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innovation through collaboration

Frequently Asked Questions About ResearcHDiscovery™

Mission

We scientifically research interactive communications through the investigation of alternative paradigms and through collaborative innovation.

"New ideas are discovered at the boundary between two intelligent entities."
–James Dunn

1. Scope

1.1 What is the ResearcHDiscovery project?

Through two-way High-Definition communication, research meets discovery. This proof-of-concept project connects multiple universities in the United States so that researchers may work and innovate in new ways. Participants in the project will be able to collaborate face-to-face with colleagues, mentors, and experts in their field of study. Topics of their choice will range from basic research to advanced applications.

More than just videoconferencing or distance learning, we believe this is the dawn of a new era in how we communicate.

1.2 What is *2-way High Definition communications*?

Also known as *telepresence*, it is the next generation of videoconferencing using HD. Because of the clarity of the experience, it represents a significant shift in the future of how we collaborate. It's like having a clear window between research labs a thousand miles apart with the ability to clearly read notes on the desk and see text or illustrations on whiteboards.

> *"After experiencing high definition videoconferencing for the past six months, I am convinced it is a significant advance for the industry. HD provides a totally different experience, one which is much closer to the in-person experience."*
> *–Wainhouse Research*

1.3 How will we use this equipment?

We expect the systems will be used daily, in almost constant use, as a window between labs enabling two or more physically separated researchers to collaborate, brainstorm, and innovate as a virtual team. Also, we see a number of other uses such as:

- Manage one-on-one professor/student advisory relationships.
- Review graduate thesis and projects.
- Create inter-university graduate degree programs.
- Open doors to more students connecting to professors and advisors.
- Study the behavioral of social interaction on this medium.
- Reduce travel to collaborating universities.
- Improve the medium and integrate new tools.
- Make up your own innovative uses.

1.4 What exactly is being delivered?

Each participating university will receive one 2-way HD communications system.

The equipment includes the following:

1) a high definition camera
2) a high definition "codec" [en**co**der/**dec**oder] appliance
3) a high definition audio conference phone
4) a wireless remote control
5) a widescreen HDTV monitor

Items 1-4 are manufactured by LifeSize Communications.

All equipment is pictured on the next page.

1) camera 2) codec 3) phone 4) remote

5) widescreen monitor

Note: The images above are not to scale.

1) The high definition pan/tilt/zoom camera includes: a wide angle zoom lens with a 70 degree field of view; resolution of 1280 x 720, 30 frames per second.

2) The codec compresses outgoing video, audio, and data, transmits this information to the far end, and decompresses incoming information. You should not need to interact with the codec once it has been properly set up in your environment. At lower bandwidths, the codec maintains frame rate but drops the spatial resolution.

3) The tabletop speakerphone console houses 16 microphones, an integrated keypad, and a display. It provides up to 16 kHz high definition quality.

4) The remote contains colored buttons which correspond to contextual options on the screen. This makes it remarkably easy to navigate the interface to place a call or control a camera.

5) The screen is a 37" HDTV monitor with a resolution of 768x1366. It provides a high definition real-time experience; optimal for one-on-one collaboration.

1.5 Why not use a larger display?

Although the equipment can accommodate larger displays, the nature of this project is to allow researchers to collaborate face-to-face as if working at the same table. The 37" display is optimal for small team or one-on-one collaboration. A larger display would require a viewing distance greater than 7.5'.

1.6 Is Kynamatrix leading the topics of research or discussion?
No. Kynamatrix is not directing the research subject matter. We are focused on the value of strategic placement of new communications technology where it will be most beneficial.

1.7 Is the donation a "gift" to the department/University?
Yes.

1.8 Do we need to return the equipment?
No. It is a permanent gift to the University.

1.9 What is the value of this gift?
The value of the hardware component of the gift is presently estimated between $8,000 and $13,000. (This breaks down as follows: the HD screen is $1,000 and the LifeSize equipment is between $7,000 and $12,000.) We will have a more accurate value of the gift at the time the equipment is delivered.

