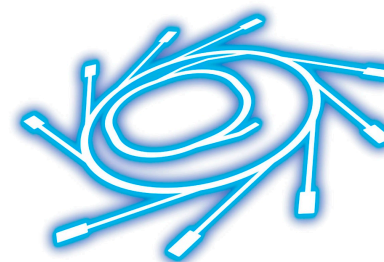




VBL e-Research Environment @ The Australian Synchrotron



Australian Synchrotron
lighting the path to innovation

Chris Myers, RI Team Lead
Open Presentation
Version 3.4



Remote Instrumentation and Networking Group (RING)



chris.myers@versi.edu.au

phone: 03 8540 4226

mobile: 0423 784 265



michael.dsilva@versi.edu.au

phone: 03 9902 0593

mobile: 0403 191 855

- Virtual Beamline (VBL)
 - Australian Synchrotron
- Remote Instrumentation (RI)
 - La Trobe
- VBL Theatrette
 - La Trobe



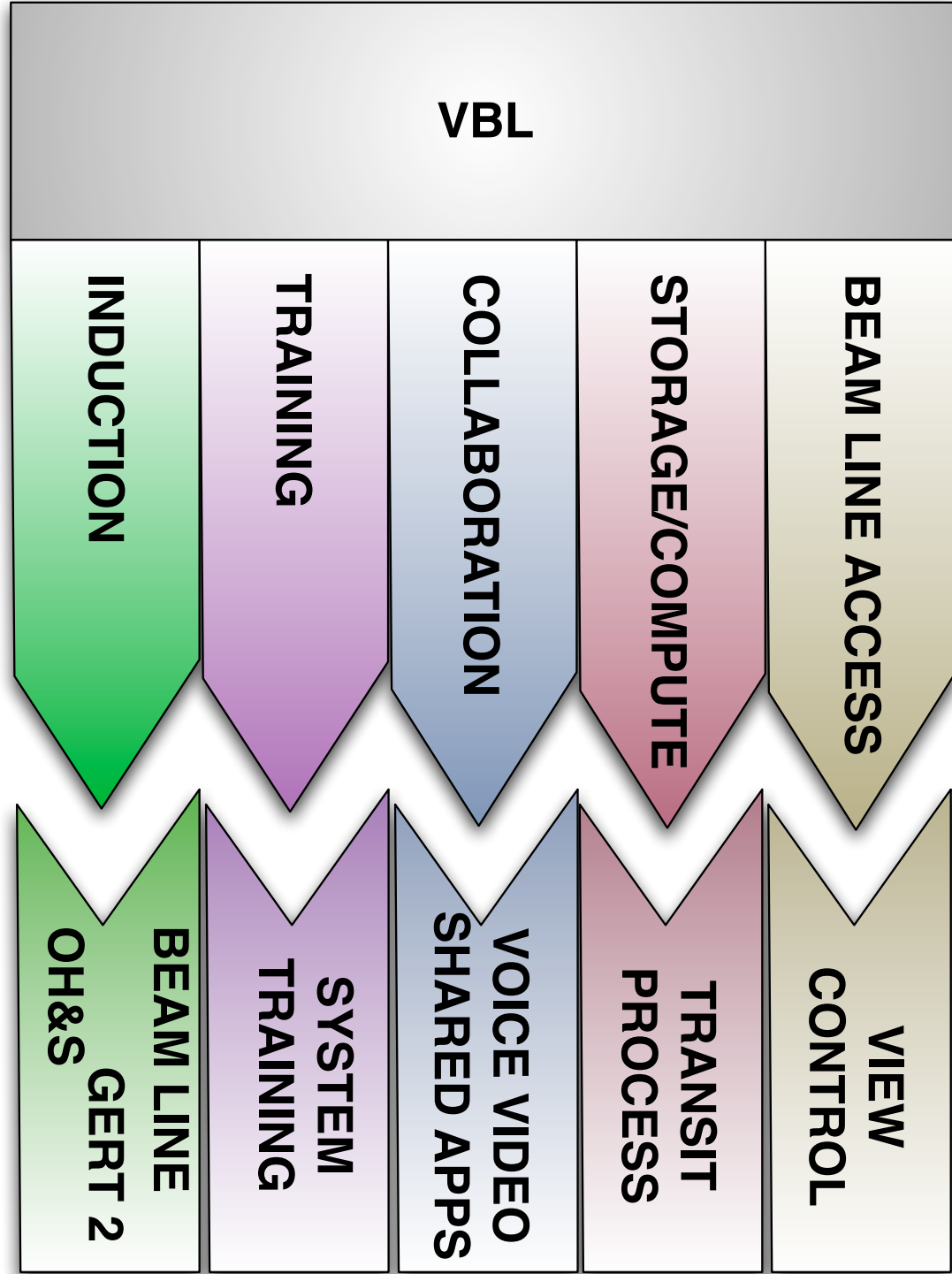
Why we need a VBL

- Science particularly that based on large instruments increasingly involves distributed, global collaborations enabled by the internet and using very large scale data collections, high performance computing resources, tele-science (remote access and control of instrumentation) and collaborative visualisation. For the Australian Synchrotron the Virtual Beam Line will be a model for this sort of distributed access.

Goals

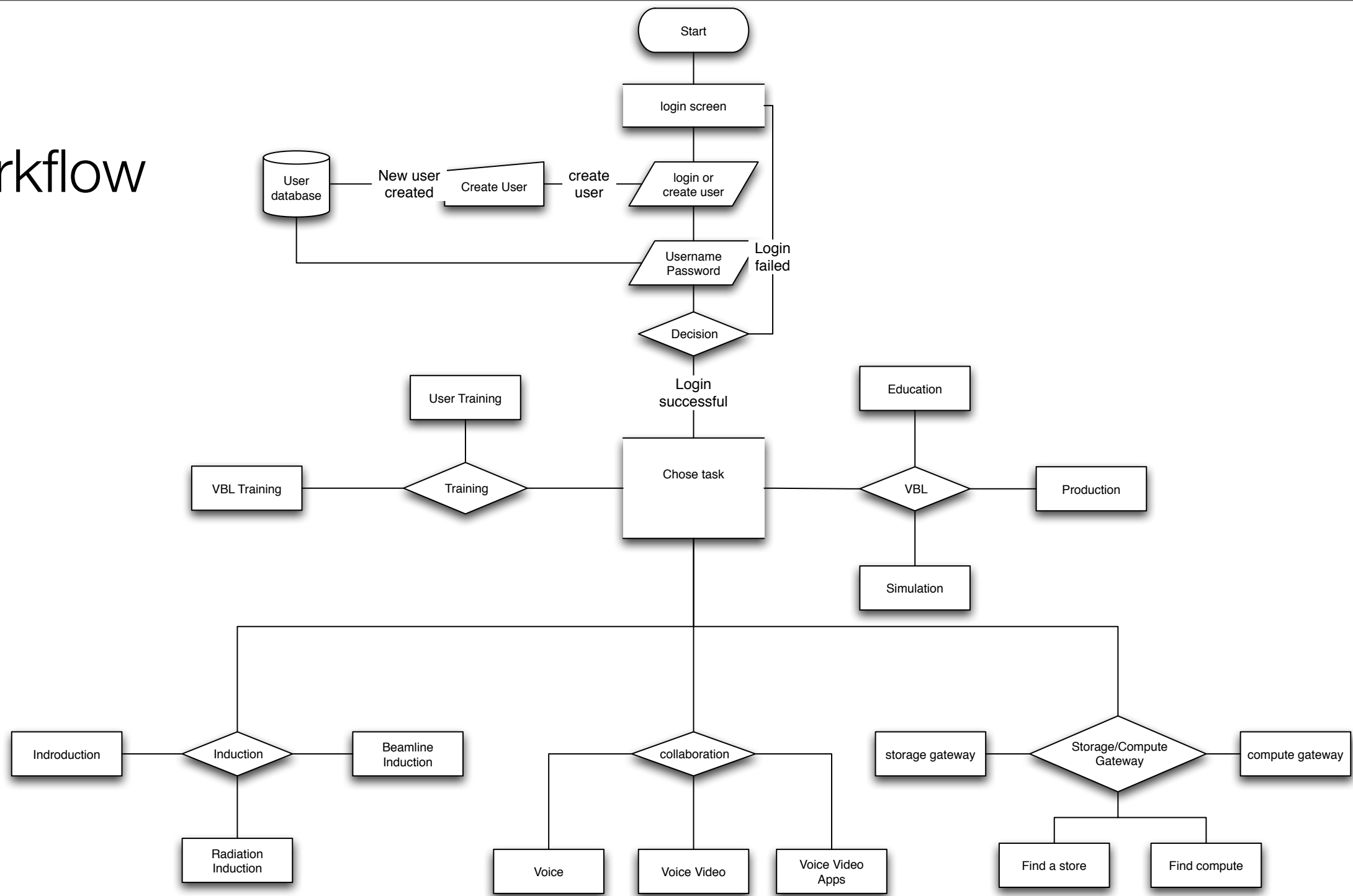
- User Friendly
- Safe
- Reliable
- Fast
- Modular design





VBL Overview

VBL Workflow



Facility Status Monitor

- The Facility Status Monitor (FSM) was developed by the Control Systems team to provide a snapshot overview of the synchrotron status. VeRSI worked with the controls team to produce a web interface to the status monitor, the WEB-FSM, and a mobile phone interface, the mini-FSM.



Australian Synchrotron Status

Control Room / Duty Officer Extn **123**

Beam Current
140.0 mA

Beam Lifetime
18.3 Hrs

Current x Lifetime
2.57 AHrs

Integrated Current
142.5 AHrs

Position

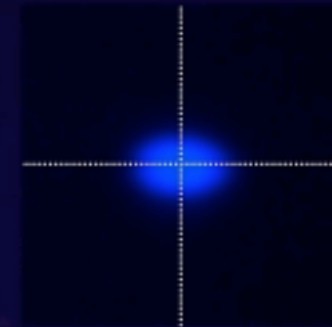
X **-29.5 μm**

Y **-2.3 μm**

Size (FWHM)

X **278.5 μm**

Y **179.7 μm**



Beamline Status

PSS Master Shutter Enable

Infra Red

Protein Crystallography 2

Protein Crystallography 1

Medical Imaging

Microspectroscopy

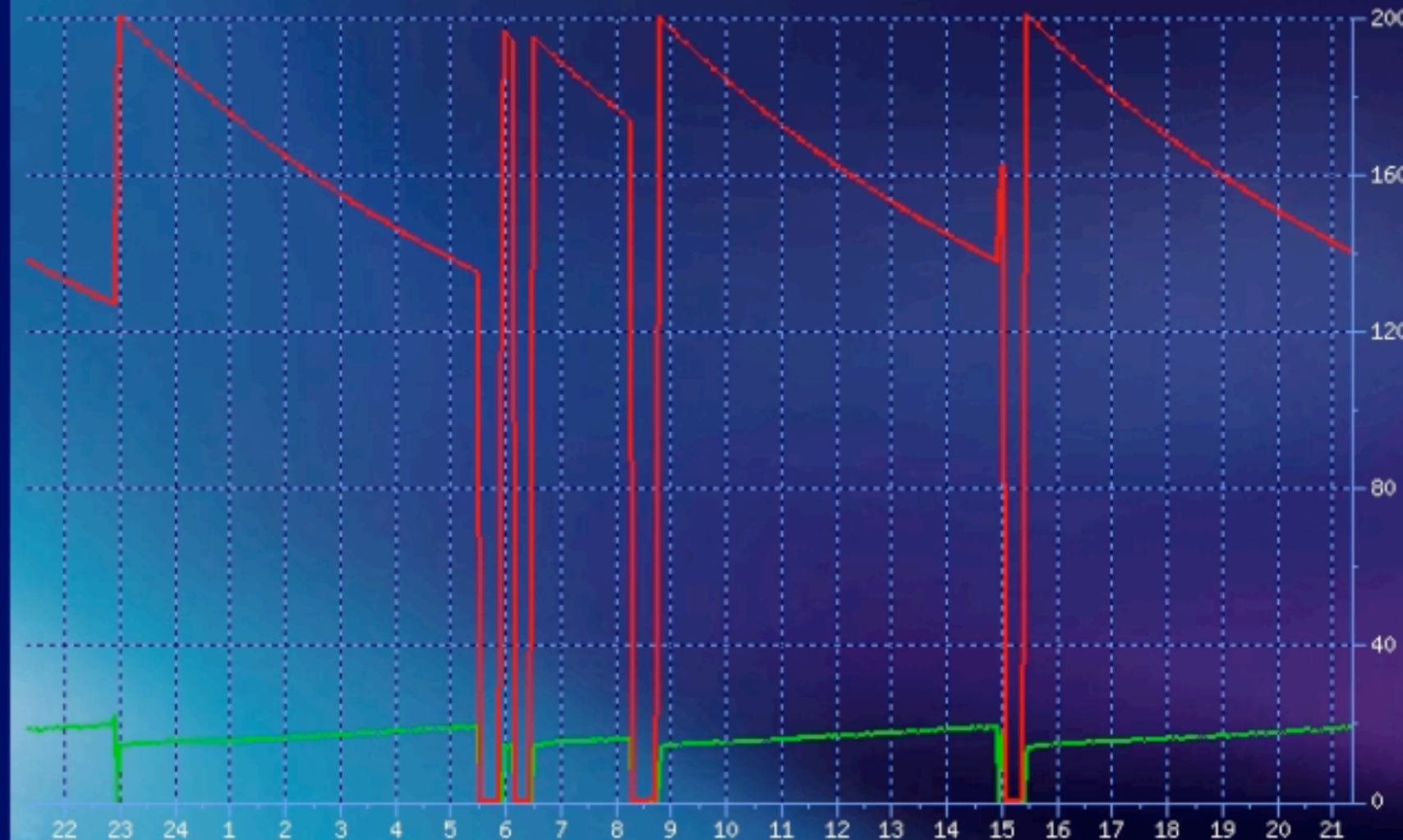
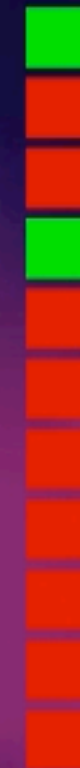
General Microprobe

Powder Diffraction

X-Ray Absorption Spectroscopy

Small/Wide Angle Scattering

Soft X-Ray



ASP
CONTROLS

eRSI

Stored Beam available for Beamline Operations...

MINI-FSM

- -- Mini FSM --
- Beam Current: 162.8 mA
- Beam Lifetime: 162.8 mA
- Current x Lifetime: 162.8 mA
- Integrated Current: 162.8 mA
- PSS Master Shutter Enable: Open
- Infra Red: Open
- Protein Crystallography 2: Shut

- Protein Crystallography 1: Open
- Medical Imaging: Shut
- Microspectroscopy: Shut
- General Microprobe: Shut
- Powder Diffraction: Shut
- X-Ray Absorption Spectroscopy: Shut
- Small/Wide Angle Scattering: Shut
- Soft X-Ray: Shut

