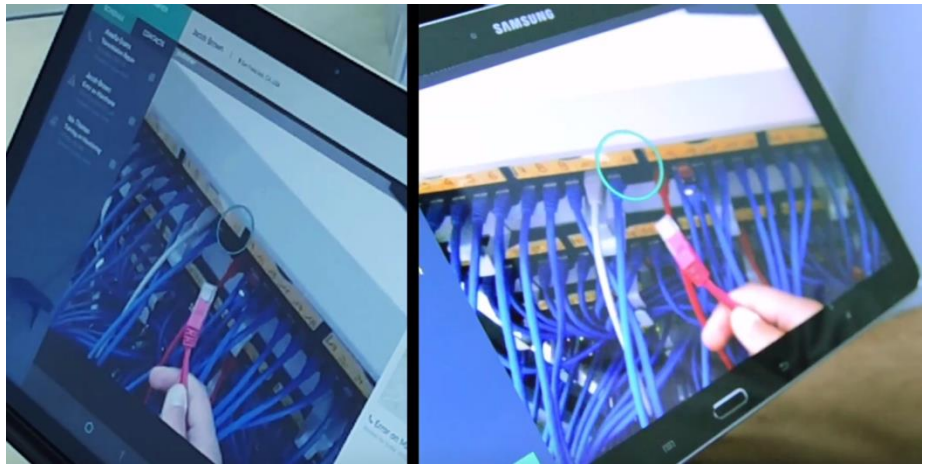


AR use cases – Enterprise: Field Support/Remote Expert Assistance

- Ability to collaborate remotely in real time remotely using live video streaming , live voice, and contextual guidance

Case study: Xerox used AR to connect field engineers with experts instead of providing service manuals and telephone support. First-time fix rates increased by 67%, and the engineers' efficiency jumped by 20%.

Case study source: A Manager's Guide to Augmented Reality, November 2017, HBR



CommScope and AR

Forward-Looking Statement

This presentation includes forward-looking statements that are based on information currently available to management, management's beliefs, as well as on a number of assumptions concerning future events.

Forward-looking statements are not a guarantee of performance and are subject to a number of uncertainties and other factors, which could cause the actual results to differ materially from those currently expected. In providing forward-looking statements, the company does not intend, and is not undertaking any obligation or duty, to update these statements as a result of new information, future events or otherwise.

This presentation is for planning purposes only and is not intended to modify or supplement any specifications or warranties relating to CommScope products or services.

CommScope & AR

- CommScope is committed to its industry position of being a thought leader
- Exploration of AR technology is part of this commitment
- Our near term goal is to thoroughly investigate AR technology, conduct analysis of use cases and gather VoC feedback
- Initial assessment has been included in the Press Release that was posted in April

CommScope Shows Augmented Reality With ImVision Intelligence to Help Customers Solve Real-World Problems

CommScope Press Release – April 11th, 2018

- Coupling AR with intelligent infrastructure to ‘see’ cables and connections behind walls and in ceilings is just the first of many uses where we believe customers will find value

- 40 percent of organizations using or piloting AR find that the technology [AR] exceeds their expectations,” according to Gartner

imVision AR Prototype – use cases

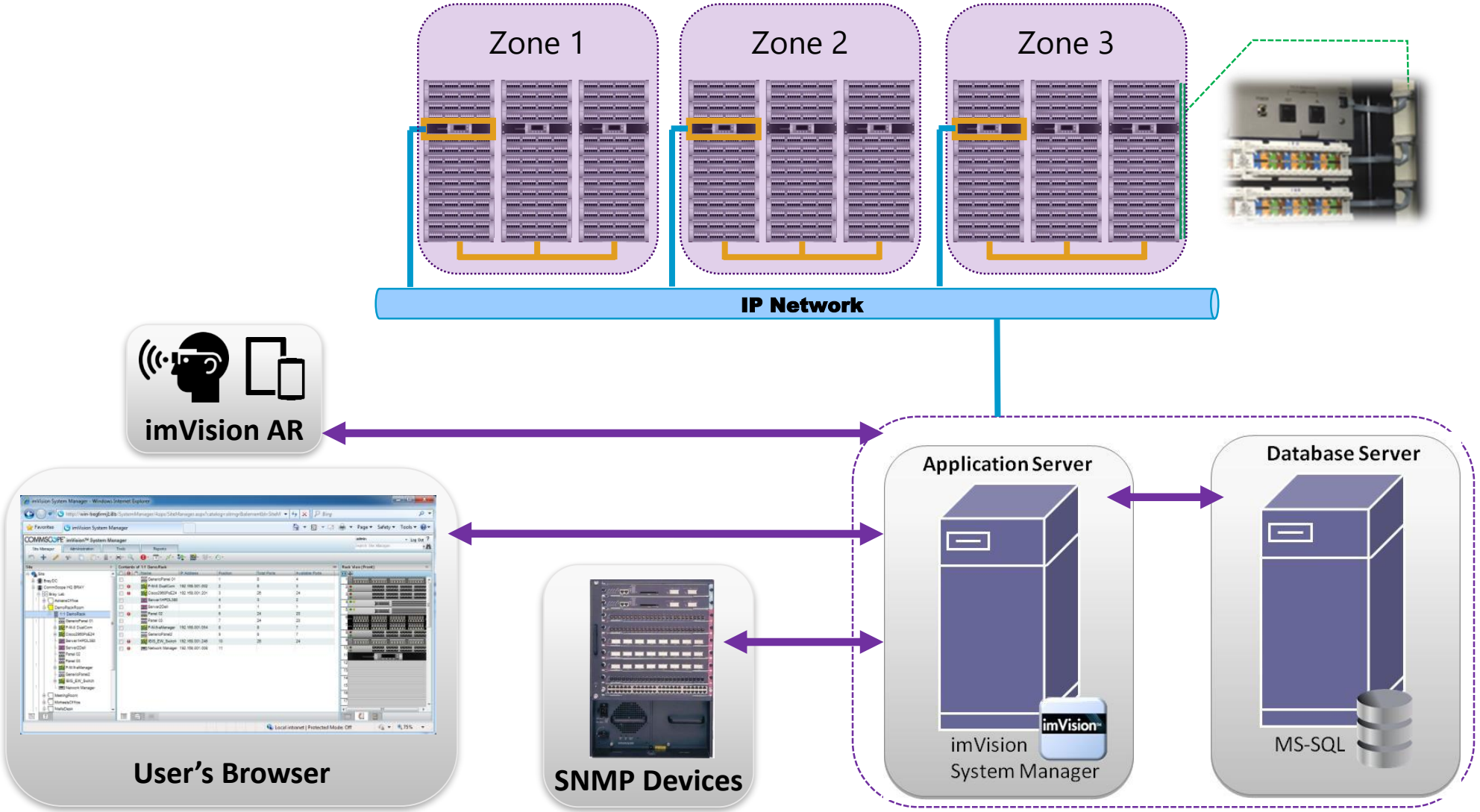
Prototype for Smart Phone:

- Use case 1: Guided work orders (via integration with SM)
- Use case 2: Trace

Prototype for Smart Glasses:

- Use case 3: Ceiling view (Display cable routing and placement of CPs and devices)
- Use case 4: Connectivity status of outlets on a faceplate

Solution Architecture



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Thank you!