Controls Action Plan

NSLS-II management held an external review of NSLS-II Controls Program areas for Beamline Controls and for IT Infrastructure. This covers the technical support and operation areas, and took place on 30-31 January 2018. The review was made up of presentations by, and discussion sessions with NSLS-II staff. The committee members for IT Infrastructure were Kevin Brown – Relativistic Heavy Ion Collider, Brookhaven National Laboratory, Andrew Ferguson – ITD, Brookhaven National Laboratory, Daniel Flath – Linac Coherent Light Source, SLAC National Accelerator Laboratory, Nick Hauser – Australian Nuclear Science and Technology Organization, Mark Heron – Diamond Light Source and John Maclean (Chair) – Advanced Photon source, Argonne National Laboratory. The committee members for Beamline Controls were Jen Bohon – Case Western Reserve University (NSLS-II UEC/SAC), Kevin Brown – Relativistic Heavy Ion Collider, Brookhaven National Laboratory, Daniel Flath – Linac Coherent Light Source, SLAC National Accelerator Laboratory, Nick Hauser – Australian Nuclear Science and Technology Organization, Mark Heron – Diamond Light Source and John Maclean (Chair) – Advanced Photon source, Argonne National Laboratory. Their comments and recommendations form the foundation for this action plan.

IT Infrastructure

Recommendation 1.1:

Establish bi-directional communication with stakeholders. This should include things such as; regular status update meetings open to all interested staff, meeting with individual beamlines to listen to their issues and needs, satisfaction surveys when tickets are closed etc.

Actions:

1/ Initiate regular Town Hall meetings;

2/ Regular internal newsletters; 2a/ Regular contributions to NSLS-II newsletters

3/ Survey feedback from users with end of run surveys;

4/ Regular scheduled I.T. meetings with Beamlines;

Timeline or Milestones:

Town Hall meetings on monthly basis: First Week of the month. Dunn Room.
Newsletter issued regularly

Beamline/IT meetings held fortnightly

End of run comments related to controls will be forwarded by the PASS administrator as they are received. Satisfaction surveys cannot be explicitly made until the PASS system is upgraded (Potentially Fluid review (ref: Lisa Miler).

Recommendation 1.2:

Establish and adhere to process for areas such as configuration management, incident response, change management, release management.

Action:

The procedures for configuration management, incident response, change management, release management are to be written. Rather than writing procedures from scratch, procedure documents from ITD have been requested in order to align NSLS-II process with Lab processes and policies. Then we will document local variations.

Note: There is a procedure in place for using Trac, this will form part of the Incident response plan.

Note: Should ITD not have appropriate existing procedures, the SBMS also has a number of procedures that can be modified.

Assessment: The current processes for Configuration management are poor and undocumented, some work is required. Incident management requires a procedural approach, with notifications being properly defined. Change and release management uses a tool called Puppet, but the process requires documentation.

Timeline or Milestones:

Revised Drafts due:
Configuration Management 7th July
Incident Management: 21st July
Change and Release Management 10th September,

Recommendation 1.3:

Make all documentation available to stakeholders so that they can help themselves, e.g. a catalog of what services the group provides, self-help "how-to's", standards to be followed. Put it in the NSLS project standard location where it is easy for people to find.

Action: Establish an up to date repository for self-help and informational documentation. There is such a repository in existence which will be further developed.

Self-help for the following will be included:
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1/ Account self help – Password reset, control accounts,

2/ Remote Access – to be extended. Use of SSH, NX etc

3/ Backup documentation – What is being backed up, frequency, how to recover data and what to not expect. How to request recovery of data.

4/ Workarounds for known issue – e.g. GPFS workarounds, NFS issues

5/ How to log problems for later resolution (Trac self help). Using Email with Trac, how to look at existing issues, how to follow an issue. How

6/ External (ITD) problems.

7/ Escalation guidelines. Off-hour response, who and how to call. what not to escalate.