- Position
- X: -111.6 um
- Y: +3.4 um
- Size (FWHM)
- X: 278.5 um
- Y: 197.7 um

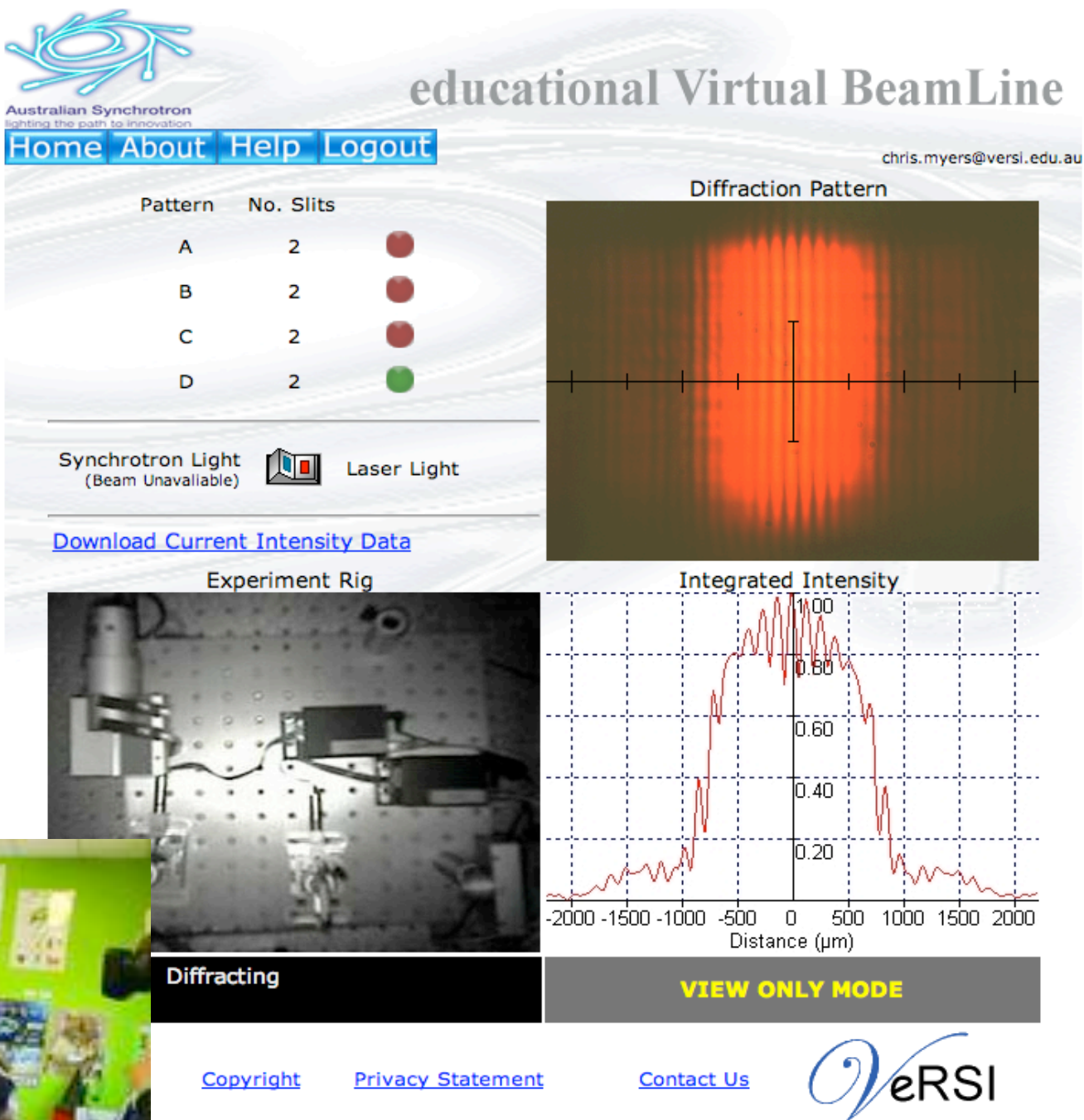


Note: must be a mobile phone with internet access that supports WML

<http://vbl.synchrotron.vic.gov.au/fsm/index.wml>

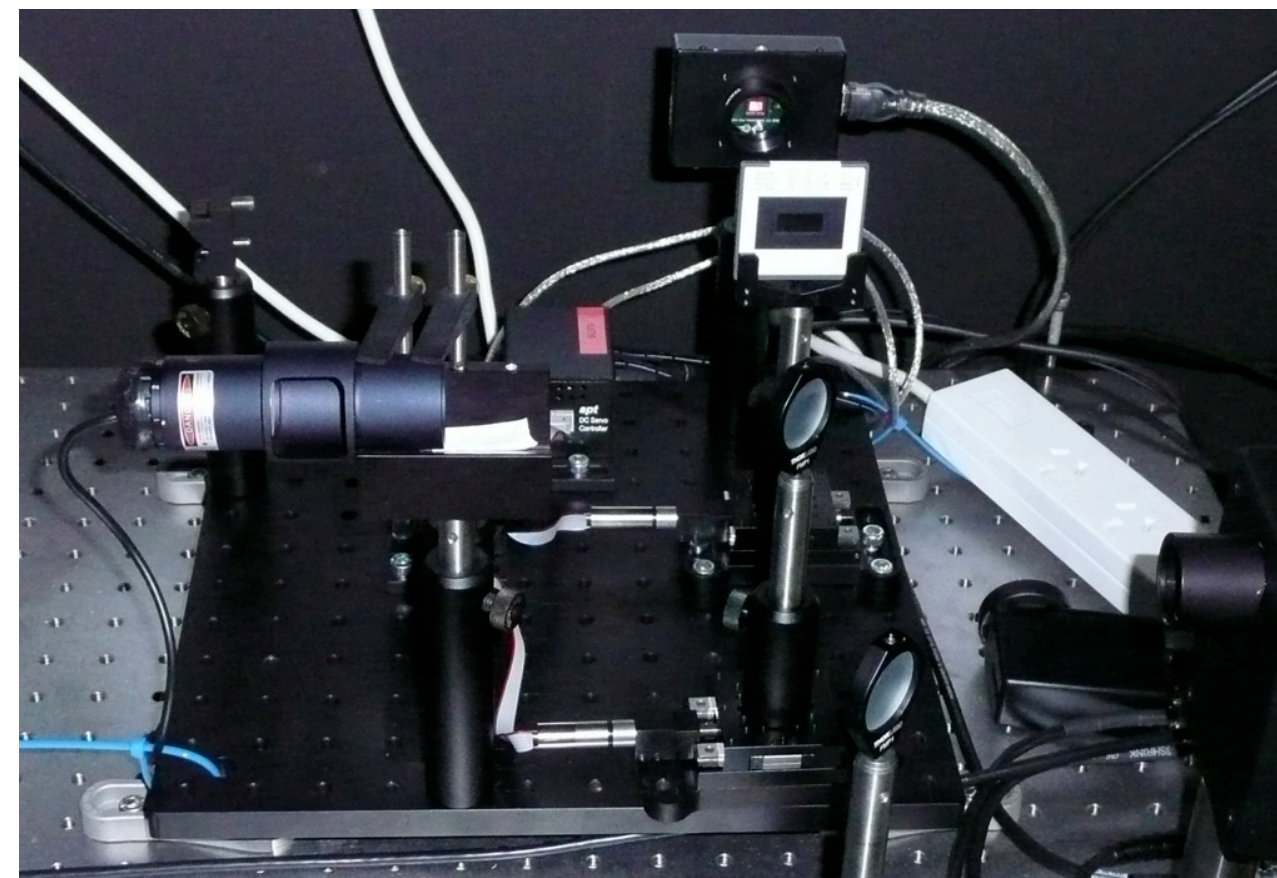
eVBL

- The Educational Virtual BeamLine (eVBL) demonstrates, in real-time, Thomas Young's classic Double-Slit diffraction experiment. The experiment has been designed as a demonstration to be used in the Victorian VCE Physics Unit 4, Study Area 2: Interaction of Light and Matter. It also provides a link to the optional Detailed Study 3.1: Synchrotron and its applications, with the primary source for diffraction the optical light produced by the Australian Synchrotron.





The eVBL is located in the ODB Hutch at the Australian Synchrotron
 Professional optical equipment has been used.
 This uses **Live Beam** - not simulated.



- This space has been provided by Mark Boland. (Big Thank-you)

eVBL - Booking

- The eVBL has its own login system.
- The eVBL also has a stand-alone booking system - 30 minute sections.
- A teacher control window.
- And a student/public view-only window

Australian Synchrotron

Lighting the path to innovation

V

irtual

B

eam

L

ine

Home

About

Help

Logout

Logged in: Demo

Select Day

June '07

Mon Tue Wed Thu Fri Sat Sun

1 2 3

4 5 6 7 8 9 10

11 12 13 14 15 16 17

18 19 20 21 22 23 24

25 26 27 28 29 30

July '07

Mon Tue Wed Thu Fri Sat Sun

1

2 3 4 5 6 7 8

9 10 11 12 13 14 15

16 17 18 19 20 21 22

23 24 25 26 27 28 29

30 31

August '07

Mon Tue Wed Thu Fri Sat Sun

1 2 3 4 5

6 7 8 9 10 11 12

13 14 15 16 17 18 19

20 21 22 23 24 25 26

27 28 29 30 31

September '07

Mon Tue Wed Thu Fri Sat Sun

1 2

3 4 5 6 7 8 9

10 11 12 13 14 15 16

17 18 19 20 21 22 23

24 25 26 27 28 29 30

October '07

Mon Tue Wed Thu Fri Sat Sun

1 2 3 4 5 6 7

8 9 10 11 12 13 14

15 16 17 18 19 20 21

22 23 24 25 26 27 28

29 30 31

November '07

Mon Tue Wed Thu Fri Sat Sun

1 2 3 4

5 6 7 8 9 10 11

12 13 14 15 16 17 18

19 20 21 22 23 24 25

26 27 28 29 30

December '07

Mon Tue Wed Thu Fri Sat Sun

1 2

3 4 5 6 7 8 9

10 11 12 13 14 15 16

17 18 19 20 21 22 23

24 25 26 27 28 29 30

31

January '08

Mon Tue Wed Thu Fri Sat Sun

1 2 3 4 5 6

7 8 9 10 11 12 13

14 15 16 17 18 19 20

21 22 23 24 25 26 27

28 29 30 31

February '08

Mon Tue Wed Thu Fri Sat Sun

1 2 3

4 5 6 7 8 9 10

11 12 13 14 15 16 17

18 19 20 21 22 23 24

25 26 27 28 29

March '08

Mon Tue Wed Thu Fri Sat Sun

1 2

3 4 5 6 7 8 9

10 11 12 13 14 15 16

17 18 19 20 21 22 23

24 25 26 27 28 29 30

31

April '08

Mon Tue Wed Thu Fri Sat Sun

1 2 3 4 5 6

7 8 9 10 11 12 13

14 15 16 17 18 19 20

21 22 23 24 25 26 27

28 29 30

May '08

Mon Tue Wed Thu Fri Sat Sun

1 2 3 4

5 6 7 8 9 10 11

12 13 14 15 16 17 18

19 20 21 22 23 24 25

26 27 28 29 30 31

eVBL - Documentation

- Construction, overview and tech documentation is available.
- All teaching notes and prac information is available for download.

eVBL Documentation

[Teachers Notes](#)

[Student Prac Notes](#)

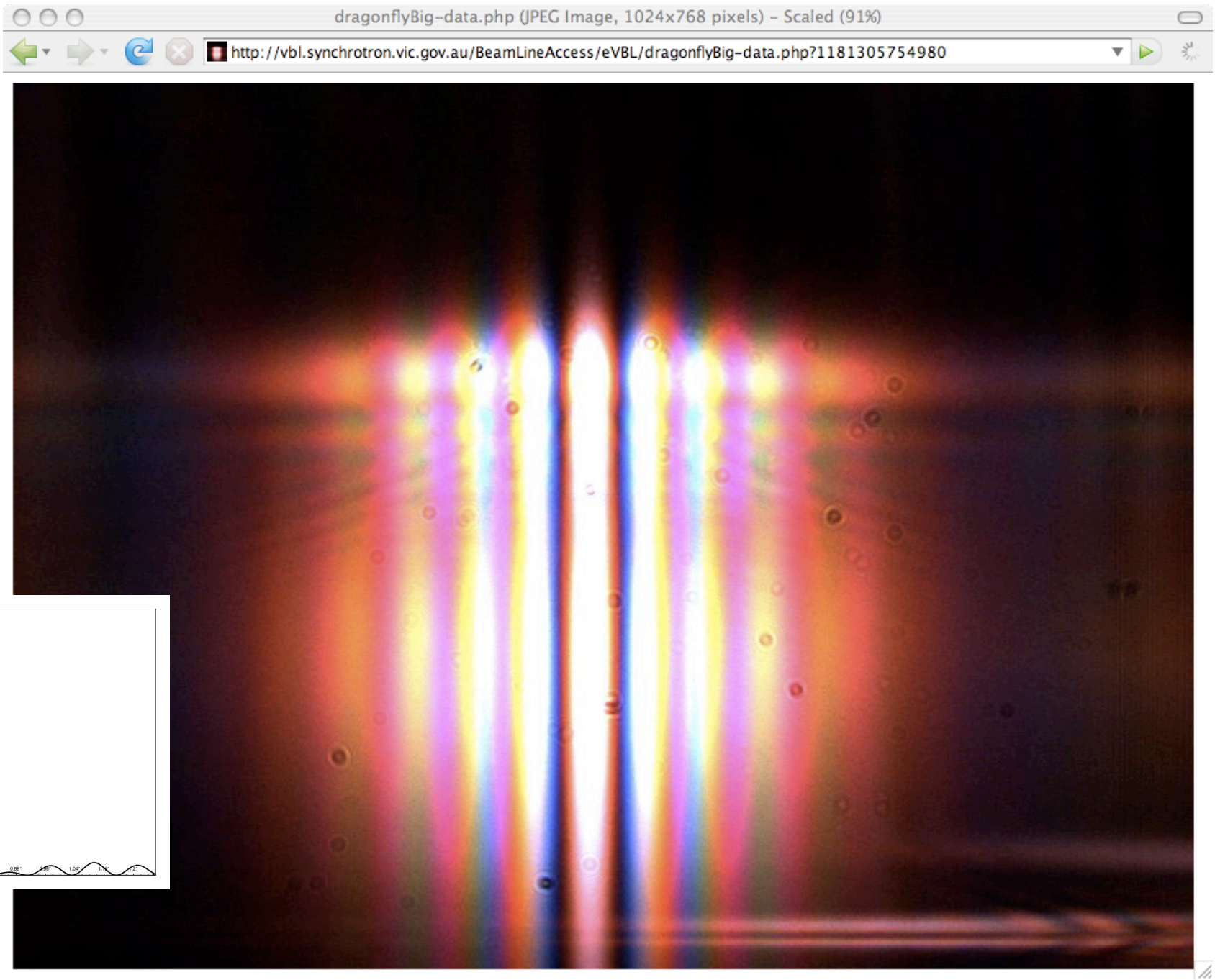
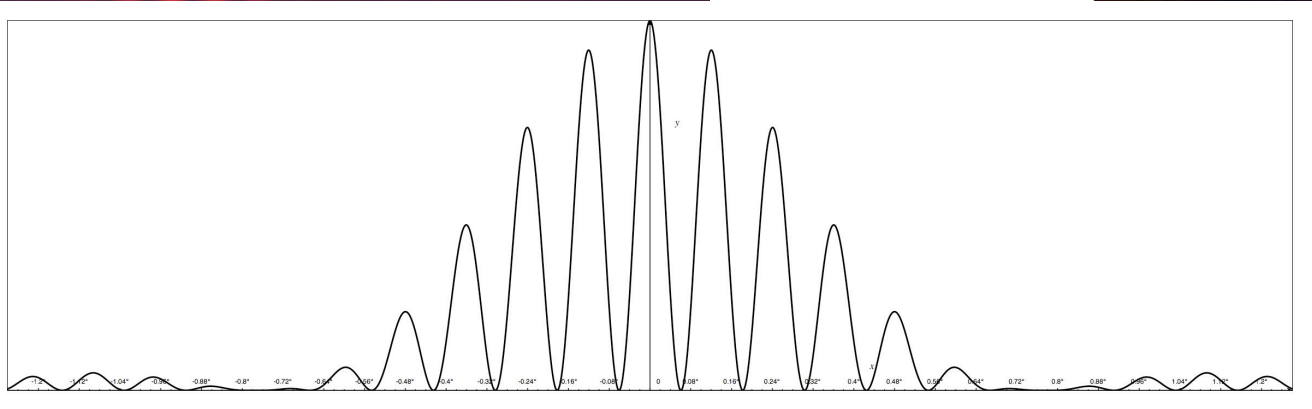
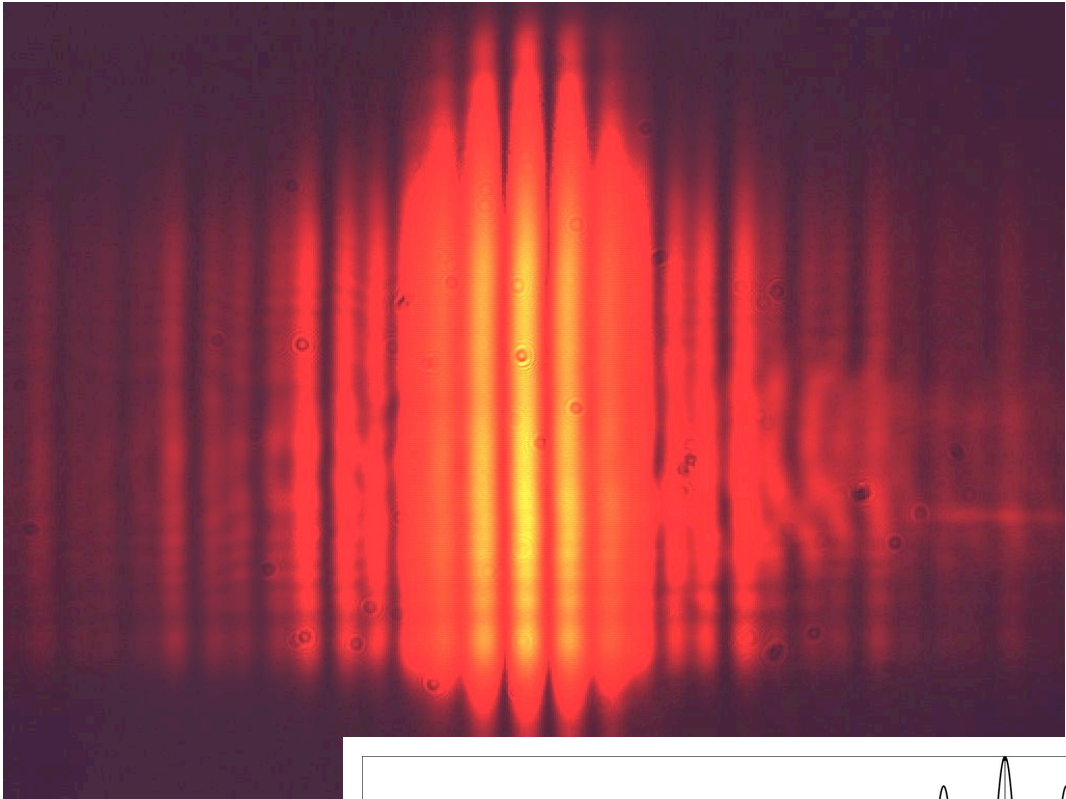
[About](#)

[eVBL Technical Specification](#)

[Help](#)

[eVBL Control Window quick reference](#)

eVBL - Images



eVBL - Control Window

eVBL control window quick reference.

main navigation buttons.