2. Participants

2.1 Who are the participating universities in the project?

1. *Massachusetts Institute of Technology (MIT)*
2. *Carnegie Mellon University (CMU)*
3. *Stanford University*
4. *Harvard University*
5. *University of Washington (UW)*
6. *Georgia Tech*

2.2 With whom can I collaborate?
The intention of the project is to allow researchers from participating universities to collaborate face-to-face on new or existing multidisciplinary projects. Although Kynamatrix is granting units to these six universities, it is possible to communicate with any other standards-based systems in universities, industry, and government agencies.

2.3 Can I collaborate with groups outside of the United States?
You are free to collaborate with anyone of your choice.

2.4 Do other universities have 2-way HD equipment?
LifeSize's website lists a number of university customers, however, they are not official participants in this proof-of-concept project which specifically focuses on connecting researchers.

2.5 Who is kynamatrix Research Network?
Kynamatrix is a nonprofit scientific research organization founded in 2004 with a mission to promote innovation, research, and scholarship in the area of interactive communications and multidisciplinary collaboration.

2.6 Who is LifeSize Communications?

LifeSize is the first company to develop and deliver high definition video communications products. Founded in 2003 by industry veterans, LifeSize's award winning solutions combine exceptional quality, user simplicity and administrator manageability to make video communications a productive, true-to-life experience. LifeSize is headquartered in Austin, TX with subsidiaries in the U.K., Germany, Hong Kong and Singapore and has a network of channel partners in more than 20 countries.

2.7 Who is sponsoring this project?

The project is sponsored by Kynamatrix Research Network and LifeSize Communications.

2.8 Is Kynamatrix affiliated with LifeSize Communications?

No. Kynamatrix is an independent non-profit scientific research organization. Kynamatrix is vendor-neutral.

3. Purpose

3.1 Why is Kynamatrix granting this equipment?

We believe that 2-way HD represents an emerging fundamental form of collaboration. We hope to accelerate multidisciplinary innovation by supporting collaboration using new forms of interactive communications.

3.2 What's in it for Kynamatrix?

We hope that 2-way HD technology has reached a critical point of usability and acceptance and will become ubiquitous as a communication tool, saving time and energy resources by removing the barrier of distance between conversations.

The project will enable participants to connect and communicate with the clarity of high definition as though they are in the same room. By providing the equipment, we are enabling this form of collaboration.

Also, we hope that this new technology will open doors to explore alternative forms of interactive communications. For example, we envision the sharing of knowledge through this medium by the integration of text and imagery directly into the visual experience. We expect that universities will see the potential for this technology and incorporate 2-way HD as a useful research tool in new programs of study being developed.

3.3 What is the measurement of success?

If the equipment sits unused for whatever reason, this would be a measure in the negative. If the equipment proves useful as a window between universities where it becomes a dependable tool of research, this would be a measure in the positive. Data relevant to the adoption of this new form of communications will be useful to determine the viability of the tool.

The success of this project will help to move forward with requests for grants and corporate funding to seed additional universities, schools, and non-profit organizations with equipment.

3.4 We already have email, IM, Skype, and Polycom; why bother with HD?

2-way HD breaks down distance barriers more so than other existing communications technologies. In fact, the technology is transparent enough to allow participants to forget they are separated. We believe this will allow collaborative innovation to occur in new and unprecedented ways.

4. Schedule

4.1 When do we get the equipment?
Equipment is scheduled to ship in January 2007.

4.2 Will there be a press release?
We are scheduling a press release in late February 2007 after the equipment is installed and operational. A ribbon cutting ceremony is being planned to showcase the launch of a new era in research collaboration.

4.3 What are the terms for ending the trial?
The project is a permanent gift to help foster innovation through collaboration. We expect the equipment will be useful as an ongoing research tool.

5. Installation

5.1 Who will set up the equipment?
An authorized LifeSize partner will set up and configure the equipment. Installation in a suitable environment is not difficult and can be accomplished within 15 minutes depending on the location.

5.2 Where will the system be installed at each university?
We expect that the system will be installed in a central, secure area which can be reserved and accessed by graduate students and professors university-wide.

