WAINHOUSE
Research

Being in Two Places at Once

Video Collaboration Robots bring new independence and functionality to knowledge workers

May 2013

Sponsored by:

iRobot®

Introduction

The 21st century is bringing new paradigms to the workplace – with mobile, social, visual, and virtual describing the coming work environment for knowledge workers, business line managers, and senior executives. Nowhere is this more evident than in the video conferencing and collaboration space. The new generation of information workers – employees who have grown up in the digital age and for whom "work" is what they do, not where they go – are accustomed to video chat, instant messaging, and social networks for communications. These employees expect to use these tools at work, at home, and on the road, and to be reachable at any time.

In the past year or more, a new concept has begun to attract the imagination of those in the digital workplace – robotic telepresence or the Video Collaboration Robot – a device that brings together two way audio-video communications, mobility, and remote control. A Video Collaboration Robot allows people to move through a distant building by remotely sending to a destination a mobile robot equipped with camera, microphone, speakers, and a display screen that shows the face of the person directing the robot. In many cases, a Video Collaboration Robot creates the illusion that a person is really there since the person is represented by a 3D object, the robot, that moves around freely. While still a fledgling industry, Video Collaboration Robots hold the promise of "collaboration that can take you anywhere."

> *This industry is so new that the terminology used by vendors, customers, and the press is still evolving. Video Collaboration Robots are also known as telepresence robots, business collaboration robots, and robotic telepresence systems.*

Video Collaboration Robots are not designed to match the high-quality audio and video connections possible with conference room video systems. Rather, the intention is to give the operator the freedom to move and converse spontaneously with anybody at the remote location by transporting the person's presence to any office, conference room, or factory floor location where a conversation is required.   Robotic telepresence in short fully adds freedom of movement to the video conferencing experience.

Robotic Telepresence as a Video Conferencing Segment

Video Collaboration Robots today come in a wide variety of price points and features. Basic capabilities, however, are common: two-way audio and video, the telepresence video component, and a mobility capability provided by a self- contained robotic component that can be autonomous (see below) or remotely controlled. While telepresence robots are indeed mobile, the concept of mobility today is closely associated with tablets and smartphones, devices where the mobile element is provided by humans. Video Collaboration Robots, in contrast, are maneuverable and self-propelled.   In this sense, a Video Collaboration Robot becomes a new class of video conferencing system, and several vendors have been positioning their devices in this way, suggesting that the remote user can be "projected" into a destination and interact with local participants.
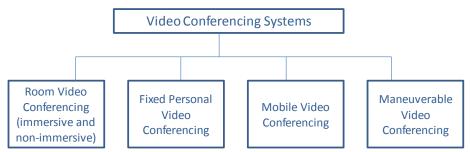
Figure 1 Business Collaboration Robots and Video Conferencing Systems

Robotic Telepresence vs. Mobile Video Conferencing

Since the early days of the video conferencing industry, customers have deployed room systems on roll-about carts in order to be able to move the systems easily from conference room to conference room. These "mobile" systems made sense because they allowed different departments or teams to share the use of an expensive resource and to video-enable almost any conference room with the right network connections.

More recently, mobile has been associated with tablets and smartphones – devices that enable communications from almost anywhere including the office, the home, the local coffee shop or shopping mall, and the factory floor. These solutions overcome the historical limitation of "fixed location."   Video Collaboration Robots, on the other hand, go much further by putting control into the hands of the remote user. The maneuverable nature of the Video Collaboration Robot provides a level of independence not available with any other form of business communications – the ability for a remote person to go where he needs to go when he needs to go, and to do so without requiring action on the part of anyone else.

Video Collaboration Robot Segments

Many specifications describe the Video Collaboration Robots that are available today – height, weight, run time between battery recharges, size of video screen, focal length of camera, number of microphones, network requirements (Wi-Fi, 3G, 4G), and interoperability with industry-standard video conferencing systems or with Skype, etc. One parameter, however, deserves particular attention for any enterprise considering Video Collaboration Robot deployment – the navigation technology.