Slit pattern selector area.
The green button indicates the currently selected Slit.
Click on a red button of an alternative slit to move that slit into the beam.
Buttons will be yellow when motors are in movement.

Light source selector.
This toggle switches between Synchrotron light and laser light.

The status of the synchrotron Light will be indicated here:

This link will take you to a separate page with the current data used to produce the intensity graph, at right.

Experiment Rig
This is a still image of the birds eye view of the experiment rig
Move your mouse over the different items will provide information on the rig's elements.

This status monitor will show the current activity of the eVBL.
e.g. the motors moving a different slit into place.

Australian Synchrotron
Lighting the path to innovation

V irtual B eam L ine

Home About Help Logout

Logged in: chris.myers@versl.edu.au

Pattern	No. Slits	
A	2	
B	2	
C	2	
D	2	

Synchrotron Light (Beam Available) Laser Light

[Download Current Intensity Data](#)

Experiment Rig

Status: Diffracting

Time Left in your session: 16 minutes

Finish

Copyright Privacy Statement Contact Us

VeRSI

The logged in user will appear here.

Diffraction Image
This is the current diffraction image produced by the CCD camera.
This image is automatically refreshed.
If you click on the image a high resolution image will appear in a separate window.

This slider will increase the refresh rate of the image.
Internet speeds above 2 Mbps are required for higher refresh rates.

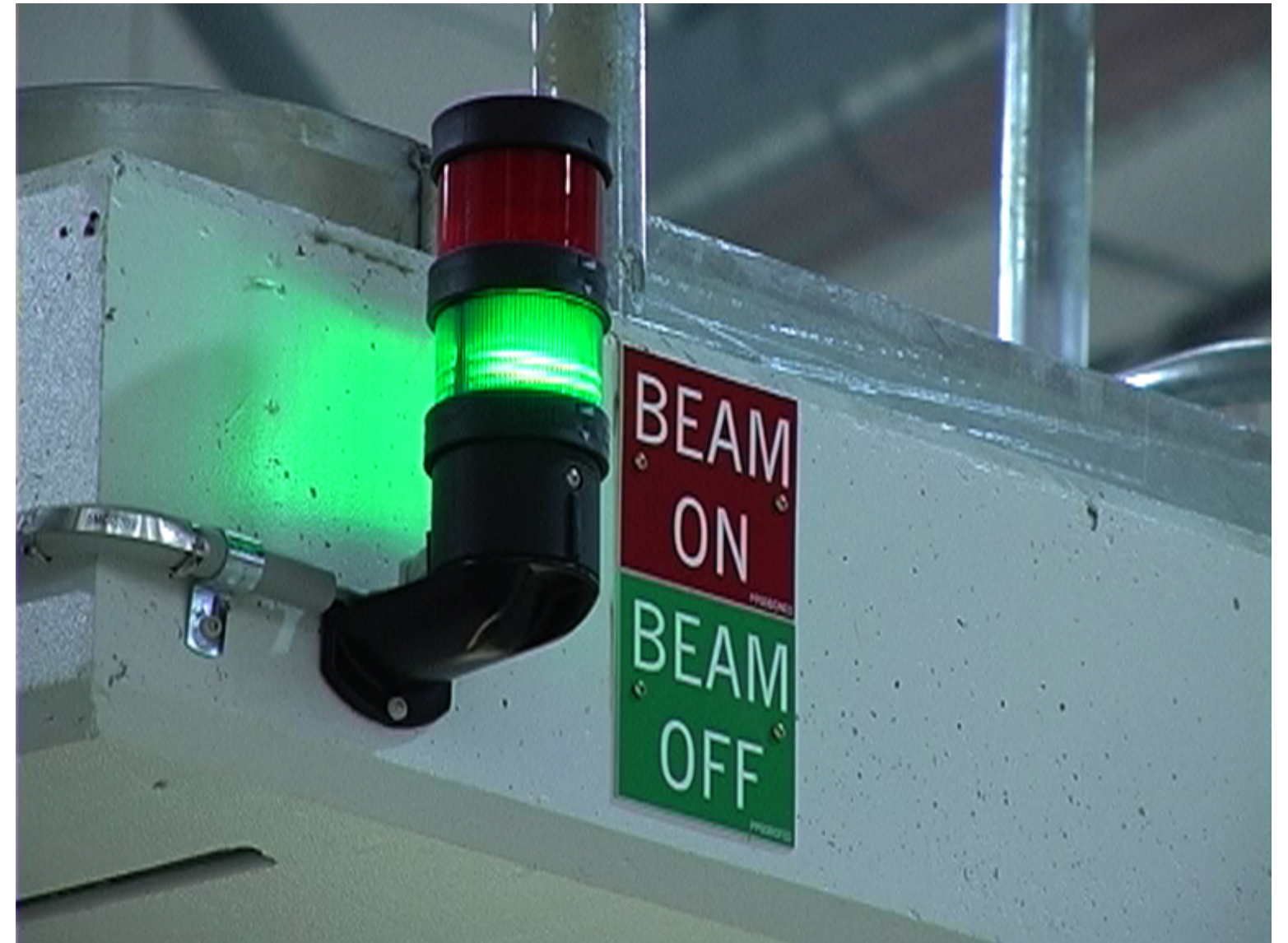
Integrated Intensity Graph
This is the current intensity graph, with data for the graph from the diffraction image above.
This image will automatically refresh.
If you click on the graph a larger graph will appear in a new window.

This slider will increase the refresh rate of the image.
Internet speeds above 2 Mbps are required for higher refresh rates.

This area will indicate if you are in view only mode, rather than control mode.
In control mode it will show the time remaining in the current session.
The finish button will take you back to the home page

Online Induction System

- The online induction system allows remote users to undertake an exam via the internet.
- The features of this system include multiple choice questions, multiple answer multiple choice, automatic marking, picture and/or text questions and answers, exam timer and users and examiners are emailed the result of the exam.
- Automatic update of LDAP directory



Online Induction System

- Slide image presentations.
- Video presentations.
- All slide and video presentations are timed to prevent users from skipping sections.
- Overlays or hyperlinks are available to add extra information for slides only.



Online Induction System

- Full admin back end.
- Modify, add, remove exams.
- Modify, add, remove questions.
- Add, remove Slides.
- Add extra material for download.



Virtual BeamLine

chris.mvers@its.monash.edu.au

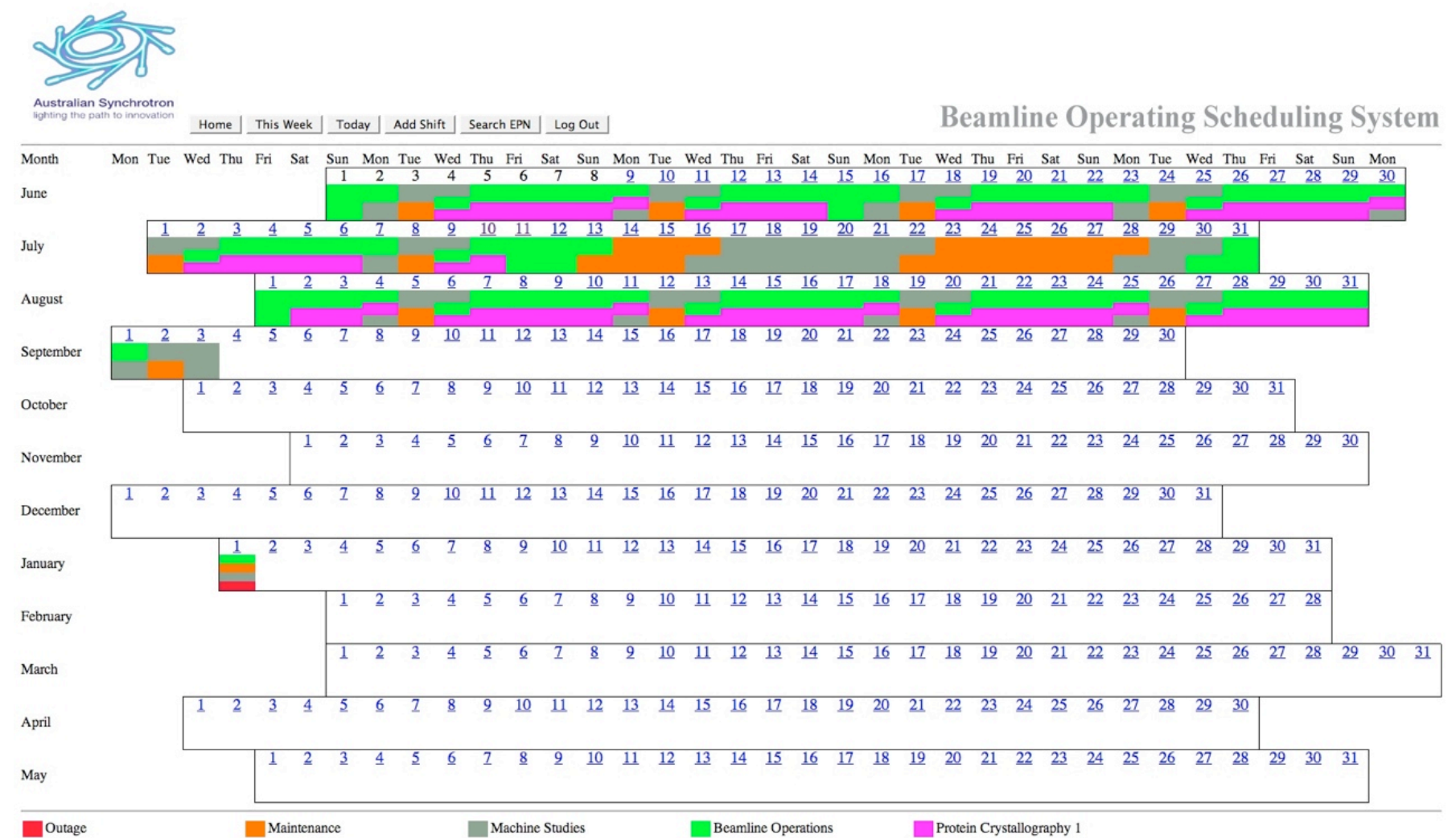
MENU

Induction Admin Area:

1. [Add New Exam](#)
 2. [Add/Edit Presentation to an Exam](#)
 3. [Add/Edit Extra Files needed for an Exam](#)
 4. [Add/Edit Pool to a Pool/Adaptive Exam](#)
 5. [Add Questions to an Exam](#)
 6. [Edit Total Questions to ask for an Adaptive Exam](#)
 7. [Edit/Remove an Exam](#)
 8. [View All Exams](#)
 9. [Review Induction Exams](#)
-
10. [Change Email Settings](#)

BOSS

- The Beamline Operating Scheduling System (BOSS) is a tool for booking in user beamline activities, sharing that data with your team and with the accelerator OPS group, user office and safety officers.



BOSS

- Each Beamline has its own view with the accelerator OPS group having an overview.
- Bookings are made by the Beamline Scientist.

Start Date:

Time (24 hour) 00:00 ▾ - Day 9 ▾ / Month 6 ▾ / Year 2008

Finish Date:

Time (24 hour) 00:00 ▾ - Day 9 ▾ / Month 6 ▾ / Year 2008

Experiment Proposal Number (EPN) :

Primary Investigator (PI) Name :

Primary Investigator (PI) Phone :

Primary Investigator (PI) Email :

Users (Email) :

Search

Gap :

Polarisation :

Special Requirements :

Description :

Hazards :

Other Hazards :

Mount Point for Frames:

Mount Point for Home:

Confidential :

Attendance Required ▾

No ▾

Book

BOSS

- Features

- man power shift scheduling.
- Experiment search.
- Data Access Control.
- Setup information.



Australian Synchrotron
lighting the path to innovation

[Home](#) | [This Year](#) | [This Week](#) | [Today](#) | [Add](#)

Search Experiment Proposal Number (EPN)

[search](#)[show all](#)

Experiment Proposal Number (EPN)	Start Time	Finish Time
509	2008-08-30 08:00:00	2008-08-31 08:00:00
539	2008-08-29 16:00:00	2008-08-30 08:00:00
550	2008-08-27 16:00:00	2008-08-29 08:00:00
534	2008-08-24 08:00:00	2008-08-25 08:00:00
508	2008-08-23 08:00:00	2008-08-24 08:00:00
513	2008-08-20 16:00:00	2008-08-23 08:00:00
486	2008-08-17 08:00:00	2008-08-18 08:00:00
464	2008-08-16 08:00:00	2008-08-17 08:00:00
511	2008-08-13 16:00:00	2008-08-15 08:00:00
514	2008-08-10 08:00:00	2008-08-11 08:00:00
573	2008-08-09 08:00:00	2008-08-10 08:00:00
564	2008-08-06 16:00:00	2008-08-08 08:00:00
469	2008-08-03 08:00:00	2008-08-04 08:00:00
499	2008-08-02 08:00:00	2008-08-03 08:00:00
9072008	2008-07-09 16:00:00	2008-07-10 08:00:00
478	2008-07-05 08:00:00	2008-07-06 08:00:00
463	2008-07-02 16:00:00	2008-07-05 08:00:00
492	2008-06-29 08:00:00	2008-06-30 08:00:00
453	2008-06-27 16:00:00	2008-06-29 00:00:00
574	2008-06-25 16:00:00	2008-06-27 08:00:00
21062008	2008-06-21 08:00:00	2008-06-22 16:00:00
507	2008-06-18 16:00:00	2008-06-21 08:00:00
13062008	2008-06-13 08:00:00	2008-06-14 16:00:00
465	2008-06-11 16:00:00	2008-06-13 08:00:00

User Pref.

- Features

- Update their own personal details.
- Upload proxy's for data transfer.
- Check current access rights and role.

Personal Information

User id:	chris.myers@versi.edu.au
Jabber id:	chris.myers.versi.edu.au
User Name:	Chris Myers
Surname:	Myers
Given Name:	Chris
Initials:	CAM
Title:	Mr
Description:	Virtual BeamLine Development
Telephone Number:	0385404226
Mobile Number:	0423784265
Facsimile Number:	
Pager Number:	
Street Address:	800 Blackburn RD, Clayton, Victoria, Australia
Post Office Box:	
Post Code:	3800
Postal Address:	800 Blackburn RD, Clayton, Victoria, Australia
Preferred Language:	English
X509 Proxy Certificate	Browse...

Australian Synchrotron Information

Role: Beamline Scientist

Beamlines: Protein Crystallography 1 Protein Crystallography 2 Optical Diagnostics Beamline VBL

User Pref.

- Features

- Users can also change their passwords.
- And perform self server password recovery.



The screenshot shows the 'Virtual BeamLine' user preference interface. At the top left is the Australian Synchrotron logo with the tagline 'lighting the path to innovation'. Below it are links for 'HOME' and 'LOGOUT'. The main section is titled 'User Pref.' and contains a form with the following fields: 'User ID' (pre-filled with 'chris.myers@versi.edu.au'), 'Current' (password field), 'New' (password field), and 'New (again)' (password field). A 'CHANGE' button is located at the bottom right of the form.



The screenshot shows the 'Virtual BeamLine' password recovery interface. At the top left is the Australian Synchrotron logo with the tagline 'lighting the path to innovation'. Below it are links for 'HOME' and 'LOGOUT'. The main section is titled 'Password Recovery'. Below the title is a text box with the instruction: 'To Start the process, please enter your User ID (email address) and then please enter without spaces the characters shown in the image.' Below this are three input fields: 'User ID', 'Image' (which contains a CAPTCHA image showing the characters 'QYGLU' overlaid on a blue and green abstract background), and 'Characters in image'. A 'SUBMIT' button is located at the bottom right of the form.

User Pref.

•Features

- Users can create their own account to be authorised by the user office.
- PI's of experiments can also add authorised users to the experiment or to access the data sets.