8/ Fault finding tools. Performance screens ping and trace tools. Gathering data

9/ PASS issues

Commentary: The ITD pages can be copied in part to help. They have a useful format.

Timeline or Milestones:

Aim to complete by 1 August 2018

Recommendation 1.4:

NSLS IT staff should make use of the extensive IT knowledge at BNL. To leverage this institutional knowledge, BNL should establish an IT working group consisting of technical staff from around the lab.Increase transparency with the rest of lab to operations of NSLS-II.

Action: Form an IT steering group with ITD representation, and other stakeholders; develop charge for the steering group.

Timeline or Milestones: Ongoing. An IT steering group consisting of the following has been established. They meet regularly. A charge has been drafted and will be refined.

Garth Williams (Chair)
Tony Wong (RACF)
Nick D'Imperio (CSI)
Stuart Wilkins
Stuart Campbell
Andrei Fluerasu
Andrew Ferguson (ITD)

Recommendation 1.5:

The financial model proposed for use of CSI resources needs to be negotiated at the level of upper management and made more favorable to NSLS II. If it is more cost effective to use cloud resources instead of CSI, BNL management needs to pursue how to bring the local cost down and made viable to NSLS II operations.

Action:

NSLS-II management will evaluate options presented by facility director's working group, compare with current CSI business model, and decide path to pursue.

Timeline or Milestones: Evaluations completed by 1 June 2018; longer term roadmap established by 1 August 2018.

Recommendation 1.6:

It is recommended that the NSLS-II IT group de-scope by offloading selected services to other parts of Brookhaven National Laboratory. The group is currently spread thinly and is trying valiantly to provide many different services. Examine which of these services the group must provide and which could be provided by different means. Consider what services the facility must provide from internal resources and which of these have to be provided by the IT group. Look for opportunities to offload other work from the IT group. Examples include;

- Database administration to be transferred to the DAMA group and ITD
- Enable stakeholders to help themselves and not have to rely on the IT group. This would include making documentation available to them
- Utilize other resources at the lab for specialized expertise and for staff augmentation for specific tasks
- Standardize on one version of Operating System (the committee heard that there were 3 versions of Debian being supported).
- It was not clear that there was any vendor support for Debian. Consider moving to an OS where vendor support is available, for example RHEL.

Action: A Database admin set of requirements will be drafted. Action as to the appropriate transfer of responsibilities will depend on the identified requirements.

Similar, a set of requirements for the delivery of non-traditional IT services will be defined. This will include provision of "Jupyterhub" and similar services.

Timeline or Milestones:
Database Admin – 1-Jun
Other services 1-July.

Recommendation1.7:

Work with ITD to deliver on critical unsolved issues e.g. IP address space management, NFS performance, GPFS tuning.

Action: Initiate closer interaction with ITD. Plan regular individual meeting with targeted ITD staff for status updates and to establish better 2-way communications.
Action Plans : Plan for Routable network
Plan for GPFS configuration
Plan for Server (BL) configurations

Note: This also iuncludes a workplace cultural issues. There has been a "silo" mentality at the NSLS and NSLS-II and a history of poor performance by ITD that exacerbates the situation.

Timeline or Milestones: Ongoing. We have called for ITD assistance with NFS. We are working closely with ITD on the SSO issue, which also raises issues with IP addressing.

SSO – Originally May 2018, now deferred to August 2018 due to technical issues. May be possible to introduce earlier on selected beamlines. SIX has volunteered.

Recommendation 1.8:

Take more advantage of COTS software packages and the vendor support that is available to support them.

Action: Determine possible candidates for COTS solutions: Cots Packages/functions should include

PASS
Operating Systems
Network data appliances (Appliance NFS servers)
Performance Monitoring
Help desk systems (COTS DOE package is called "Service now"

Timeline or Milestones:

1. Produce a list of possible COTS solutions by 1-July
2. Cost the list 1-August
3. Cost benefit analysis 1-September
(+ ongoing)

Recommendation 1.9:

Consider that DAMA should be responsible for data management.

