

OPERATOR ROLES AT THE AUSTRALIAN SYNCHROTRON

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Abstract

The Accelerator Operators at the Australian Synchrotron undertake a wide variety of critical functions as part of their regular duties. In addition to normal Control Room duties, they play a major Role in Machine Physics, provide after hours support for Users on Beamlines and contribute extensively to the Controls and Database Development across the facility.

OPERATIONS AT THE AUSTRALIAN SYNCHROTRON

The Australian Synchrotron (AS) has been in User Beam Operation for 8 years. It comprises a 3GeV electron storage ring with a full energy injector. Top Up Operation commenced in 2013 and there are currently 10 beamlines. The yearly schedule includes 5000 hours of User Beam and 2000 hours of Machine Development and Physics.

Operator Rostering

Operators are rostered to cover 24 hours a day, 7 days per week. Two Operators are rostered on each shift and work a 12 hour 7 day on, 7 day off, 7 nights on 7 days off rotating roster. The Operators find this particular roster rotation works extremely well. It features minimal shift changes, every second weekend off and sufficient time to prepare for and recover from the night shifts. For 75% of the week the Operators are the only AS staff regularly on site and they play a key role in the delivery of great science.

Diversity of Tasks

Since commencing Top Up Operations and the provision of uninterruptible power to the Storage Ring, RF and the Conventional Facilities, minimal Operator intervention is required to maintain stored beam during User Operations.

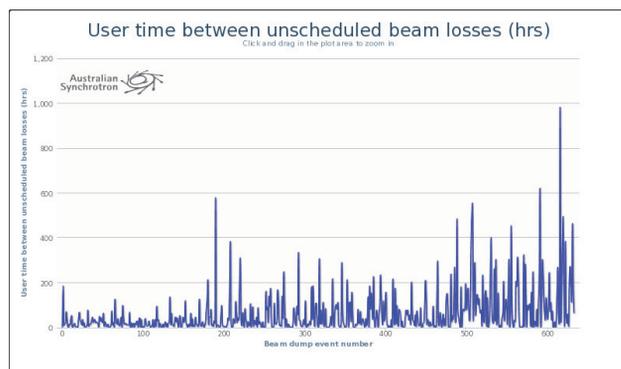


Figure 1: Reliability improvement of operation indicated by the increasing times between unscheduled beam trips.

The reliability of operation of the Australian Synchrotron (see Figure 1) is demonstrated by the recent delivery of 982 hours of User Beam without an unscheduled beam loss event. Some time is still required for dealing with minor trips, tuning, fault diagnosis and recovery but most Operator time is devoted to other activities and projects.

Operator Projects

Some of the Operator Projects include:

- The development of an Electronic Log Book
- Maintaining the Facility Statistics and KPI's.
- EPICS, Database and Web page maintenance
- Design and construction of a Tunnel Robot
- Development of Environmental Monitors
- Improvement to Beam Diagnostics
- Auto-tune Routines for the Accelerators

A key Role the Operators now undertake is to provide "After Hours Support" to Users on Beamlines.

After Hours Support for Users on Beamlines

Beamline Science staff provide support for Users between 8:00 and 18:00 Monday to Friday and are rostered on call weekends and until 22:00 each night. At other times the Operators provide the User support. Furthermore any requests for on call User support is provided through the Control Room. This has been a very successful undertaking with the Operators now handling around 70 User support calls each month.

Operators have been formally trained on a number of beamlines and are able to apply their machine problem solving skills to assist with fault resolution and training on beamlines.

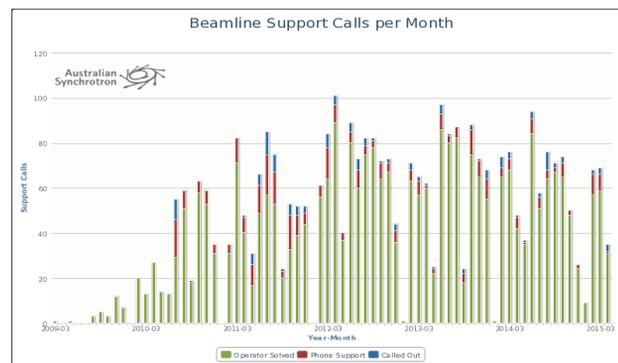


Figure 2: Graph showing the number of beamline support calls per month handled by the Operator.

It can be seen in Figure 2 that the number of support calls handled by the Operators grew over the first couple of

years and has stabilised at around 70 per month. Furthermore the number of occasions where beamline Scientists have needed to be phoned or called in has steadily declined. This User support is appreciated by Users and Beamline Scientists alike, as the Users obtain high quality support and Beamline Scientists are able to maintain good Work-Life balance.

Figure 3 illustrates that the Operators developed skills over the first two years of the program and are the number of times that they need to call on the skills of the Beamline Scientists continues to decrease. A further benefit of the Program is that the Operators have captured much of the knowledge and skills required to solve problems on the beamlines in the beamline Electronic Log books. These are a part of the Operator developed log books for the machine and are providing an ever increasing knowledge base of the history and daily operations of both the machine and Beamlines as illustrated in Figure 4.

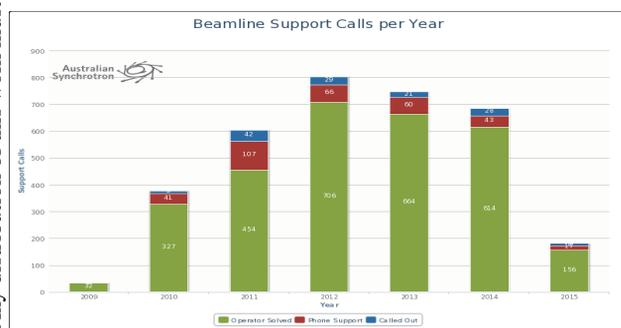


Figure 3: Graph showing the decreasing requirement for Operators requiring specialist assistance to solve problems for Beamline Users.

Examples of Beamline Support Calls

Typical requests for Beamline support provided by Operators include:

1. Changing Gas Bottles, refilling cryogenes,
2. Restarting IOC's & resolving Data collection Issues
3. Resetting Motion Control Systems
4. Loading/Unloading sample cassettes for users
5. Resolving Detector issues
6. Password and Access issues
7. Simple Experiment Configuration Changes
8. Resetting Equipment Interlocks
9. Loss of Signal Intensity
10. Noise or Artifacts in Spectra
11. Sample/Beam Alignment
12. Commissioning/Monitoring
13. Stocking the Vending Machine

14. User Training and Inductions
15. PSS – searches, trips, events, shutters etc
16. Facilities – Alarms from Oxygen, Labs, LN2 etc.

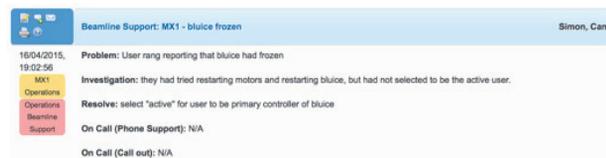


Figure 4: An eLog entry showing a common fault resolution for the MX beamline data collection.

Conclusion

The Operator Roles at the Australian Synchrotron have developed with the maturing facility and the Accelerator Operators now provide excellent skilled support for Users on Beamlines. The increased support by the Operators is broadly appreciated by both Users and Beamline Scientists and contributes significantly to the excellent scientific output of the facility.