Australian Synchrotron
lighting the path to innovation
[HOME](#) [LOGOUT](#)

Virtual BeamLine

chris.myers@versi.edu.au

Experiment User Management

Experiment: 12345

Users:

Name 1 : Chris Myers
Email 1 : chris.myers@versi.edu.au
Telephone 1 : 0385404226

Name 2 : Chris Myers
Email 2 : chris.myers@its.monash.edu.au
Telephone 2 :

Name 3 : Michael D'Silva
Email 3 : michael.dsilva@versi.edu.au


Australian Synchrotron
lighting the path to innovation
[HOME](#) [LOGOUT](#)

Virtual BeamLine

New User Information

Email:

First Name:

Surname:

Initials:

Title:

Description:

Telephone Number:

Mobile Number:

Facsimile Number:

Pager Number:

Street Address:

Office Box:

Code:

Address:

Preferred Language:

Beamlines: Protein Crystallography 1 ☐
Protein Crystallography 2 ☐

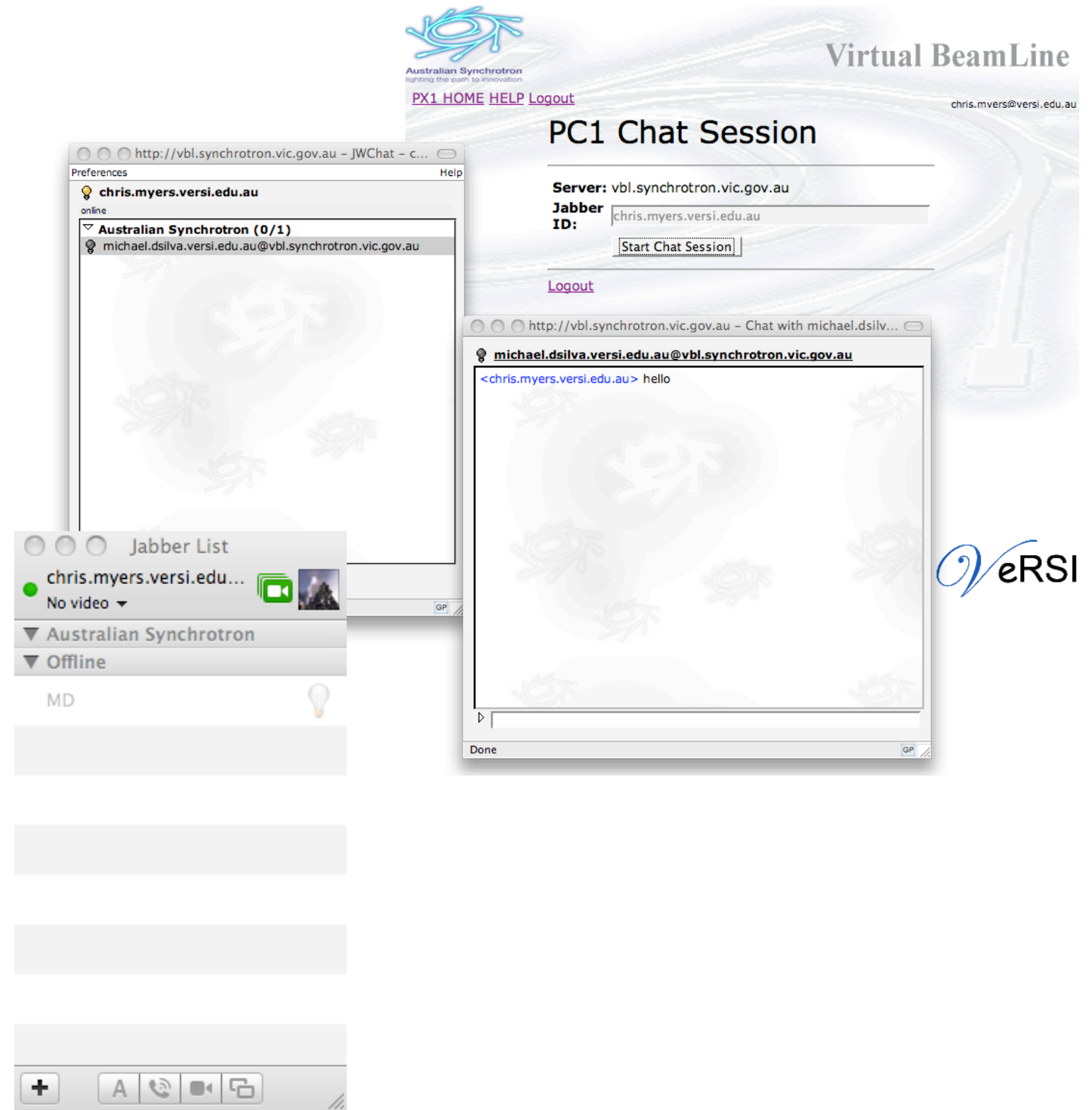
User Pref.

- Back end tools are available for authorised personal to:
 - approve new users.
 - add or edit users details.
 - and import users via a CVS formatted file.

- [Experiment User Access Management](#)
- [View new User Requests](#)
[\(1 waiting request\)](#)
- [Add New User Preferences](#)
- [Edit User Preferences](#)
- [Import Beamline Users from CSV](#)

IM Solution

- Openfire jabber server.
- integrated into local LDAP server.
- jwchat client installed into web portal.
- Can integrate with existing clients like ichat.
- Allows group/conference chat with password protection.
- connections can be encrypted.



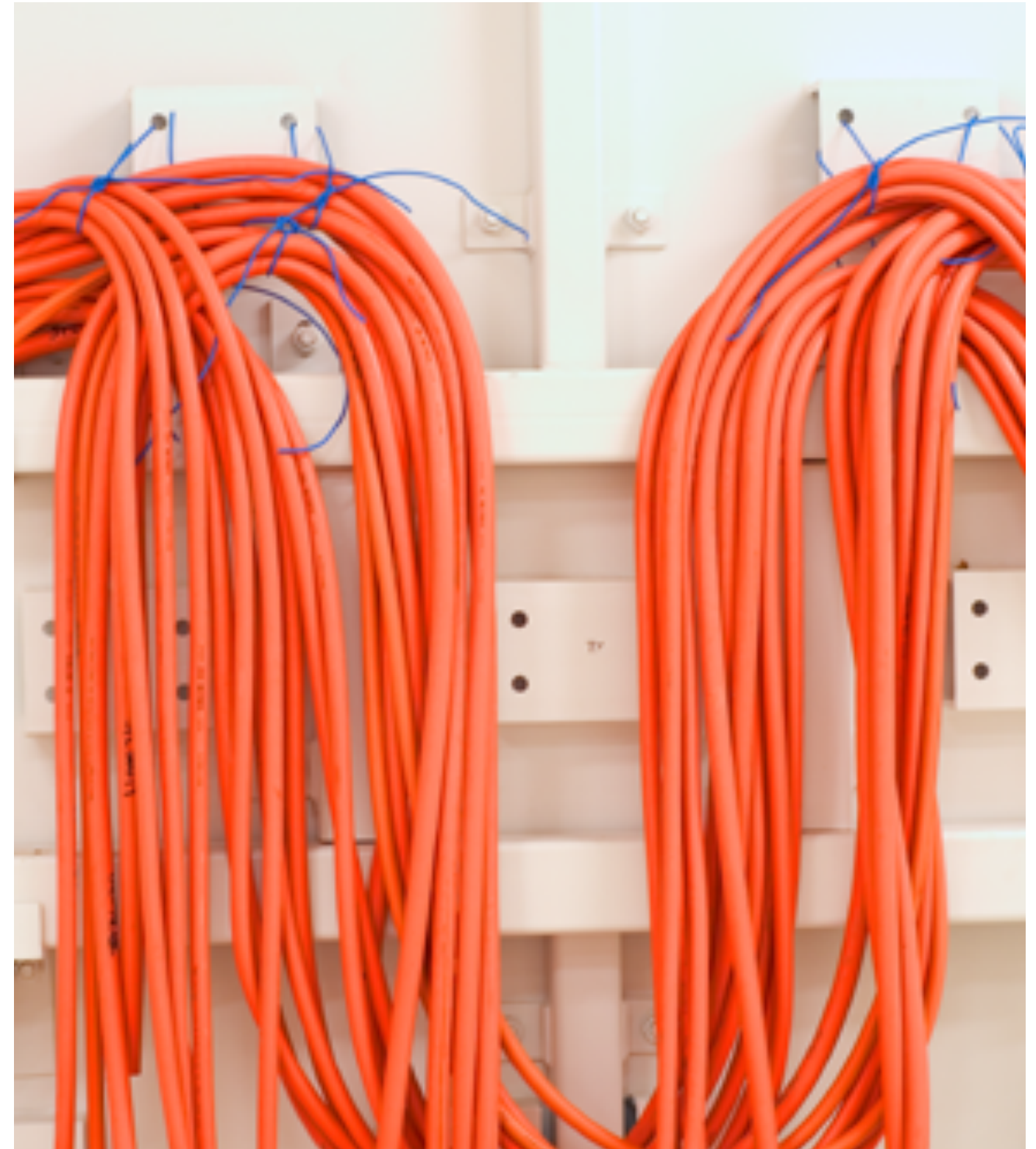
Data Transfer

- This VBL service will ultimately enable transport of data sets to all national and international Grid enabled storage systems from the Australian Synchrotron.



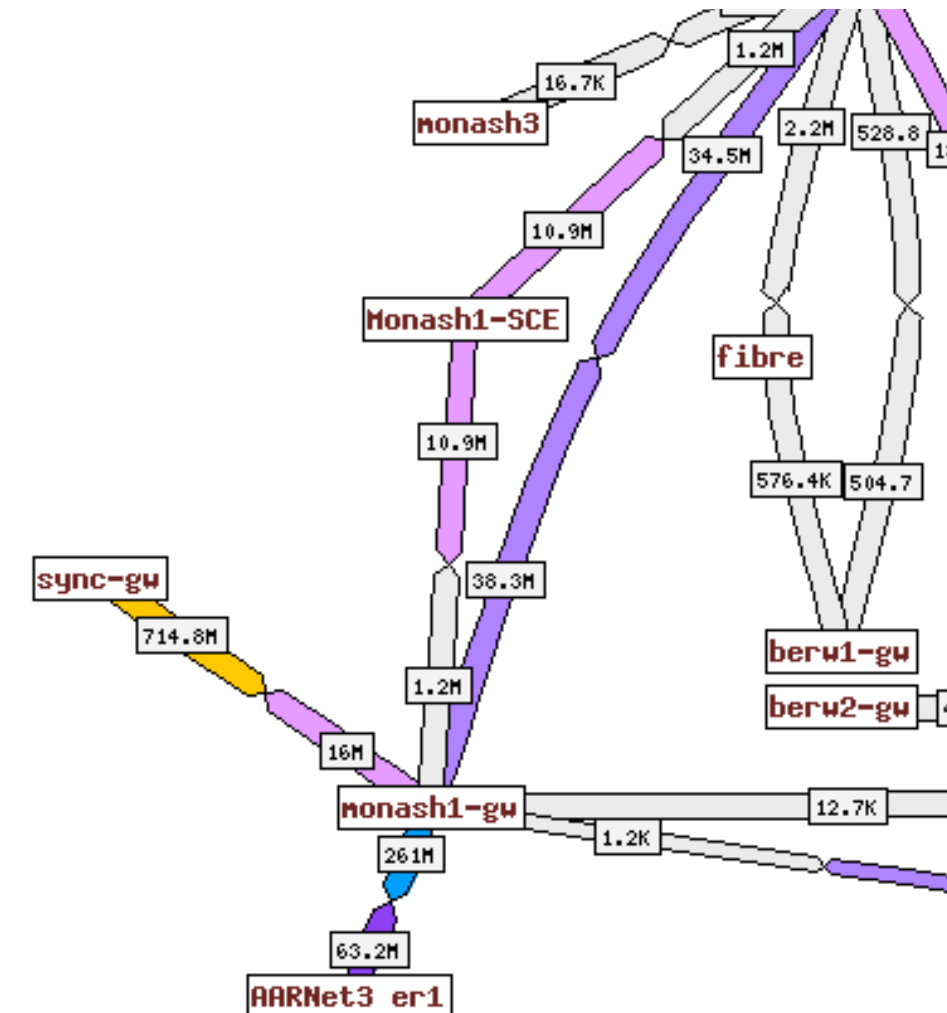
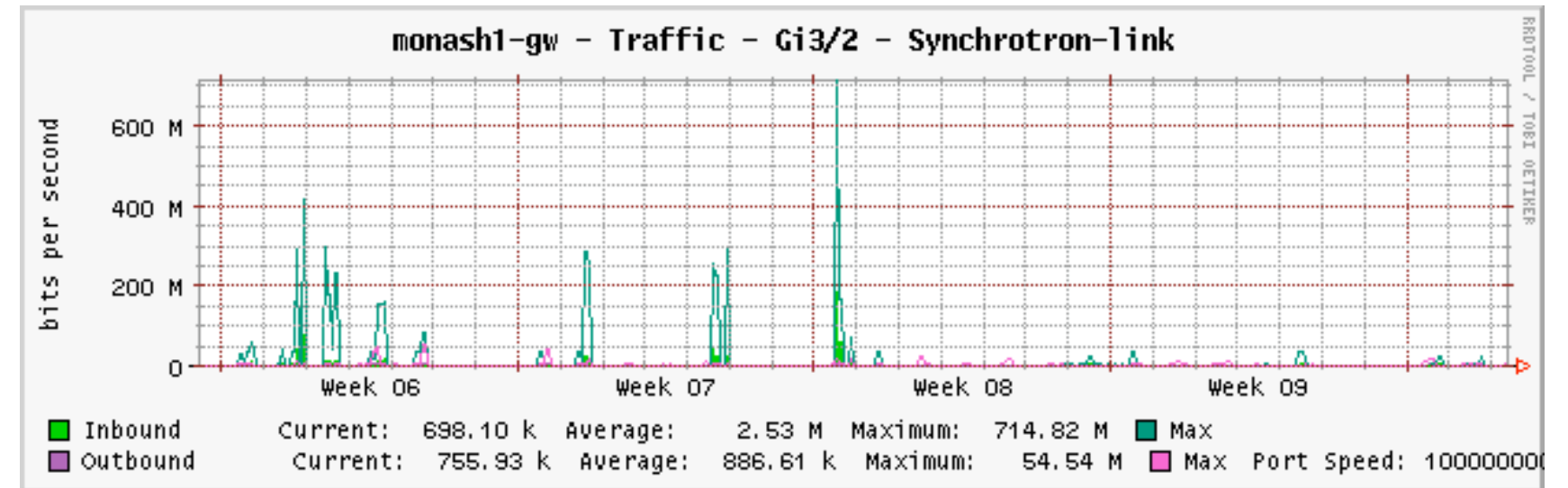
Data Transfer

- Comprising a GSI enabled Globus GridFTP service to transport data between the sites; for authorisation and authentication we use IGTf compliant X509 certificates issued by the APAC Grid Authority under ARCS.



Data Transfer

- Network rates of approximately 714-Mbps where achieved using data sets produced from the Protein Crystallography 1 beamline.



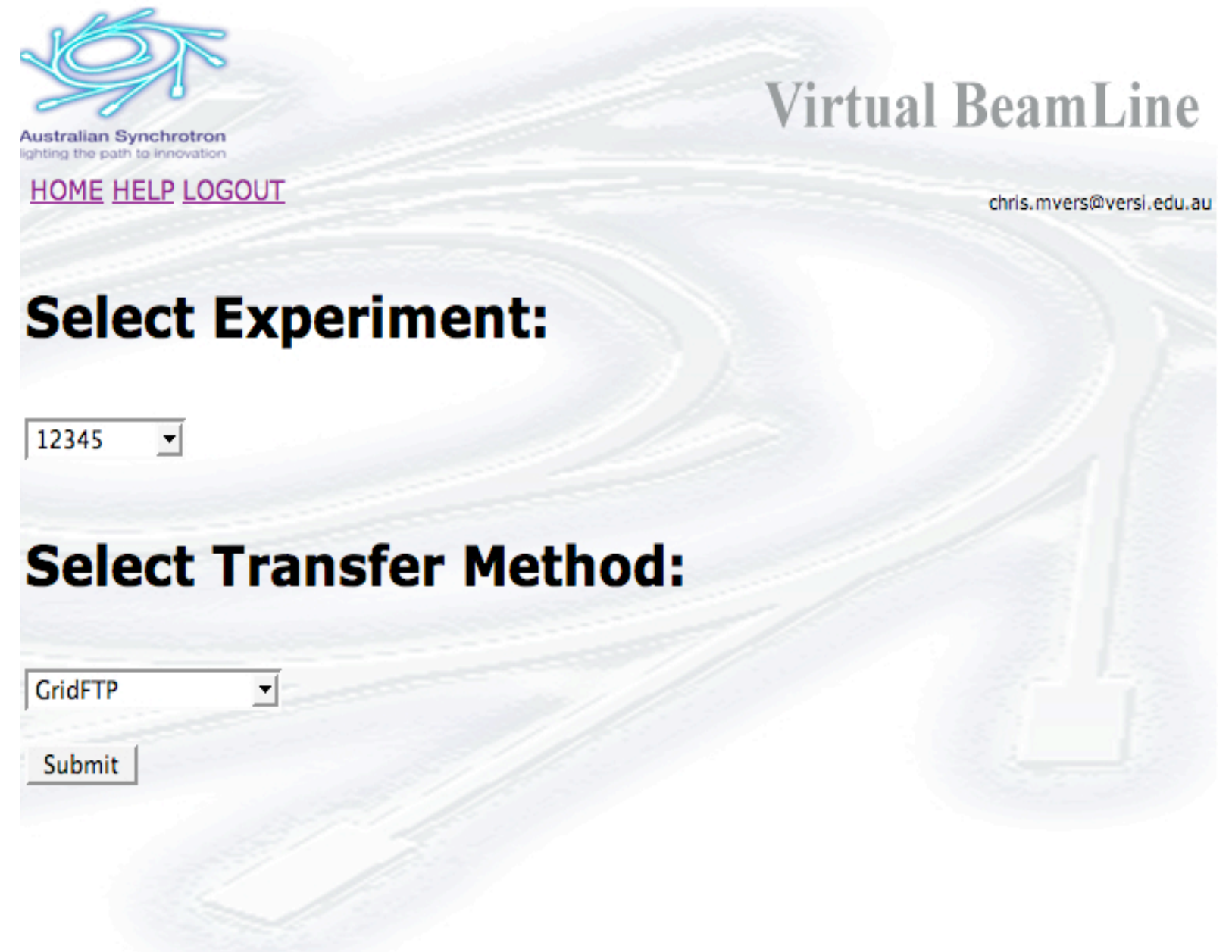
Data Transfer

- The VBL Main Menu
- This is the tasking area for all VBL activities.