Action: (See database issue in recommendation 1.6.) Define an overarching Data management plan. Decide the technology to achieve each step and assign accordingly.

Commentary: Data management is a "Catch all" phrase for the full lifecycle data collections, short term, long term, archival.

Timeline or Milestones: 1-Aug for overarching Data management plan
1-July for Org chart changes

Recommendation 1.10:

Senior NSLS II management should consider options to add additional staff to the IT Group along with greater management structure to create time for more effective management of the group. Management effort needs to be spent devising an IT strategy, improving management of group activities and improving the groups interaction with stakeholders.

Action: Author IT strategy. Present to working group and iterate.

Timeline or Milestones: 1-Sept-2018
Preliminary IT "out"resource plan to be presented 21-May

Recommendation 1.11:

Senior NSLS II management should set clear objectives for the IT Group in terms of: technical scope and requirements; use of central BNL IT services and customer engagement.

Action: Refine the WBS dictionary to explicitly call out work performed by this group, and the work planned for BNL ITD

Timeline or Milestones: Complete the dictionary by 15 June 2018

Initial Outsource plan" to be presented ASAP

Recommendation 1.12:

NSLS II Senior Management should recognize the importance of investing in software and computing to sustain the quality, capability and capacity of scientific output of the facility. This should be reflected in the planning and development of the resource model and the importance of such investment may need to be communicated to funding authorities.

Action: Continue to refine the staffing model and communicate needs to NSLS-II sponsor.

Timeline or Milestones: Ongoing.

Recommendation 1.13:

NSLS Senior Management should develop and resource a data management plan of facility.

Action: Refine the NSLS-II Data Management Policy and estimate resource requirements for implementation.

Timeline or Milestones: Revised policy by 1 September 2018

Part II

Beamline Controls (including EPS and motion controls)

Recommendation 2.1:

Management should seek to bolster the talent-pool in core EPICS/software development, and motion support, through training and development or by replacing recent departures in this area. Consider formation of a controls software development/'tools' group, or team, to support new devices, feature requests, new tools, etc.

Actions:

Consider Controls Program organization change to create a Common Controls System group that includes EPICS base and driver support, user interfaces (CSS), equipment protection, motion controls, controls services (Archive, Masar, Beast, etc), hardware and detector support, and cable management.

Encourage controls staff to participate in the EPICS collaboration.

Offer training opportunities to controls staff.

Milestones/timeline:

Reorganization consideration for 1 July 2018 NSLS-II org chart issue.

Staff to attend EPICS collaboration meeting at Argonne in June 2018

Various training opportunities provided for both Controls Program staff and others:

Area Detector training – 16 May 2018 (Mark Rivers)

Allen Bradley vendor training – Dependent on Vendor and demand. Aiming for 1-Aug-2018

Delta Tau vendor training - Dependent on Vendor and demand. Aiming for 1-Aug-2018 (May get new hires involved) 1-Nov-2018

CCP152 Studio 5000 Logix Designer Level 4: Function Block Programming – 15-16 May 2018 (was Cancelled) 1-Sep-2018

See also recommendation 1.1

Recommendation 2.2:

Management should explore and implement talent-retention strategies. Consider providing public recognition of accomplishments, and opportunities for training, and conference-travel.

Actions:

Evaluate possible acceleration of green card process for qualifying staff members.

Staff encouraged to attend EPICS collaboration and other conferences or training opportunities.

Make deliberate effort to recognize staff achievements in the Controls Newsletter and Controls Program team meetings and monthly Town Hall meetings

Plan to locate Controls Program staff in appropriate office settings.

