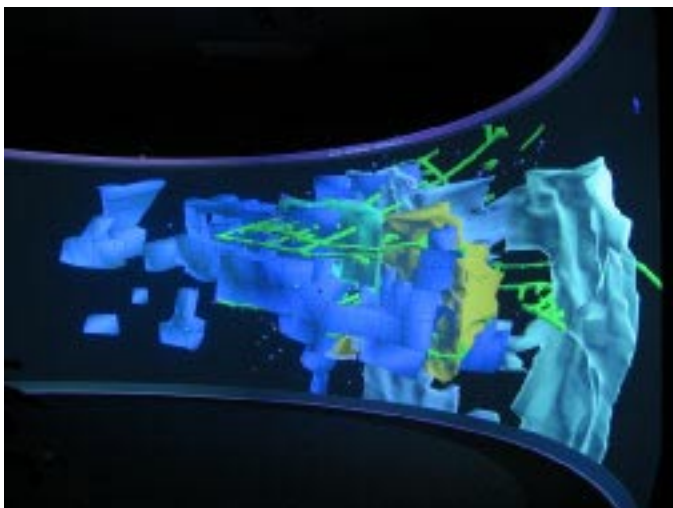


Virtual Reality at MIRARCO - Mining Innovation

MIRARCO's Mining Exploratorium Program uses the world's first collaborative immersive Virtual Reality Laboratory (VRL) designed to help mineral exploration and mining companies find solutions to their mineral exploitation cost reduction challenges. Located in Sudbury Ontario, Canada's largest mining-industrial centre, the VRL allows multi-disciplinary teams to significantly reduce the time required to understand complex datasets, while improving the overall quality of decision making.



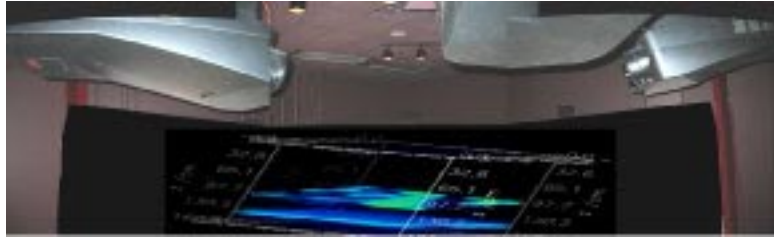
The facility's 3.9 million pixels are projected on a 22-foot radius spherical screen. The advanced edge blending provides a seamless three-dimensional stereographic image around the session participants, drawing them into a virtual representation of their most complex data sets.

The size of the screen and the use of stereo provide a “relaxed intensity”, allowing a project team to interpret and evaluate complex data without feeling tired or losing focus.

What is Virtual Reality Anyway?

Virtual reality (VR) is an elusive concept, difficult to define due to its varied applications.

VR is the result of a technology that allows you to see something that isn't really there – hence “virtually” real. Your senses tell you that what you see is right in front of you, but your brain fights back by telling you that it is nothing more than a “holodeck” experience. Often, the brain loses, and you become enveloped in a world outside your own, where opportunities suddenly expand beyond what is possible to what is dreamable.



The power of VR lies in the ability to visualize information and make decisions based on what is seen, without going through elaborate mathematics or expensive trial and error processes. When placed in the mining context, where costs can exceed hundreds of millions of dollars, the benefit becomes immediately apparent. Decision makers from every part of your company can gather in a VR facility to understand the impact of their decisions on all aspects of the process – exploration, mine planning & design, operations and closure – and how this will affect the bottom line.

VR allows companies to instantly see the financial impact of decisions on:

Ore grade and excavation rates

Mine planning

Ground control methods

Stress and seismicity

Physical placement of stopes, ramps and other structures

Scheduling human resources and equipment

Virtual Reality Has Many Applications

Use VR to create “visual scientists” and support “visual engineers”, where seeing is not only believing but also convincing.



Project team identifying data gaps by converting 2D plans into 3D and viewing them in the VRL

Data Visualization

When a company’s decision makers see their collective data in immersive VR, “light bulb moments” are inevitable, as the team identifies opportunities in their project: a new strategy; a better process; a defining trend. This is VR data integration, where multiple data sets can be compared, modified, combined; where huge amounts of data suddenly turns into pivotal, profitable information.

Exploration Review and Planning

Technical teams working together tend to make better decisions than the best practitioner working alone. Supported by the most sophisticated earth-modelling package, VR provides a means to get the team to focus on key issues and reach consensus on strategic goals - fast. A number of mining and exploration companies are already beginning to see immediate payback from immersive collaboration. The facility can also be utilized for pre-field trip briefings, or for knowledge transfer between company, staff, consultants, and management.

Mine Planning and Event Simulation

Event simulation has become very popular in manufacturing domains, and holds great potential for the mining industry. Examples include:

- Feasibility studies and mine plan audits
- Health and safety
- Mining technology prototyping and virtual testing

Acquisitions

Cut 20-50% of the time out of an acquisition evaluation. Virtual Reality is already doing this in oil and gas; it allows technical teams to integrate complex data and quickly understand key problem areas during intense property review sessions.

Investor Risk

Stereo VR increases the level of understanding and compresses evaluation times. In the Mining Exploratorium, board of directors and potential key investors can gain a much better understanding of technical issues, identify areas of potential liability and thus gain a better understanding of investment risk.

Investor Relations

Brief financial analysts and investors on the potentials of a new prospect, find or property. With full multi-media capabilities, the VRL adds true 3D visualization to existing multimedia presentations, greatly improving understanding.