Data Transfer

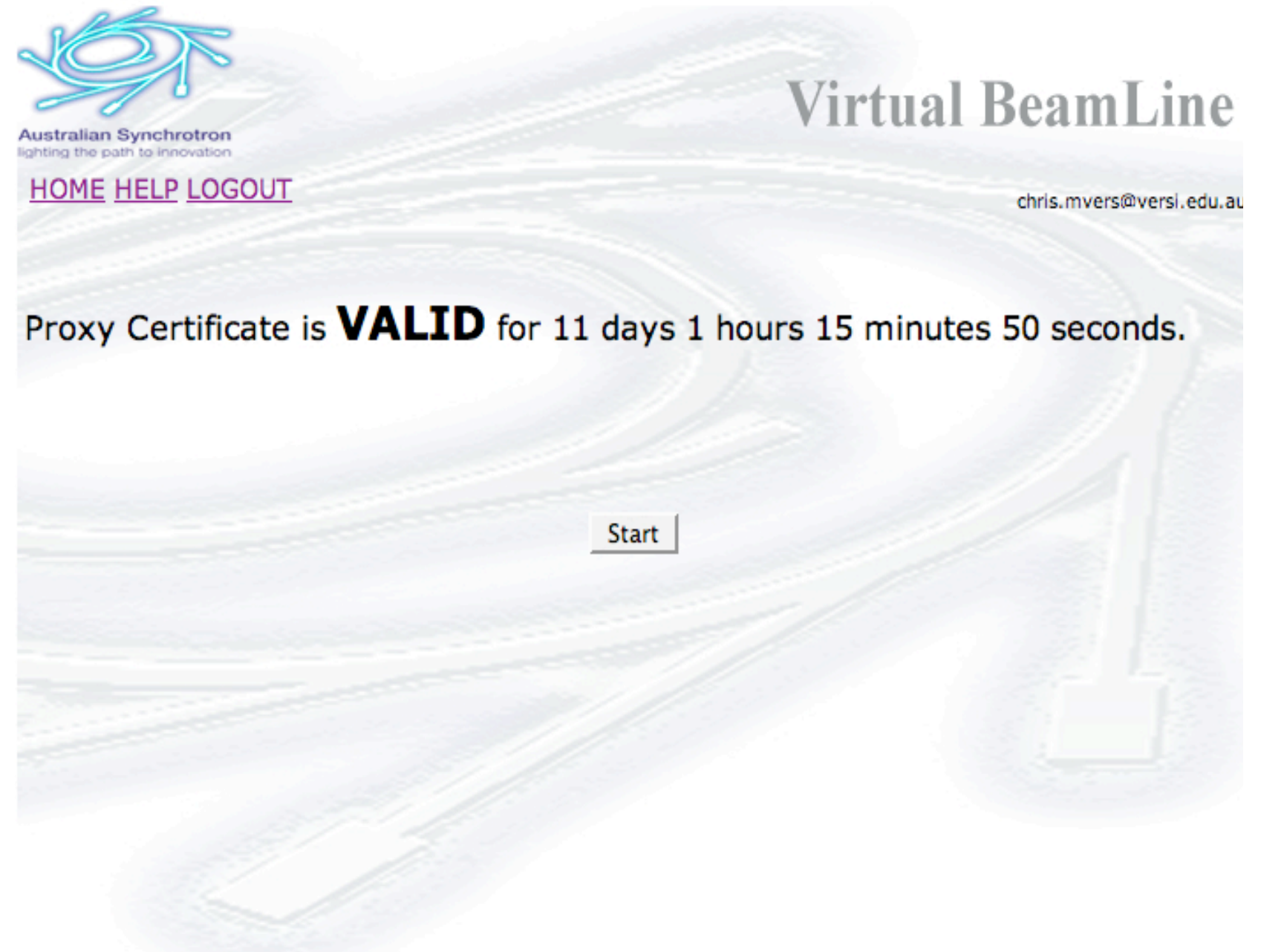
- This menu allows the user to select experiments they have access to and then select the transfer method.
- GridFTP complete.
- SSL complete.
- SRB under test.



The screenshot shows the 'Virtual BeamLine' web interface. At the top left is the Australian Synchrotron logo with the tagline 'lighting the path to innovation'. To the right of the logo are links for 'HOME', 'HELP', and 'LOGOUT'. Further right is the email address 'chris.mvers@versi.edu.au'. The main heading is 'Virtual BeamLine'. Below this, the text 'Select Experiment:' is followed by a dropdown menu showing '12345'. Below that, the text 'Select Transfer Method:' is followed by a dropdown menu showing 'GridFTP' and a 'Submit' button. The background of the interface features a faint, stylized image of a synchrotron facility.

Data Transfer

- If the user selects GridFTP.
- This page checks if the users proxy certificate is valid and how much longer it will remain valid for.
- Proxy certificates are upload via the user preferences area.



Data Transfer

- This is the main transfer page for GridFTP
- Users can drag and drop files or directories

The screenshot shows the 'Virtual BeamLine' web interface. At the top left is the Australian Synchrotron logo with the tagline 'lighting the path to innovation' and navigation links 'HOME HELP LOGOUT'. The user email 'chris.myers@versi.edu.au' is at the top right. The main area is divided into two panels: 'PX1 Storage' on the left and 'My Files' on the right. The 'PX1 Storage' panel shows a directory tree with a 'test' folder containing 26 files named 'OKxtal1_1_001.img' through 'OKxtal1_1_026.img'. Below this list are 'Expand All' and 'Collapse All' buttons. The 'My Files' panel is currently empty and has 'Expand All', 'Collapse All', 'Remove', and 'Remove All' buttons. Between the panels are '>>' and 'Refresh' buttons. At the bottom, there is a search bar, a 'View transfer options' button, and two large buttons: 'TRANSFER FILES NOW' and 'TRANSFER FILES LATER'.

Data Transfer

- Then the users can use a pre-configured download site or just type the name or IP of their GridFTP service.

Monash University

tmp/

View transfer options

-fast	☒		Recommended when using GridFTP servers. Use MODE E for all data transfers, including reusing data channels between list and transfer operations.
-parallel	☒	10	The number of parallel data connections should be used.
-block-size	☐		The size (in bytes) of the buffer to be used by the underlying transfer methods.
-tcp-buffer-size	☐		The size (in bytes) of the buffer to be used by the underlying ftp data channels

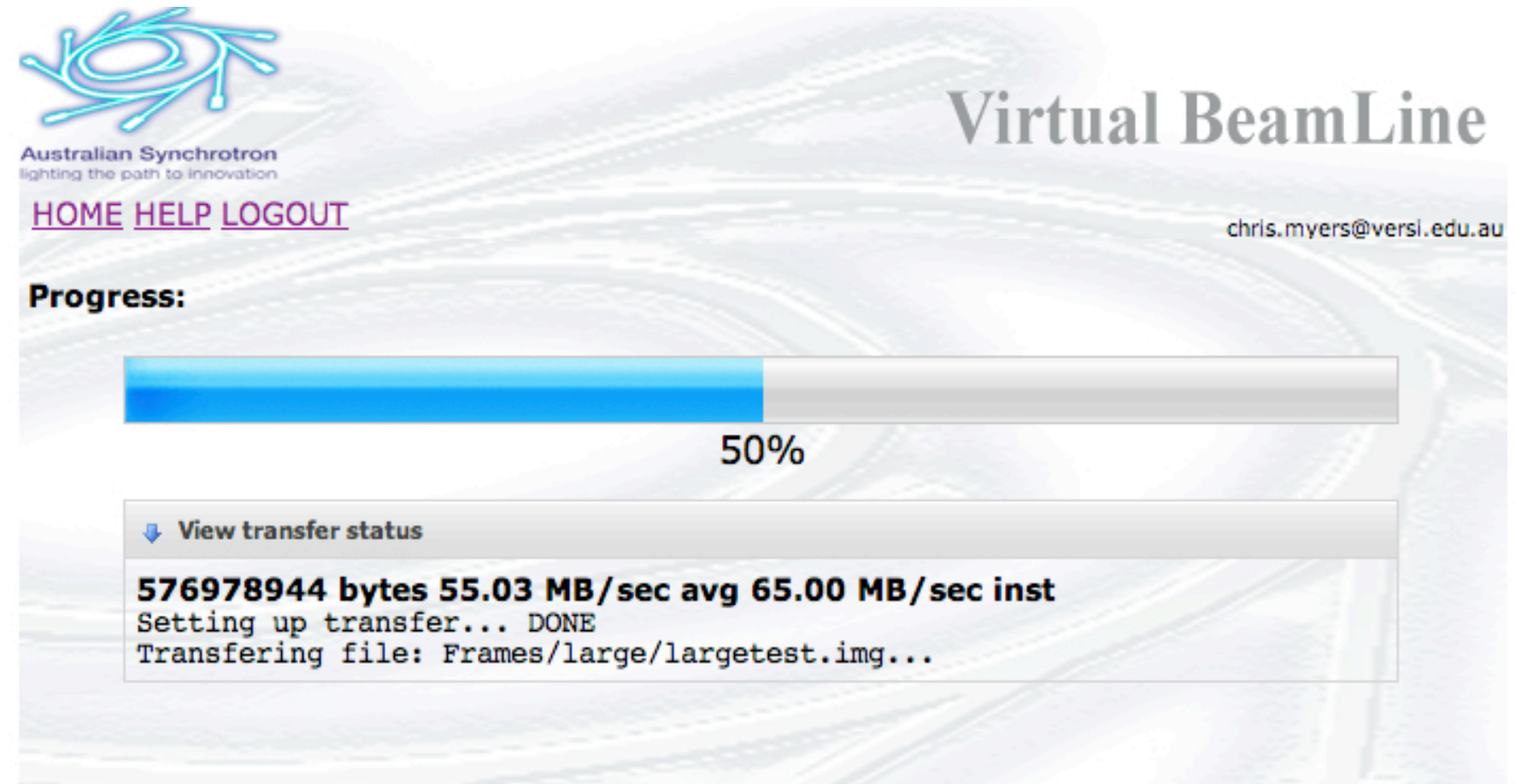
TRANSFER FILES NOW

TRANSFER FILES LATER

- ❑ Advanced options are available.

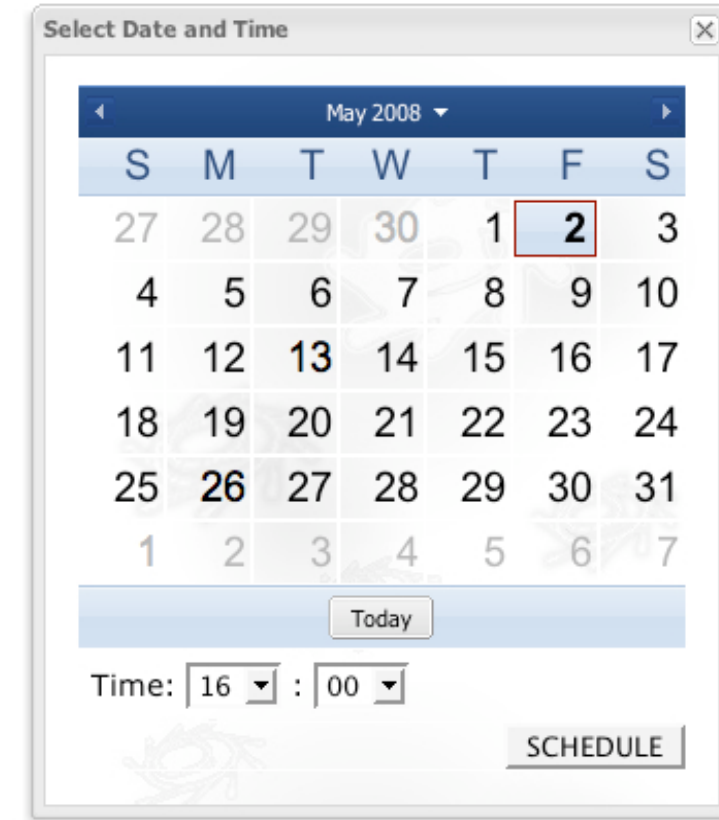
Data Transfer

- Users can transfer now and observe the transfer.



Data Transfer

- Or choose to schedule a transfer for later.



Select Date and Time

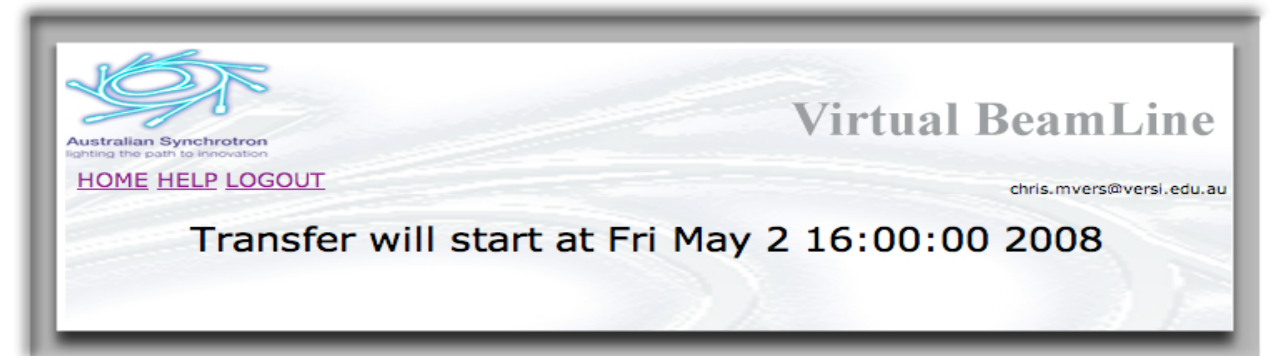
May 2008

S	M	T	W	T	F	S
27	28	29	30	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7

Today

Time: 16 : 00

SCHEDULE




Australian Synchrotron
lighting the path to innovation

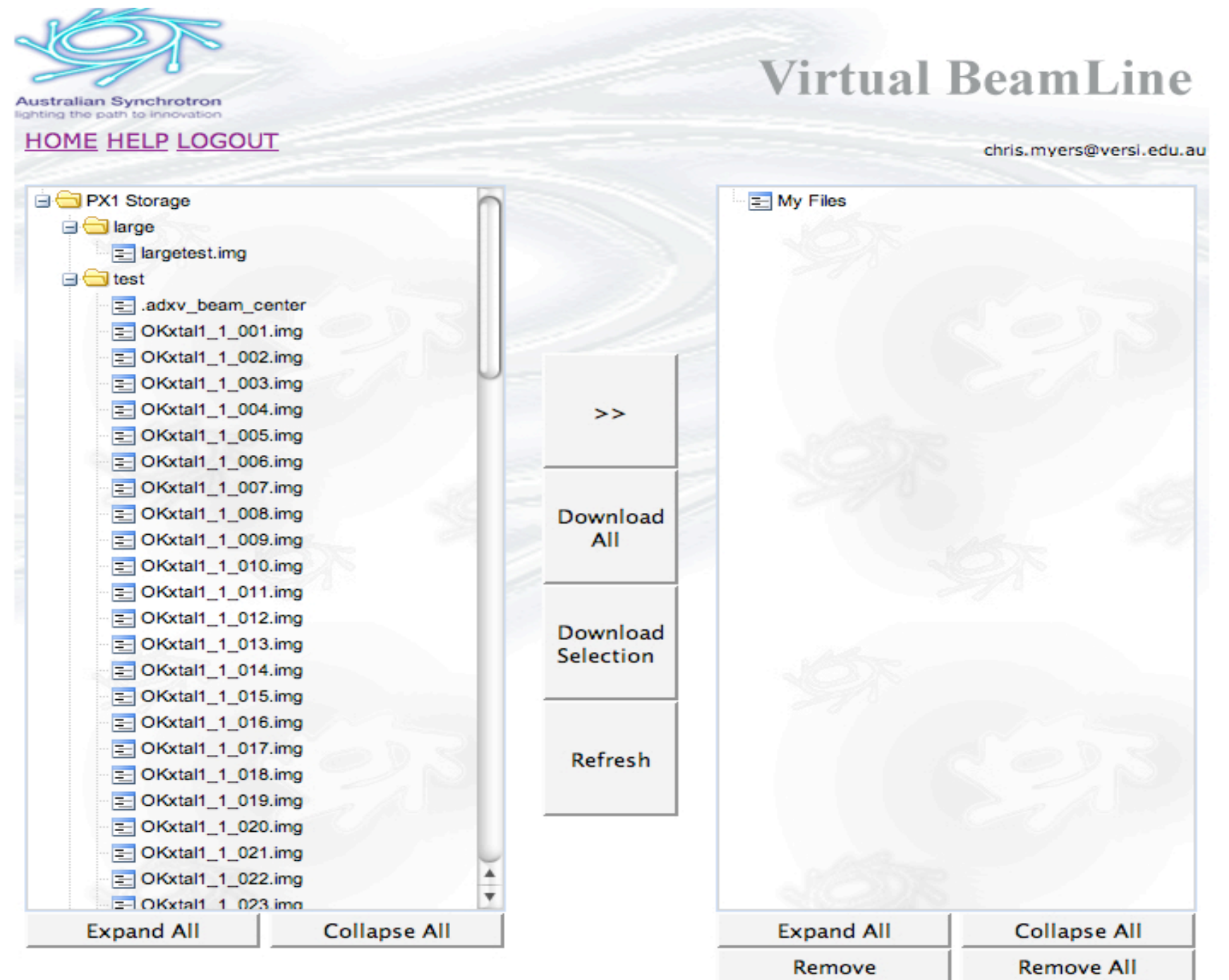
[HOME](#) [HELP](#) [LOGOUT](#)