Milestones/timeline:

HR to prepare list of all PSD staff with potential early green card processing – 31 May 2018

See also recommendation

Recommendation 2.3:

Explore opportunities to engage the technical staff in embracing and advancing facility goals. Remove barriers including the noise associated with competing requests that prevent staff from focusing and completing objectives efficiently (decision fatigue.) This can be helped by clear, well-defined and enforced priorities, stronger use of the centralized request mechanism, and assigning task queues aligned with priorities.

Actions:

Strengthen the role of the Point of Contact to address priorities and assignment of specific tasks.

Prepare document to provide guidance for establishing priorities of individual Controls Program tasks

Milestones/timeline:

Establish labor budget for each POC in FY2019 budget plan and operations WBS

Guidance document preparation – 4 June 2018

Recommendation 2.4:

Management should reassess whether the staffing model is optimum to meet the stated objectives of NSLS II being a world leading facility, and to sustain operations as project work draws to a close.

Actions:

Hold a series of workshops or brainstorming sessions with appropriate beamline/accelerator staff to establish estimate of controls program staffing for NSLS-II to be a world-leading facility.

Assess controls staffing at other facilities worldwide for comparison.

Revise WBS dictionary to describe the work for which group is responsible

Milestones/timeline:

Brainstorming plans:

Accelerator Session 15-Jun-2018

Prelim Beamlines (overall) workshop 15-July-2018

IT workshop 12-Aug-2018

Mark Heron – expected completion -is conducting a review of staffing (worldwide)

WBS dictionary revision due 25 May 2018

Recommendation 2.5:

All levels of management should provide strong support to the POCs. This should include empowering them, ensuring the correct people are in the role and that the POCs are given the time and resources required to be successful.

Actions:

Strengthen the role of the Point of Contact to address priorities and assignment of specific tasks.

Prepare document to provide guidance for establishing priorities of individual Controls Program tasks

Controls Program Manager to hold weekly meetings with the POCs to review progress and make adjustments as needed.

Use monthly Town Hall meetings to promote the work of the POC, share success stories, and discuss the evolution of the role.

Milestones/timeline:

Establish labor budget for each POC in FY2019 budget plan and operations WBS

Guidance document preparation – 4 June 2018

Hold a formal review of the roles and responsibilities of the POC – 1 October 2018

Recommendation 2.6:

Adoption of more simple motor control solutions than Delta Tau (DT) for appropriate systems (or improved automation of motor setup and tuning if possible) may help reduce the burden on controls staff. Alternatively, contractors or vendor contracts could be used to supplement staff efforts. Consider bringing in a DT engineer for a few months to address issues and train staff in situ. Overall, additional talent is needed, with a preference for junior staff with strong interest and a willingness to learn.

Actions:

Consider whether a second type of motion controller should be introduced at NSLS-II, or whether the costs for supporting another controller outweigh the benefits of a less capable controller.

Contract engineering effort with Delta Tau expertise for consulting and training staff

Provide inexperienced NSLS-II staff with Delta Tau manufacturer training.

Milestones/timeline:

Decision whether to pursue another motion control solution due 15 July 2018

Consultation purchase (40-100 hrs) is being processed/purchasing 20-July-2018

Two NSLS-II controls staff training in Ca. – 1 September 2018

Recommendation 2.7:

Promote robust development processes that bring about compliance to development standards and ensure quality of the software and solutions delivered.

Action:

Commission staff member to develop a series of documented engineering processes that include these items (Highly directed)

Milestone/timeline:

Overview document 1-July (draft in second week of June)
Detailed gather Requirements spec - August 1st
Model presentations Sep 1st
Schema Oct 1st
Sample implementation Nov 1st
Statistical analysis/Testing regime Dec 1st

Recommendation 2.8:

Look for opportunities to improve group interactions. These could include: controls-only all-hands meetings to discuss goals, strategy, issues, plans etc….; or talks by engineers open to other technical groups and beamlines staff. Topics might be recent work, emergent problems, cyber security etc.

Action:

Controls-only all-hands meetings are being (and were being) held. They follow the town hall meetings by a week.