Amidst these and many other applications, it is clear that those who seize the opportunity will find themselves leading a technical revolution in the way research and business is conducted. Virtual Reality is not a wave of the future. It's a tool for the present.



Project team discussing mine plan in Virtual Reality Laboratory

Interested?

Book a demonstration – contact Nadia Krane at reality@mirarco.org

Bring your data and explore for a day – Introductory price: \$5500 CDN/day - (less than 1/3 the going rate charged by the oil and gas industry)

Integrate VR into your project – For detailed quotes contact Peter Kaiser at pkaiser@mirarco.org

Special rates apply to research contracts and work funded by research grants

Virtual Reality Has Many Applications

MIRARCO carries out applied R&D projects with industry and institutions using the Virtual Reality Laboratory (VRL) at Laurentian University's Centre for Integrated Monitoring Technology (CIMTEC). The VRL is a tool for successful model review and data interpretation for teams comprised of technicians, engineers, planners, managers, regulators, financiers, etc. The following are some of the key steps for companies to take advantage of the utility of the VRL.

1. Think Strategy

First identify key strategic questions that must be answered. Identify one person to act as the session champion.

Select a team of people that have the required technical expertise, too much data, the management know-how and the desire to find innovative solutions. In general we recommend that 5-8 people work in the facility at any one time.

2. Gather and Test the Data Model

Gather a representative portion of data and transfer it to MIRARCO for initial evaluation. We will provide you with a clear indication of the amount of work required to transfer the data into a format used in the Virtual Reality facility. Typically, we can transfer data from existing models in a few days.

Once the data is "visible", most teams start with a critical review and evaluation of their models.

3. The Virtual Reality Session

The day prior to a session the facility's pilot will work with your project champion to review objectives and ensure that all data has been properly transferred. On the day of the session, team members are given a short briefing on the facility followed by an introduction to the goals of the session. A brief technical presentation is made to provide a common frame of reference for all participants.

Typical sessions last 1 to 3 days, with most of the day being spent in the Virtual Reality facility. The facility's stereoscopic projection system and 22 foot radius screen provide a level of stimulation and visual clarity that makes it easy to maintain high concentration during this length of time.

Collaborative data immersion provides real time interaction and allows far greater levels of cooperation and understanding between participants. This tool shortens project cycle time, improves inter-departmental communication, and allows to achieve goals more economically.

Reap the Benefits of Collaboration

Our team would be happy to provide you with a tour and demonstration in our Sudbury facility and discuss VR's applications to your company. As a non-profit R&D corporation, MIRARCO offers you access to R&D grants that fund applied research and innovative technologies. Email reality@mirarco.org to book your demonstration.

Explore the possibilities and discover how MIRARCO is "Turning Data into Gold".



MIRARCO's Mining Exploritorium Program: Virtual World Brings Real Benefits

In September 2001, MIRARCO officially commissioned the Laurentian University Virtual Reality (VR) Laboratory and launched its Mining Exploritorium Program. This program offers researchers and engineer's opportunities in virtual reality data integration for mining applications – from exploration, to feasibility, to planning and operations, to closure.

Through this Program, MIRARCO is developing the capabilities to visualize how data changes over time in a totally integrated system, a feature that is relatively new to the mining industry and converts data into information that is loaded with value.

“Visualization studies have many applications, from underground contaminant transport to stability assessment as tunnels are driven,” stated Dr. Peter Kaiser, MIRARCO President. “Integrating time into the immersive environment provides yet another dimension of scientific and engineering data interpretation.”

By using time-dependent data, the Mining Exploritorium Program offers the mining and mineral exploration industries more information from their current data sets. The results benefit mine planners, engineers and geologists through strategic design and economical operations planning.

If you have a project that may be suitable for study in the Mining Exploritorium Program, please email reality@mirarco.org, Attn: Dr. Peter Kaiser, President, MIRARCO.

VIRTUAL REALITY LABORATORY

Facility Specifications

Laurentian University, Sudbury Ontario

Facility Features:

- \$1 million data visualisation facility linked to a data sensing, monitoring, database storage and processing facility
- Sun Microsystems hardware
- 22-foot wide, 12 foot high concave screen providing total data immersion effect
- three-dimensional stereographic imaging
- ergonomically-designed chairs for highest comfort during work sessions
- Use rate is less than 1/3 of the going rate in the oil and gas sector

Our Areas of Expertise:

- Mine planning and design
- Geomechanics and ground support
- Scheduling and simulation
- Environmental monitoring and modelling
- Development of new mining technologies
- Data modelling and interpretation



Project team discussing mine plan in Virtual Reality Laboratory

Human Resources:

- The Directors of MIRARCO's research groups in geomechanics, mining technology and environmental monitoring and Laurentian University's Centre for Integrated Monitoring Technology (CIMTEC) will help you to define your Virtual Reality (VR) project and assemble an effective VR team.
- Members of the Virtual Reality team have experience in geological, geotechnical, mining, civil engineering and environmental fields.
- MIRARCO's Funding Officer is available to discuss potential funding programs, applicable tax credits, and collaborative resources from our network of companies and organizations. You could be eligible for funding of up to 50% for a high-tech virtual reality pilot project.
- MIRARCO is host to high-quality undergraduate, Masters and Ph.D. students who are available for industry research internships and research projects.

Other Amenities Available:

- Design stations for data preparation and processing
- Meeting rooms for groups from 5 to 35
- Auditorium seating 200 people
- Full catering services
- Audio / visual equipment

Commercial User Rate:

\$5,500.00 per day,
including data loading and support.
Special rate packages available.

MIRARCO – Mining Innovation

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