Most of the robots available today are controlled (or driven) by a remote operator. This is typically accomplished using a PC-based hardware or software joystick or a dedicated tablet. Remote controlled robots rely on the skill of the remote driver to avoid traffic obstacles although some include collision avoidance systems. They also require the operator's time and attention while the robot is in motion.
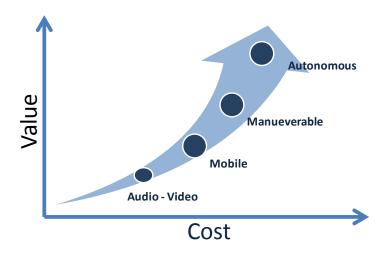
Figure 2 Hierarchy of Video Collaboration Robot features

Autonomous robots, in contrast, map their environment and have sophisticated navigation systems. The remote user simply indicates the location to which he wishes the robot to move and the robot will use an internal map of the building together with a variety of sensors and obstacle-avoidance intelligence to navigate to the intended destination. For example, the remote user could select "marketing conference room" or "stamping press 7" or a consulting physician could select "bed 14B" and the robot would then proceed to that destination without further inputs. Autonomous robots exist, but they are obviously more sophisticated and therefore more expensive than remotely driven robots.

At least a dozen vendors are in the market today with robotic telepresence systems having a wide range of capabilities and price points and targeting different segments and applications. Many would fall into the "gadget" category for hobbyists on one end or expensive, dedicated healthcare solutions on the other. Only recently have Video Collaboration Robot devices been introduced that are intended for general-purpose enterprise communications applications. These include both autonomous and non-autonomous Video Collaboration Robots.
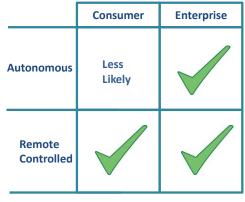

Figure 3 Telepresence robot market segmentation

Video Collaboration Robot Applications

A Video Collaboration Robot is an ideal solution when freedom of movement for the remote worker is a key requirement and the embodiment of the remote user is essential to achieve a higher level of connection than would be possible without visual contact. Examples include:

Remote team management: An engineering manager in Location A might have a team of developers in Location B. Even if the manager could travel regularly to Location A, he would still not be able to have a day-to-day presence. With a Video Collaboration Robot, he could "manage by walking around" and be

kept up to date while also maintaining an informal and nearly continuous presence with the development team. The mobility-enabled Video Collaboration Robot provides a higher level of conversational intimacy than a traditinal phone call or video call, without requiring team members to congregate in a conference room for a scheduled, formal meeting. Likewise for executive and senior management, the Video Collaboration Robot allows those managing satellite teams to be more personally present and able to move throughout an office environment. The maneuverable video conferencing system allows conversations to be taken outside of an office or conference room when needed.

Remote team collaboration: This use case is the inverse of the remote team manager. In this instance, the team is located in one location, but one or more experts are working from home or from other remote sites. The Video Collaboration Robot allows these individual contributors to be more interactive with the other team members, by visiting cubicles or team rooms or water coolers under their own control. The Video Collaboration Robot allows sidebar conversations to be taken outside of an office or conference room as needed.

Manufacturing technical support: When problems arise on the assembly line or factory floor, those responsible for diagnosing the problem and recommending a fix cannot always get to the site of the problem in a timely manner. The Video Collaboration Robot solves this problem directly, enabling a remote expert or technician to "drive" to the location and see the situation for himself while at the same time communicating with machine operators and line managers. In many industries, certain manufacturing operations take place in clean rooms where entry requires careful and time consuming preparation. Having a Video Collaboration Robot inside such a facility would provide the outside person with immediate access and the ability to move around inside the protected area.
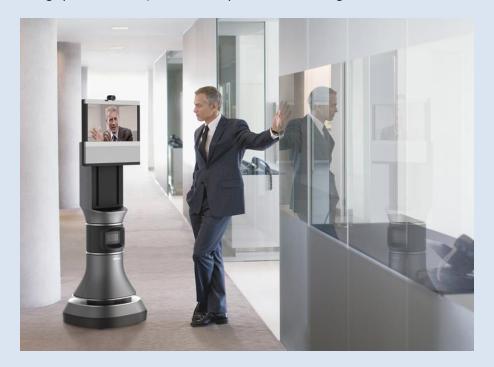
Remote corporate training and presentations: A Video Collaboration Robot allows for a more personal and interactive approach to remote corporate training and presentations. The robot can give a trainer or presenter the ability to have one-on-one interactions both inside and outside of the classroom. Similarly, the Video Collaboration Robot can give a remote "student" or class attendee an independent ability to participate in the training session while having a more immersive or personal experience at the same time.

Tours and inspections: The Video Collaboration Robot allows mobile access to areas including labs, manufacturing facilities, customer experience centers, and supply chain facilities. Remote visitors can attend a guided tour with full audio-video capabilities and interact with a guide or with other visitors as well.