Periodic technical talks on controls program matters have also been scheduled –

Milestones/timeline:

Controls-only all hands meetings – monthly;

Recommendation 2.9:

Consider forming multi-disciplinary teams for appropriate projects. This brings an element of vertical integration to an otherwise horizontal organization structure. Given the staff levels available, this would likely be part time assignments. Assigning temporary team leads would give staff development opportunities.

Action:

Identify specific project areas that would benefit from team approach.

Milestones/timeline:

Complete project list and launch 1 team – 1 July 2018

Recommendation 2.10:

Management should ensure effort is directed at priorities that are aligned with the strategic direction of the facility. It is important that the strategy is well elucidated to staff. It will help people see how their efforts fit into the bigger picture and to understand the reasoning for particular decisions.

Action:

Program Manager to assure Program group leaders understand the facility priorities and organize work consistent with these priorities.

Timeline or Milestones: 1-Sep-2018

Recommendation 2.11:

Resolve the problems with the NFS server rather than create work-arounds.

Action:

Replace single NFS server with a three server tiered solution with faster disk I/O, and migrate all users to new NFS

Timeline or Milestones: Complete by end of the May shutdown.

Action: Put in place early warning, monitoring of NFS performance

Timeline or Milestones:

Action Add Quota to NFS storage

Commentary: Performance can be impacted by inappropriate usage. Typically Bulk storage of beamline data.

1-July-2018 – initial pass.
1-Sep-2018 - User education

Recommendation 2.12:

We recommend that the computing team work with beamline personnel to determine common pain points for beamlines in a systematic way. These can then be addressed as a priority. If possible, address these issues in a way that takes steps towards the end goal. For example, a fully featured data management and curation system for users may be an end goal, but as a first step it could be possible to deploy an SFTP server for use by all beamlines as an option for users to transfer data.

Action:

Consider forming a team to explore solutions for data management in the context of recommendation #9 above.

Timeline or Milestones:

Identify team by 1 July 2018

Recommendation 2.13:

Investigate opportunities for level-1 support (simple tasks) to be performed by junior staff and for ways to enable beamlines to perform self-help. This would free senior staff for more complex, involved tasks.

Actions:

Continue with approach where POC addresses simple tasks.

Encourage training and documentation that enables beamline staff to perform tasks for which they are capable.

Timeline or Milestones:

Ongoing. The updates in the org structure will help enable this.

Recommendation 2.14:

Software and computing are an enabling technology for science facilities such as NSLS-II. Efficiencies come from not duplicating functionality across the organization while ensuring good engagement of staff through domain specific knowledge. NSLS-II needs to challenge all assumptions in its staff model to ensure across the facility that staff number are optimal. With such evidence NSLS-II should consider entering into discussion with funders as to the scientific needs and benefits for additional staff. In considering future beamline programs these should be realistically resourced for initial construction and ongoing operations.

Action:

Continue to develop staffing model and continue communications with sponsor to address optimal staffing levels.

Milestone/timeline:

Ongoing…

Recommendation 2.15:

Having established a realistic resource model, NSLS-II management should look at structures and create a working environment, career opportunities and reward which are comparable to other employment opportunities in the software/controls/computing industry both locally and nationally. Management should ensure there are reasonable opportunities for professional development of staff. This would include training and conference attendance as funding allows.

Action:

Encourage staff to participate in suitable conferences

Identify training opportunities that contribute to professional development of controls program staff

Milestone/timeline:

Ongoing.

Recommendation 2.16:

Senior NSLS-II management should set clearly defined objectives and priorities for the Controls Group, which are aligned to overall project goals. These should flow down from the strategic goals of the facility. Controls management should accordingly ensure staff are given clearly defined priorities and objectives for tactical day-to-day operations.

Action:

Revise NSLS-II strategic plan and assure priorities are clearly established.

See recommendation #10 above.

Milestone/timelines: 1 September 2018