

The ‘Imax’ of science labs – the next generation of eResearch

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INTRODUCTION

In the past VeRSI has demonstrated the eVBL (educational Virtual BeamLine), which proved that remote access to the Australian Synchrotron was possible. VeRSI then showed us that Synchrotron Users could remotely load samples and move motors on MX1 (Macromolecular Crystallography). VeRSI has now pushed the boundaries of remote access and remote control in the Australian research space.

THE PROBLEM

Remote access and remote control in a collaborative space to an expensive instrument like a beamline at the Australian Synchrotron or the XPS (X-ray photoelectron spectroscopy) at La Trobe University Bundoora is really hard. The people responsible of these expensive instruments do not like having more than a few people near the instruments. Special training like OHSE and Radiation Safety need to be undertaken by all users who go near the instrument and/or the facility. Also, “due to the nature and expense of these instruments, sharing instruments is essential and may require researchers to travel to the location of the instrument.”[2] This costs both time and money and often causes scheduling and data transportation problems.

THE SOLUTION

To tackle this problem, a collaboration of La Trobe’s eResearch Office, La Trobe’s CMSS (Centre for Materials and Surface Science) and VeRSI built a room called VisLab1. This room provides an immersive environment for a group of up to 30 researchers or students to access instruments from a remote location. The high-tech laboratory contains all the latest in visualisation technology including a 95m² multi-screen projection wall (Figure 1), six touch screens and video conferencing equipment, all in 1080p High Definition. It also has a twelve monitor 175” display wall running a Microsoft Windows PC for displaying ultra-high resolution visualisation data (Figure 2).



Figure 1: VisLab1 multi-screen projection wall



Figure 2: twelve monitor 175” display wall

THE EXPERIENCE

“One of these large, expensive instruments is the Australian Synchrotron located in Clayton, Victoria. In fact allowing remote access from La Trobe to the beamlines at the Australian Synchrotron was one of the major drivers behind the creation of VisLab1. Since completion, VisLab1 represents the first fully-functional, immersive space in which to remotely access VBL enabled Beam Lines from The Australian Synchrotron. This also includes the ‘remote administration software’, a form of which also controls the CMSS lab instruments, thus providing a seamless and familiar experience to researchers no matter where they are or the specific instruments they are using.”[2]

“‘It’s like being there without the time and expense of travel,’ says Dr Pigram. ‘For example, our students are now able to carry out experiments on the Protein Crystallography beam line at the Australian Synchrotron.’ The University is a founding partner in the Australian Synchrotron.”[1]

“VisLab1 is used as an immersive educational tool. La Trobe's Physics and Nano-technology Programs offer tertiary subjects in both Surface Science and Synchrotron Science and Technology. Within these disciplines the conventional lab environment provides a physical experience of an instrument to students but learning about the instrument in this way in a large group often results in some students gaining experience and knowledge while others lose interest because they do not have direct access to the instrument. VisLab1 is able to conquer this challenge because every single student out of a group of 30 is able see and experience every aspect of the instrument and laboratory as if they were in the lab itself.”[2]

REFERENCES

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2. VeRSI, *VisLab Sneak Peek*, eNewsletter 15, 2011, <https://www.versi.edu.au/news-and-publications/enewsletter/enewsletter-15/vislab-launch>

ABOUT THE AUTHORS

Michael D'Silva

Michael is the Project Manager and a Software Systems Engineer for the Collaborative Cyber Infrastructure for Instrumentation team at VeRSI. His key responsibilities include software project management and the design and development of eResearch software.

His current projects include implementing a collaborative working environment by developing the Virtual BeamLine (VBL) at the Australian Synchrotron. The VBL enables users to access experiments and collaborate remotely. In addition, he was involved in several of VeRSI's life science projects, such as the Genome Data Mining and the Laboratory Supervisor Management System projects.

Some other projects he is involved in are the Remote Laboratory Instrumentation at La Trobe University and the VisLab1 room at La Trobe University. Used for remote teaching purposes, the VisLab1 supersedes the need for small group size as well as time spent travelling and completing safety induction, as it allows the students to run experiments remotely, while enjoying the same immersive experience as at the Synchrotron and La Trobe.

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Chris Myers

Chris is the Program Director at VeRSI. His duties include delivery of a collaborative communication environment that allows researchers to remotely interact with the MX1 (Macromolecular Crystallography) beamline and Powder Diffraction beamline (PD) at the Australian Synchrotron. He is managing the construction of a remote VBL environment at La Trobe University as well as an integrated instrumentation environment for materials and surface scientists.

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