Solution Spotlight - iRobot

iRobot, the sponsor of this white paper, has established a clear market leadership position in robots for consumer applications (floor cleaning, gutter cleaning, etc.) and for military applications (bomb squads, security missions, battlefield surveillance). In addition iRobot's navigation technology has

been field proven in RP-VITA, a telemedicine Video Collaboration Robot designed by iRobot in collaboration with Intouch Health that was recently approved by the FDA for use in hospitals. Now iRobot is taking its state-of-the-art robotic technologies and combining them with Cisco's telepresence expertise to introduce the world's first enterprise-ready, video collaboration robot, the iRobot Ava 500, with i) autonomous navigation capabilities ii) interoperability with industry-standard videoconferencing systems, and iii) familiar, easy-to-use scheduling and control interfaces.

Autonomy: iRobot's autonomous navigation and mobility platform means the robot can safely navigate facilities and office environments while maneuvering to avoid people or objects on its own. The device does not have to be driven by a remote operator; rather the user just needs to designate the desired destination. Destinations can be selected by tapping a location on a pre-programmed map or by selecting a room or employee by name. When the job is finished, iRobot Ava 500 will return to its home docking station to recharge automatically; no user driving time is required.

Interoperability: Besides the excellent audio and video quality (up to 1080p high-definition resolution) provided by the field-proven Cisco video conferencing system, iRobot Ava 500 sports an unprecedented level of interoperability based on the use of industry standard protocols for enterprise-class audio, video, and security. These field-proven protocols are embedded in millions of room and personal video conferencing endpoints.

Ease of Use: Users are able to schedule and control iRobot's Video Collaboration Robot using a familiar iPad interface. Users can also reserve a session for any time in the future at any desired destination where an iRobot Ava 500 is located.   The scheduling system integrates with a user's personal calendar.

iRobot Ava 500 also allows the operator to adjust the height of the unit. This capability provides an optimal experience whether interacting with colleagues while standing in hallways, labs, or facility tours, or when participating in meetings while lowered to a sitting position.

The combination of these technologies allows iRobot Ava 500 to build on the concept of telepresence and mobility by extending the power of in-person communications over remote distances while giving a freedom of movement that has never before been associated with video conferences or meetings.

Summary

The Video Collaboration Robot combines mobility and remote independence with the world of visual communications. While robots are typically thought of as industrial machines to take over tasks for humans, the Video Collaboration Robot is intended to be a more interactive tool for managers and knowledge workers to use when working with others. Robotic telepresence devices give their "drivers" the freedom to move at will to any cubicle, office, cafeteria, or factory floor location and to converse or collaborate with anybody. The Video Collaboration Robot truly enables people to be in two places at once.

About iRobot

Founded in 1990 by Massachusetts Institute of Technology roboticists, iRobot designs and builds some of the world's most important robots. iRobot's home robots are revolutionizing the way people clean – inside and out. More than 9 million home robots have been sold worldwide, with the award-winning iRobot Roomba floor vacuuming robot leading the charge. More than 5,000 of the company's defense & security robots have been delivered to researchers, military and civil defense forces worldwide, performing thousands of dangerous search, reconnaissance and bomb-disposal missions while protecting those in harm's way. Leveraging its state-of-the-art Ava mobile robotics platform, iRobot is bringing its solutions to new markets. Already in hospitals, these robots are also ideal for retail, security, industrial and a variety of business and consumer applications. With two decades of leadership in the robot industry, iRobot remains committed to building robots that improve the quality of life and safety standards worldwide.

About Wainhouse Research

Wainhouse Research, www.wainhouse.com, is an independent market research firm that focuses on critical issues in unified communications, visual collaboration, and rich media conferencing technologies and applications. The company conducts multi-client and custom research studies, consults with end users on key implementation issues, publishes white papers and market statistics, and delivers public and private seminars as well as presentations at industry conferences. Wainhouse Research also publishes a free newsletter, *The Wainhouse Research Bulletin that* covers all aspects of rich media enterprise communications.

About the Author

Andrew W. Davis is a researcher, analyst, and opinion leader in the field of collaboration and conferencing. He is a co-founder of Wainhouse Research and currently focuses on covering the video side of the collaboration market as well as strategy consulting and new business development activities. A well-known industry guest speaker, Mr. Davis holds B.S. and M.S. degrees in engineering from Cornell University and a Masters of Business Administration from Harvard University. More about Andrew.