chris.mvers@versl.edu.au

Transfer will start at Fri May 2 16:00:00 2008

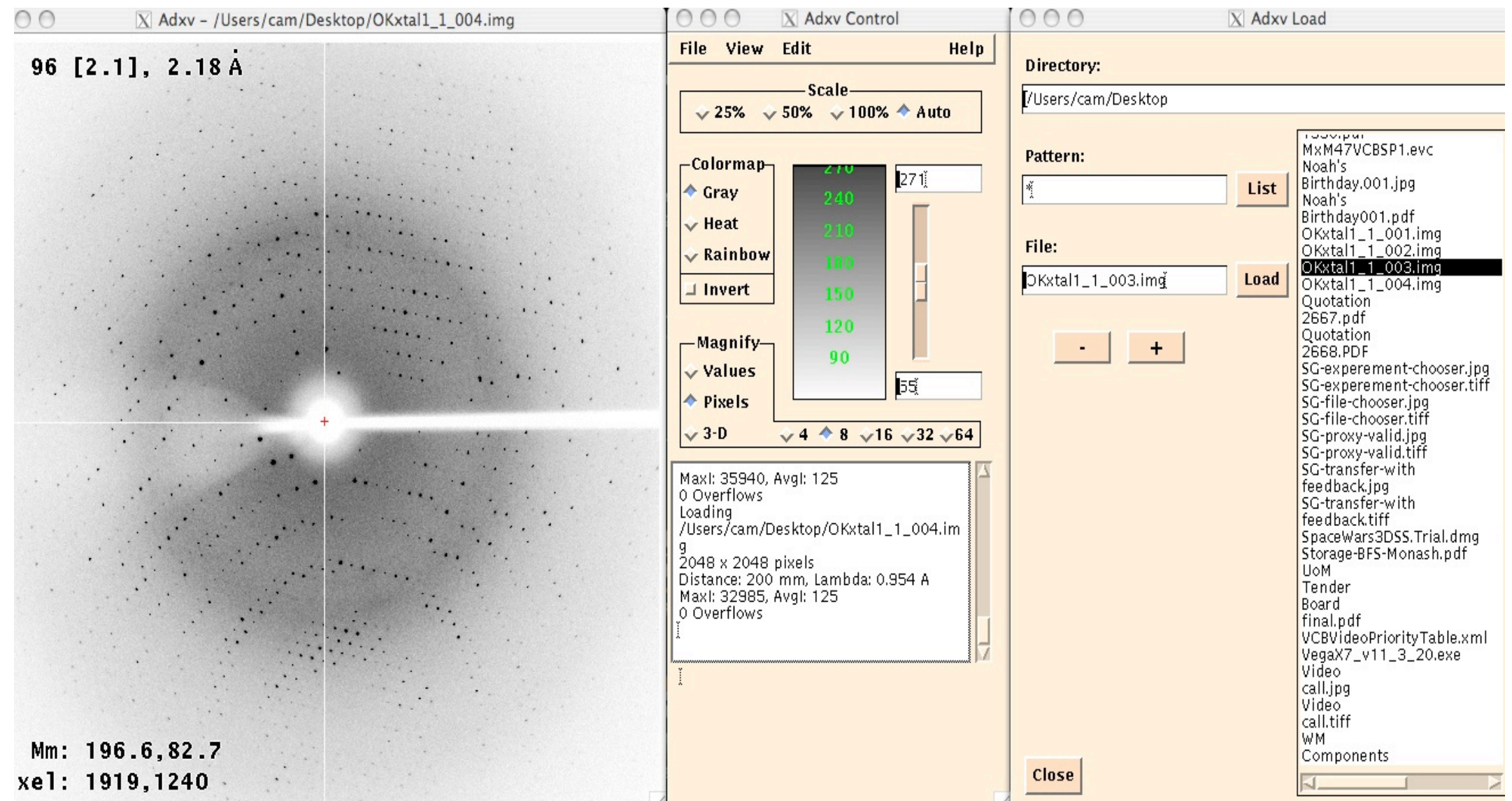
Data Transfer

- This service is available in SSL as well.
- users can drag and drop.
- download all or a selection of files.
- or double click for a single file.



Data Transfer

- This service is all about getting the images back to the users lab for solving faster.

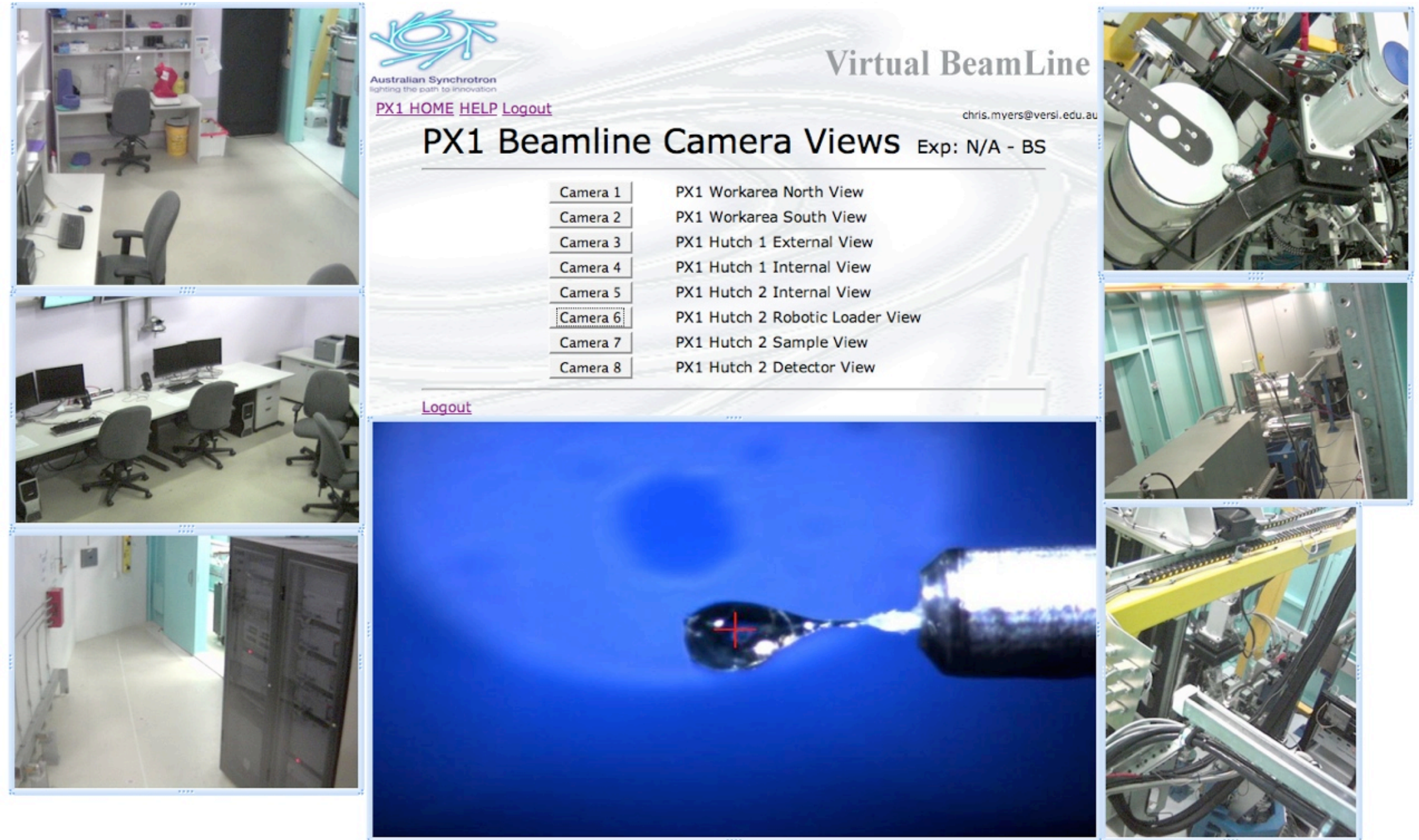


Beamline Installation



Work Area Overview

- Video captured from the PX1 beamline.
- Refreshes every 2 seconds.
- WEB 2.0
- Camera views can be moved and resized.



Virtual BeamLine
chris.myers@versl.edu.au

PX1 Beamline Camera Views Exp: N/A - BS

Camera 1	PX1 Workarea North View
Camera 2	PX1 Workarea South View
Camera 3	PX1 Hutch 1 External View
Camera 4	PX1 Hutch 1 Internal View
Camera 5	PX1 Hutch 2 Internal View
Camera 6	PX1 Hutch 2 Robotic Loader View
Camera 7	PX1 Hutch 2 Sample View
Camera 8	PX1 Hutch 2 Detector View

[Logout](#)

The interface also features six smaller video feeds around the main content area, showing various parts of the beamline facility, including work areas, huts, and robotic loaders.

Video Collaboration

- Aethra Vega X7 H323 Video conferencing unit.
- 720p HD video images.
- Requires 4M bandwidth.
- enterprise reliability.
- VCBpro HD 12 port MCU deployed.
- VpointHD soft clients deployed and managed by MXM.



Video Collaboration

- Full web control integration.
- Displays Call Status.
- Allows camera selection local and remote
- Pan tilt functionality local and remote.
- Dual video.

 Australian Synchrotron
lighting the path to innovation

[HOME](#) [HELP](#) [LOGOUT](#)

Virtual BeamLine

chris.mvers@versl.edu.au

PX1 Video Call

Call Status: idle

Number:

7 8 9

4 5 6

1 2 3

0

` ~ ! @ # \$ % ^ & * () +

Q W E R T Y U I O P [] { } =

A S D F G H J K L ; : ' \ _ -

Z X C V B N M < > ? , . /

C



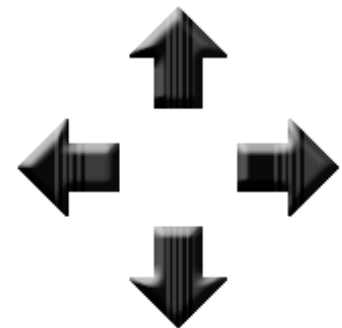


Camera Control:

Site:

Video Input:

Pan/Tilt



Zoom



Conference Pin:

7 8 9

4 5 6

1 2 3

* 0 #

Video:



Audio:

-  +

Dual Video:

 Video Conference Unit Reset:
Only use this if Unit fails to function.