5.3 What are the installation requirements?
Note: The authorized LifeSize partner who performs the installation will work with your IT department to configure the following details:

Internet Connection
The installation location will require 1 Mbps bandwidth to the Internet with low latency. Low latency means that there is a minimum of delay through firewalls and packet inspectors. High latency will impair the feedback and realism of being in the same room.

Power
200W for the LifeSize components.
275W for the HD screen. (8W in standby)

Environmental
Operating temperature: 0°C (32°F) to 35°C (95°F). (Room temperature)
Operating humidity: 15% to 85%, non-condensing.

Lighting
The optimal lighting is 300 to 500 LUX. (Standard office lighting)

5.4 What other equipment needs to be provided by us?
No other equipment needs to be provided, unless you wish to place the equipment on a portable cart.

5.5 What are the port requirements for a call?
The LifeSize device requires 6 UDP ports (plus 2 additional if presenting data) and 2 TCP ports per call. The default port range for UDP and TCP is 60,000 to 64,999. For enabling H.323 firewall NAT traversal, you must allow incoming and outgoing TCP traffic from port 1720, the range of TCP ports specified in the restricted ports, and the range of UDP ports you have chosen for restricted ports.

6. Support

6.1 Who will support the equipment?
We are arranging support maintenance through local authorized LifeSize partners.

6.2 What if the unit simply doesn't work?
All equipment is covered by a one-year limited warranty. You would contact the support provider.

7. Usage

7.1 Is the system easy to use?
Yes. Users can initiate an audio or a video conference call from the phone as well as from the on-screen interface. The user interface is context sensitive. The system is quite simple to use, and requires very little hands-on training.

7.2 Will someone be watching our conversations or reporting the results?
No. Your communications are private and secure.

7.3 Can I connect a computer to the equipment to share my screen remotely?
Yes. You can share your computer screen and view a participant simultaneously.
The equipment is H.239 compliant.

7.4 How will we schedule use of the equipment?
You can schedule use of the equipment in much the same way you schedule the use of any other university resource. Globally accessible online calendars allow parties on both ends of a call to schedule use of the equipment for their next call.

7.5 If there is only one system on campus, how can this be beneficial?
Until this communications resource becomes ubiquitous, a brief walk across campus to use a shared resource is far less costly than traveling across the country to collaborate.

7.6 Can we control the remote camera?
Yes, with permission from the remote user.

8. Facts

8.1 What other telepresence systems are available?
A number of vendors are now beginning to offer 2-way HD solutions.
These include: Cisco, HP, Lifesize Communications, Polycom, Sony, and Tandberg.

8.2 How can I get involved with the innovation team at Kynamatrix?
If you are interested in interactive communications and want to help advance innovations in the applied areas of communications, energy, public safety, and transportation, send an email to info@kynamatrix.org.

8.3 Where is kynamatrix located?
Based in Redmond, Washington, we have board members and volunteers across the nation.

8.4 What is High Definition video?
High Definition video generally refers to any video system of higher resolution than standard-definition. These higher resolutions are identified as 720p, 1080i, and 1080p.

> **720p** is 720x1280 (or 720 horizontal scan lines with 1280 pixels per line.)
> The "p" refers to *progressive* meaning that the lines are scanned from the top to the bottom of the screen in one sweep.
>
> **1080i** is 1080x1920 (or 1080 horizontal scan lines with 1920 pixels per line.)
> The "i" refers to *interlaced* meaning than the odd lines are scanned first followed by a second pass to fill in the even lines. Interlaced video reduces the signal bandwidth by a factor of two, however, interlaced video frames will exhibit motion artifacts. Progressive video conveys all of the lines of resolution sequentially in a single pass, which makes for a smoother, cleaner image.

The LifeSize video operates on 720p at 30 frames per second over a 1Mbps connection.

8.5 Is the 2-way HD equipment standards-based?
Yes. The LifeSize equipment is based on the latest H.264 standard and provides H.263 support for interoperability with all standards-based video communications systems. The LifeSize codec is an H.323 device, and as such can talk to any H.323 codec.

8.6 Does the product downgrade to standard definition in situations where the recipient doesn't have HD technology?
Yes.

8.7 Does the downgrading require additional hardware?
No.

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