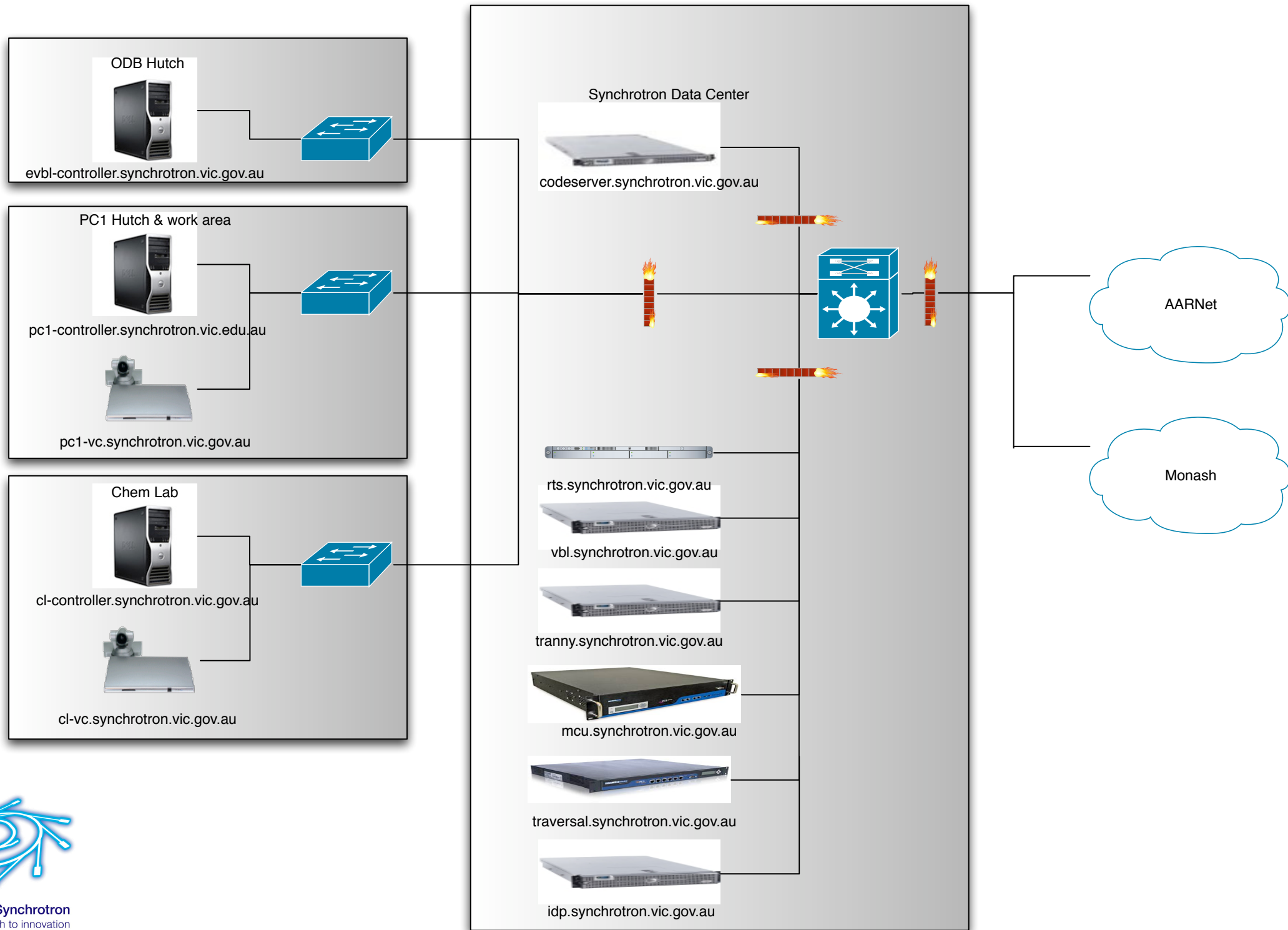
Remote Control

- PX1

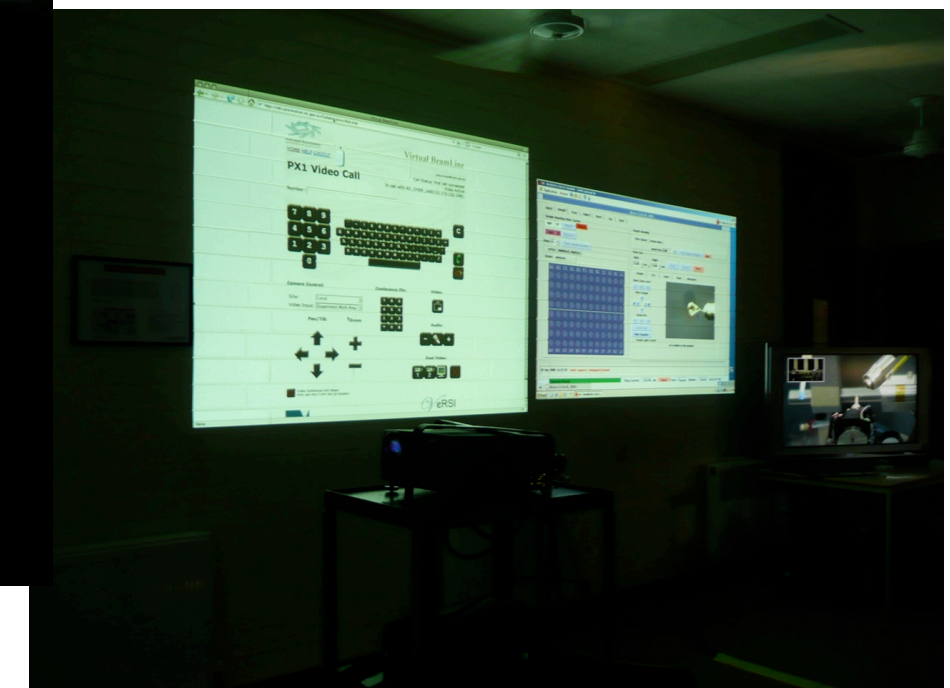
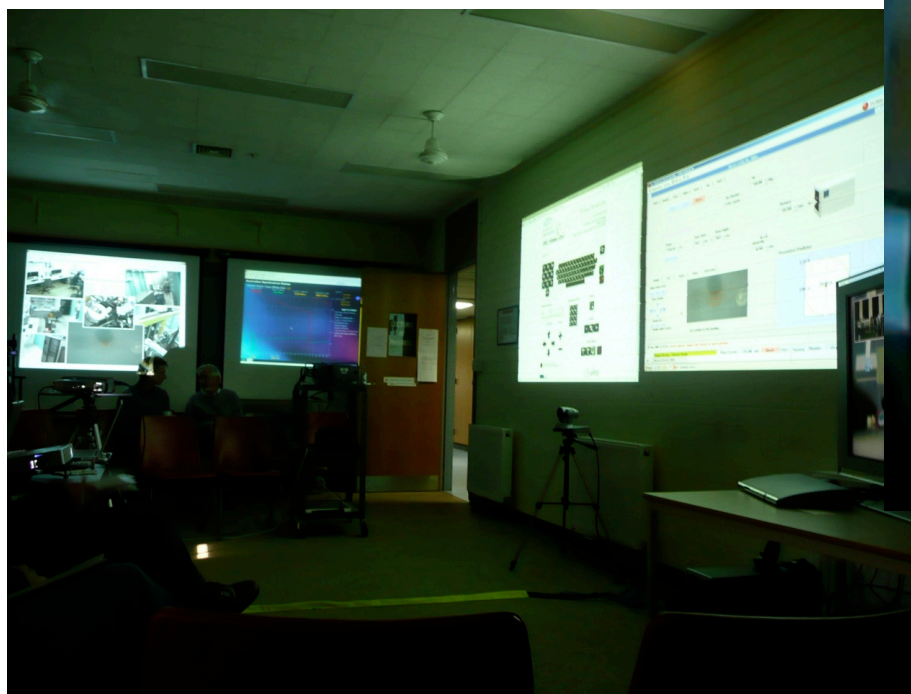
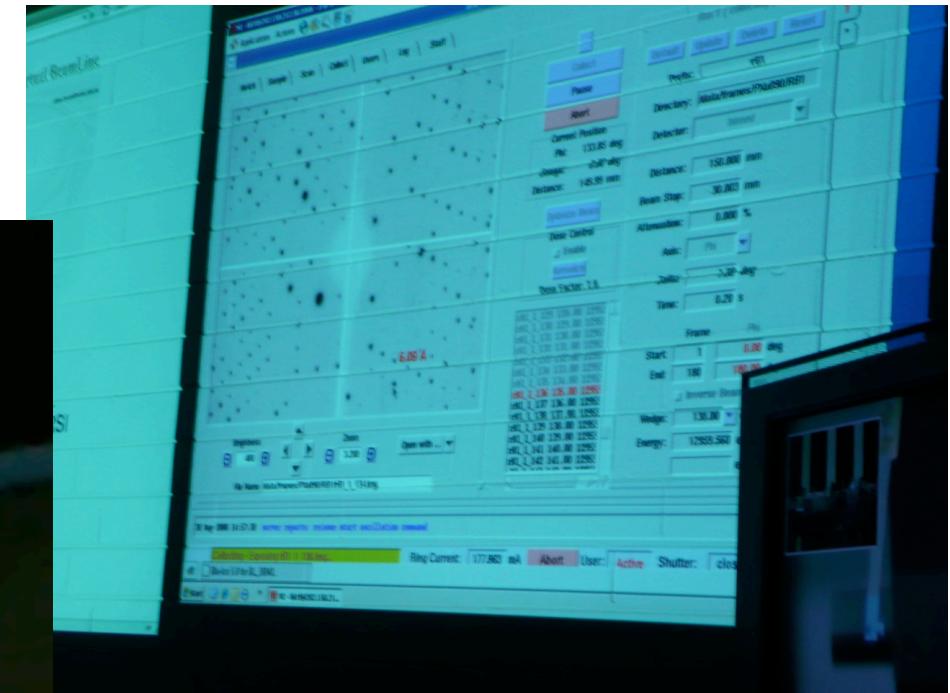
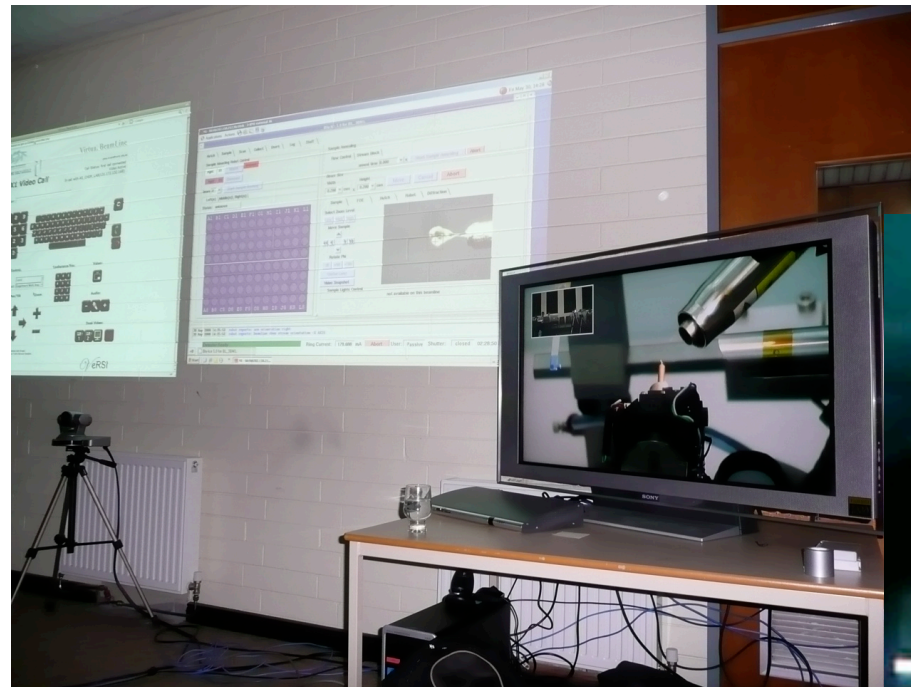
- Remote control has been developed by the beamline scientist's under Dr Adam's of the Australian Synchrotron using no machine and enabling the remote user to have full control via the blu-ice control interface.



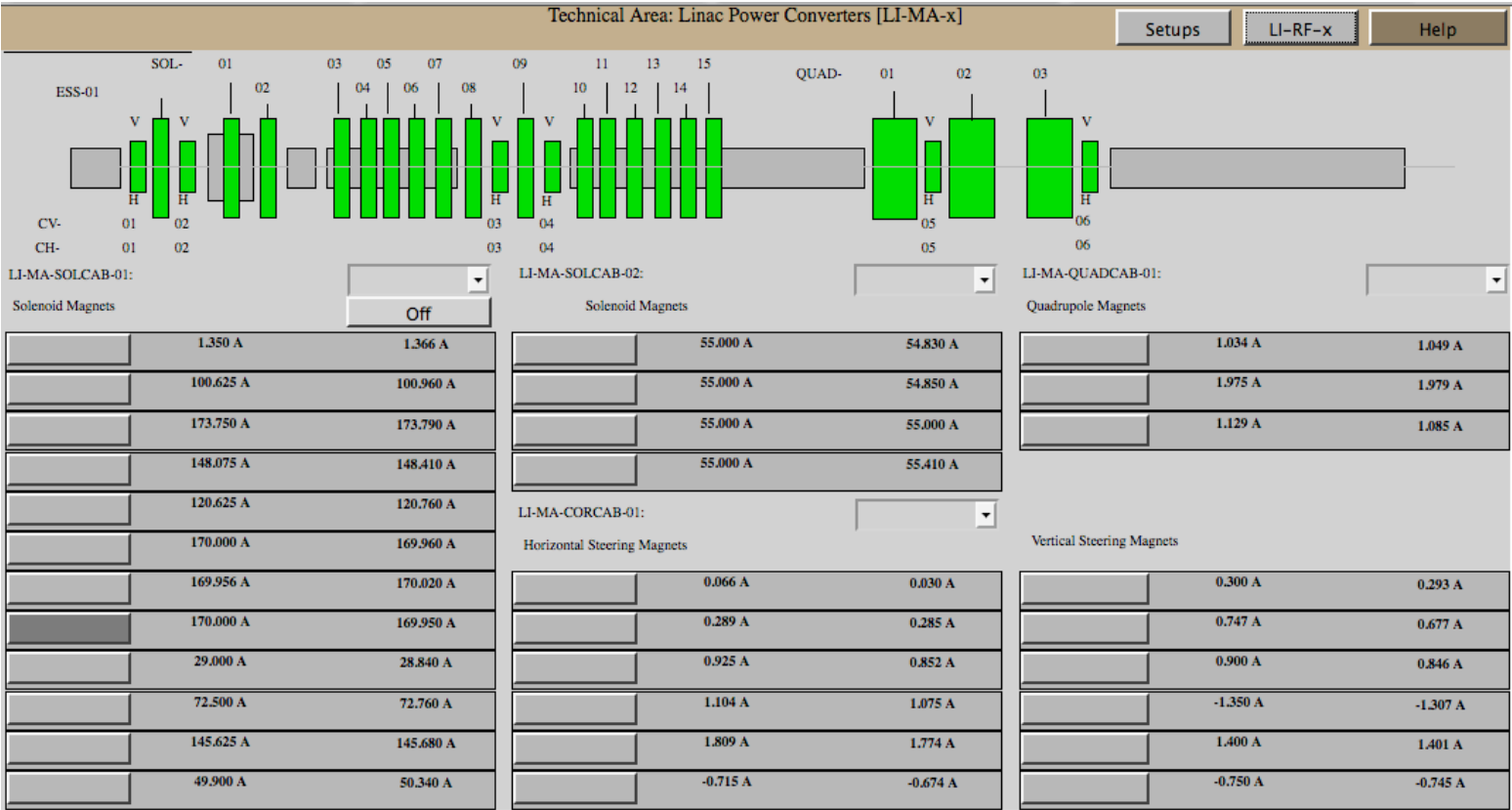
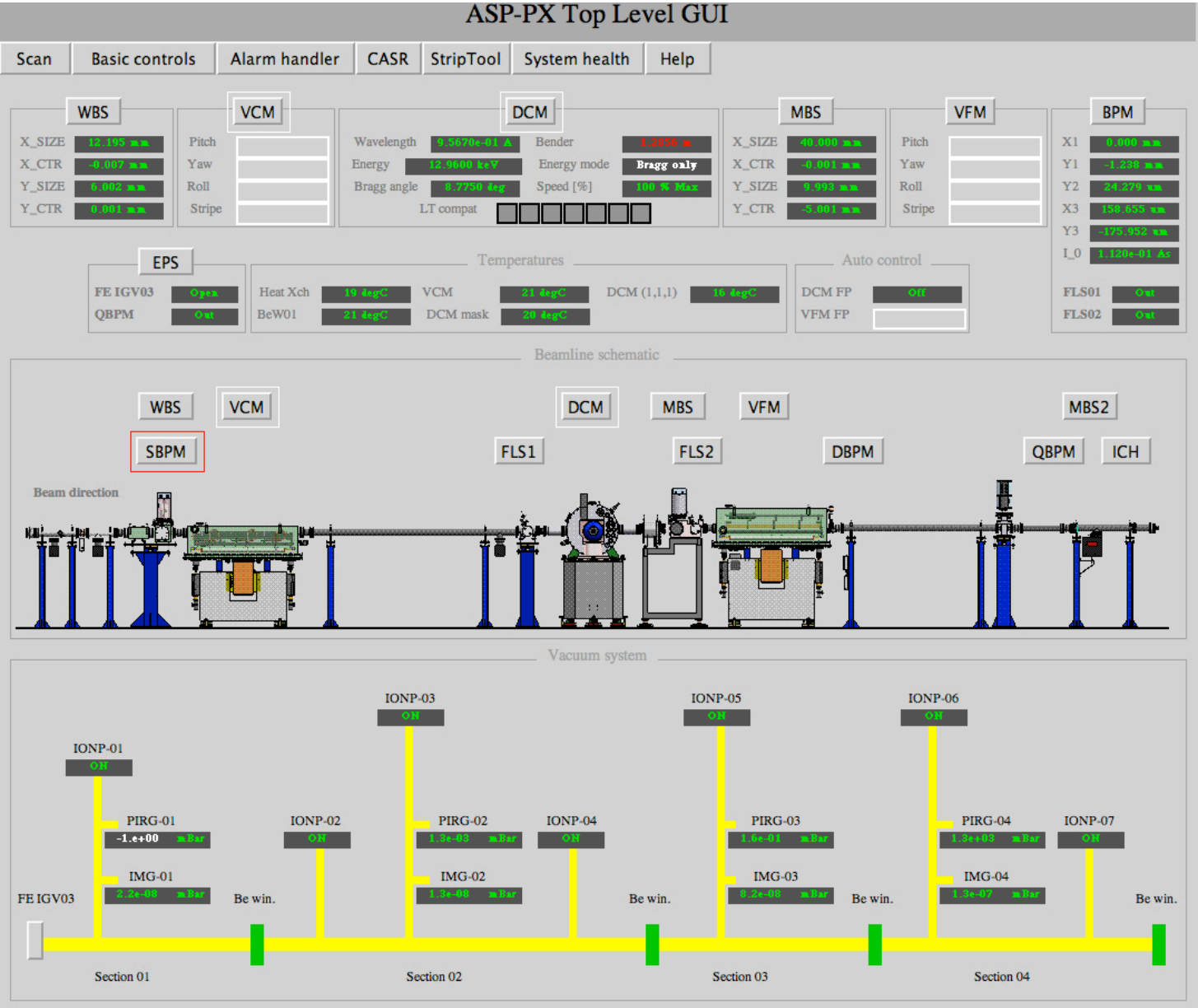
System Deployment @ Australian Synchrotron



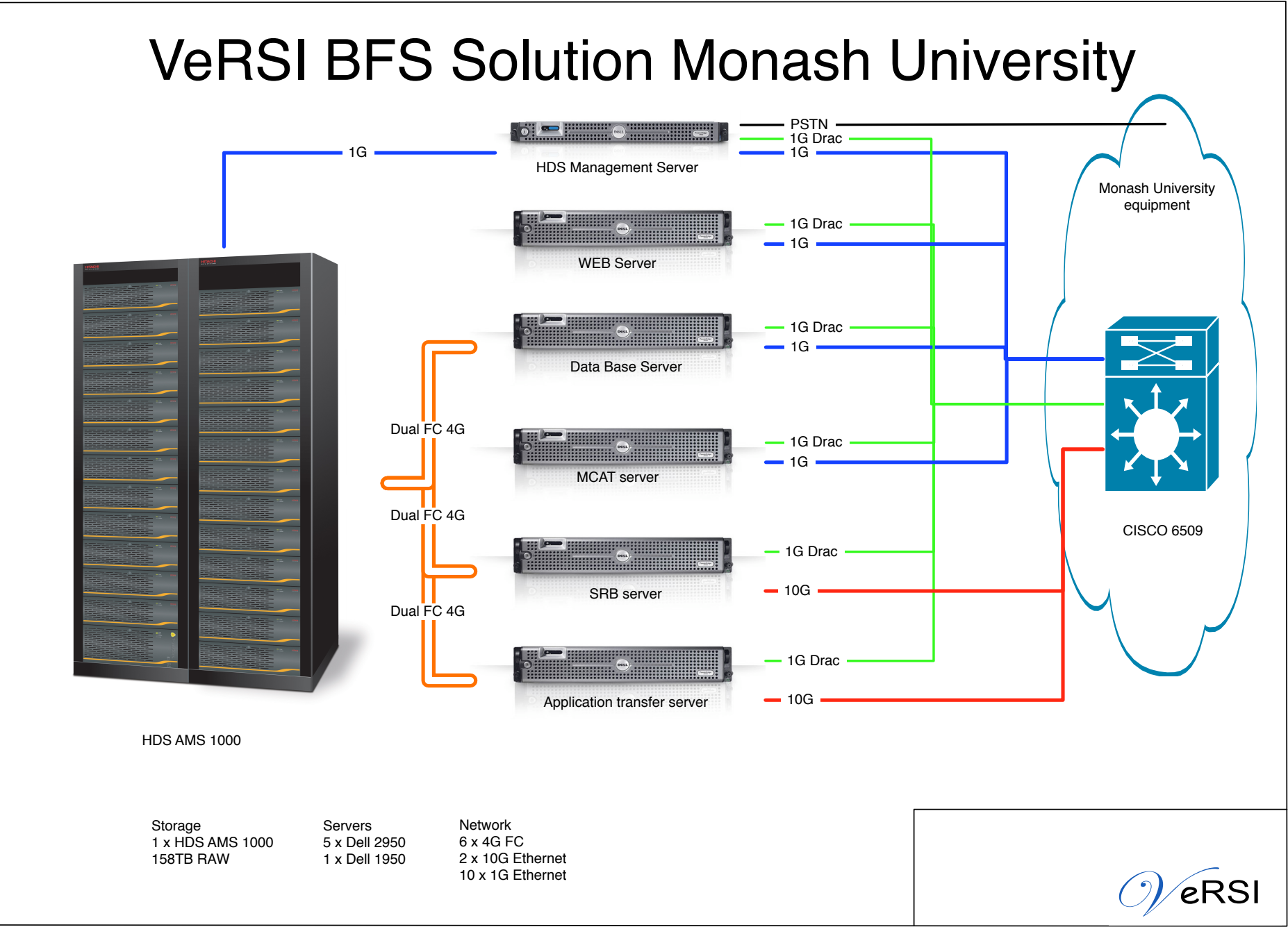
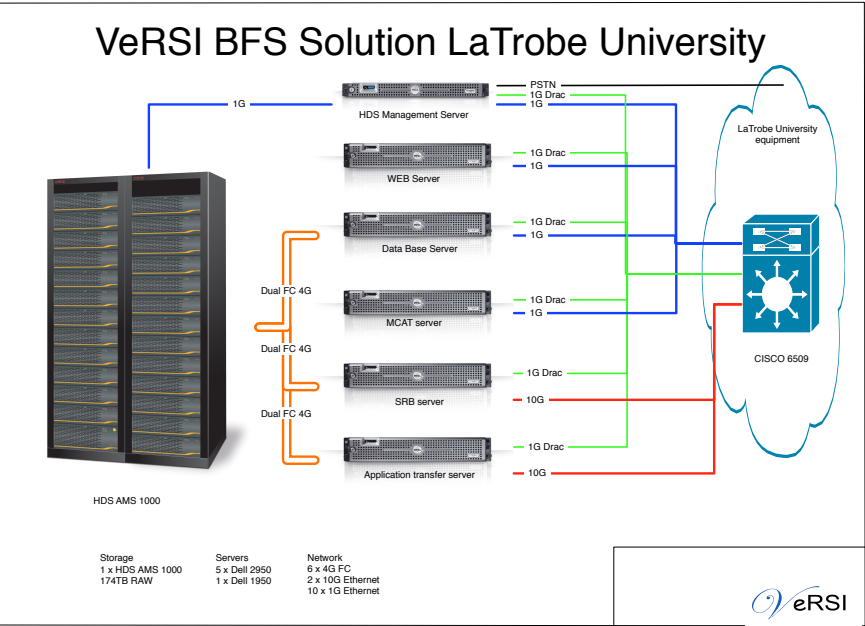
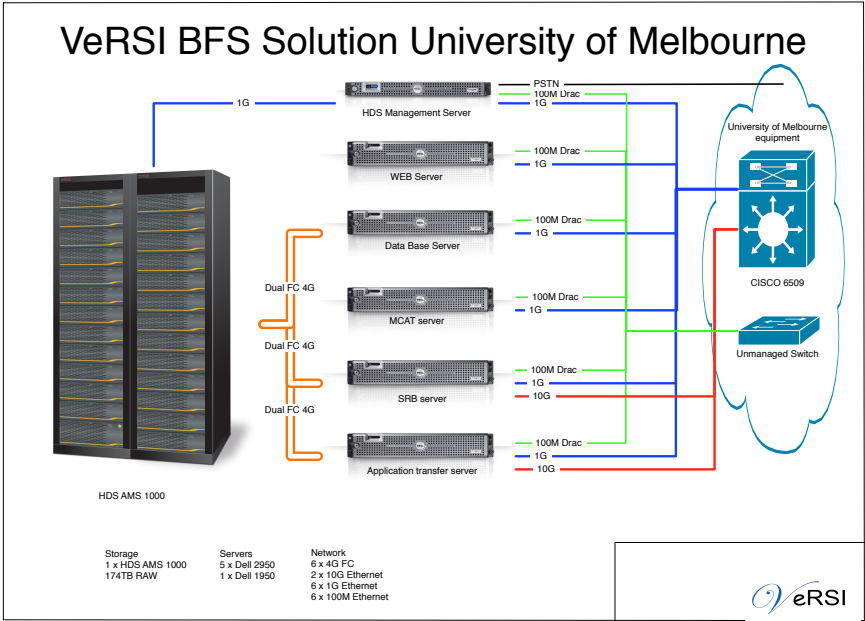
So What's Next - Demonstration to User Groups



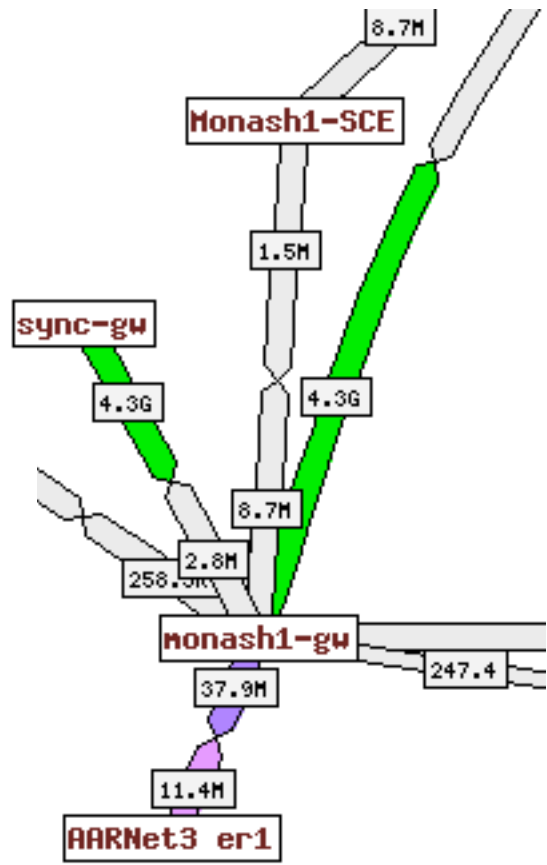
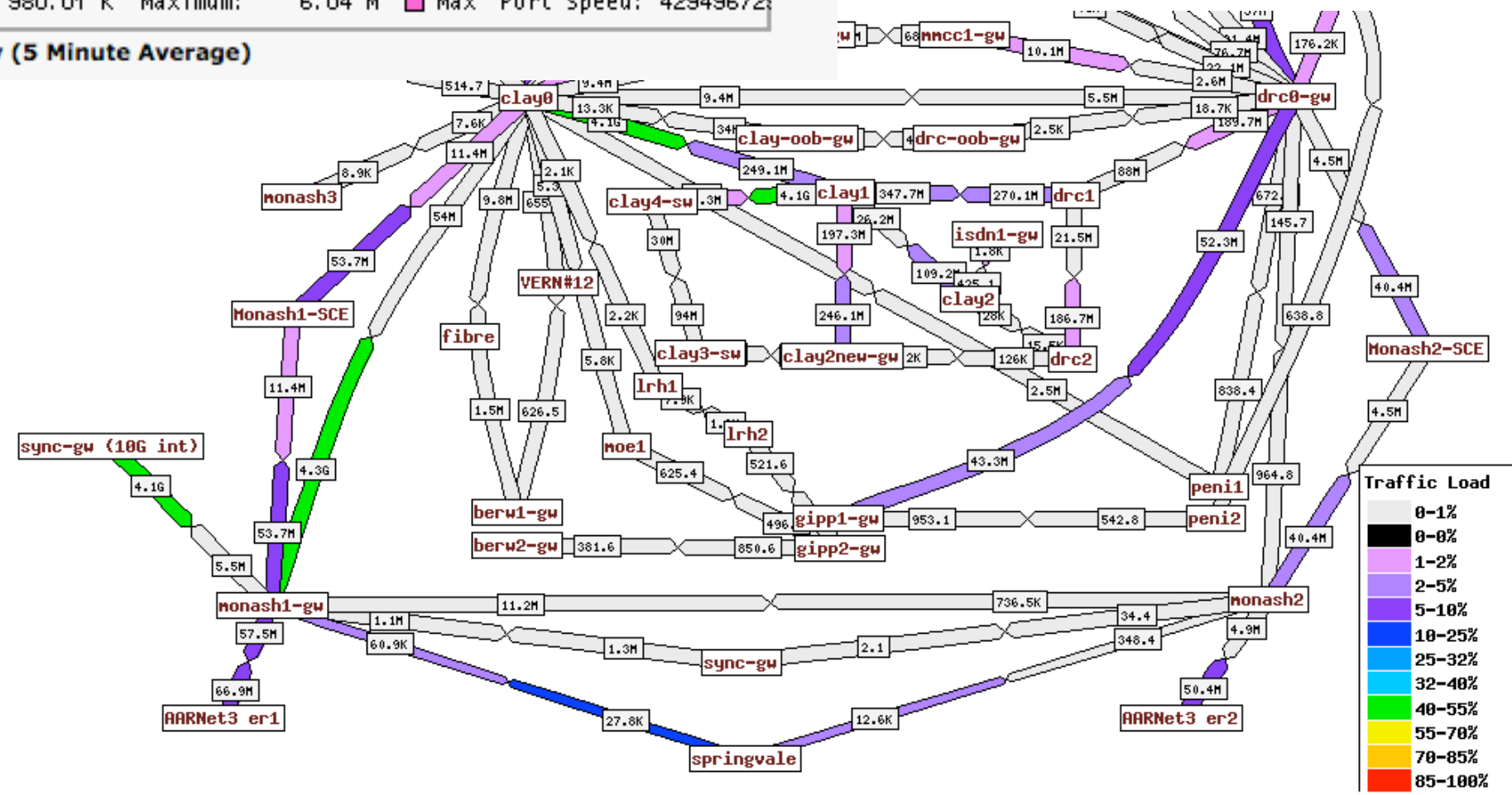
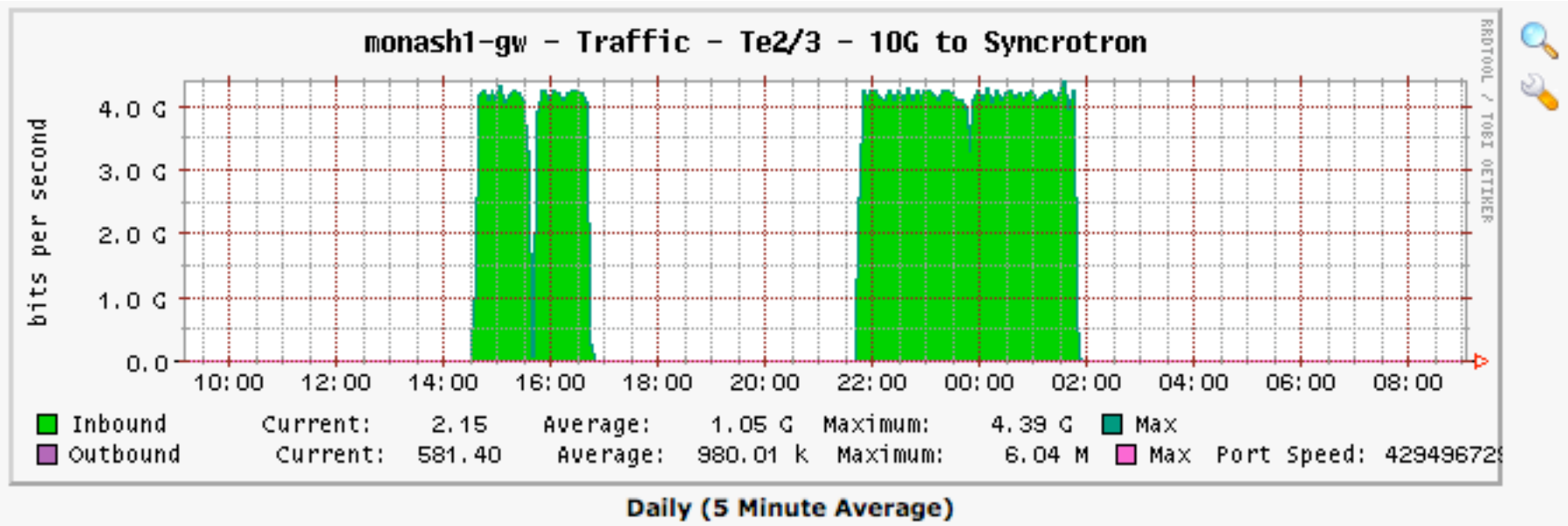
So What's Next - Web based EDM Screens



So What's Next - Secondary Grid Storage using SRB



So What's Next - High capacity data flows to Monash on new 10G private link



Thanks

- MMV - Victorian Government
- Australian Synchrotron
- With special thanks to
 - PX Team under Dr Adams
 - Controls/network Team under Richard Farnsworth
 - Electrical engineering Team

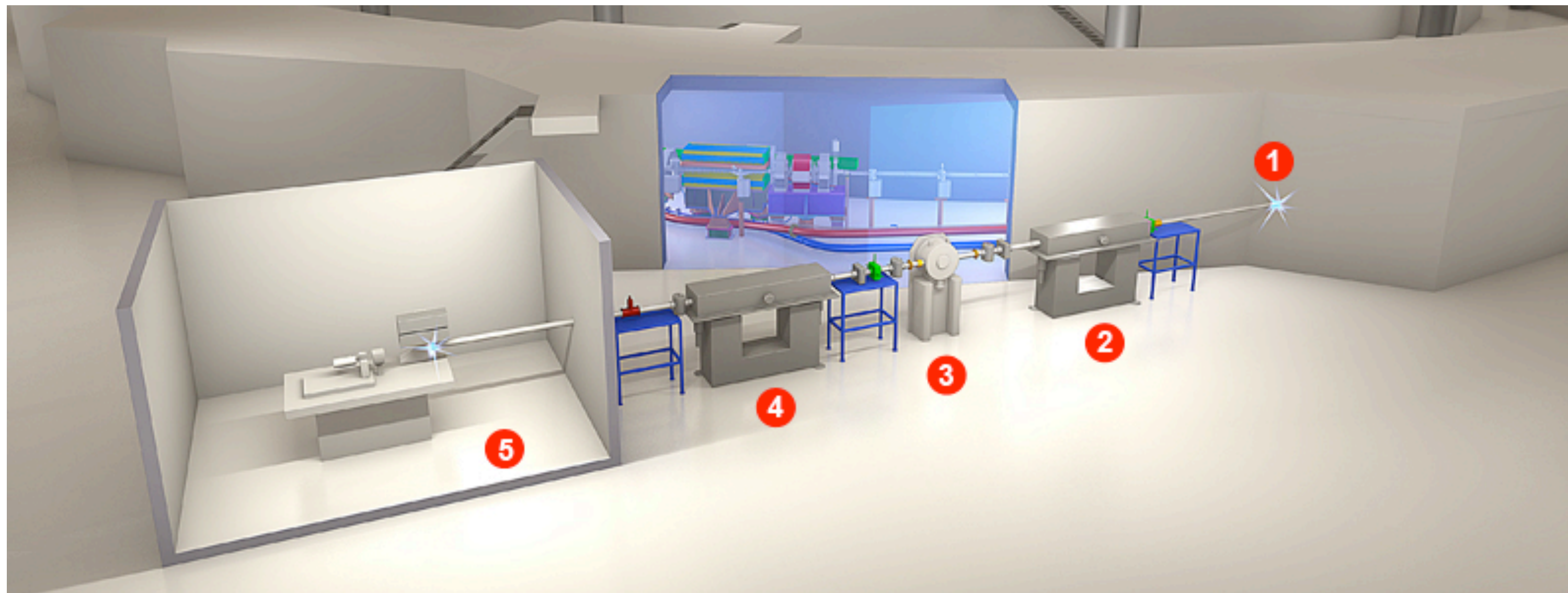
● Corporate



Thanks
Chris Myers
chris.myers@versi.edu.au

Please Note: All software developed
by VeRSI for the VBL Project is open
source.





Demo Time

