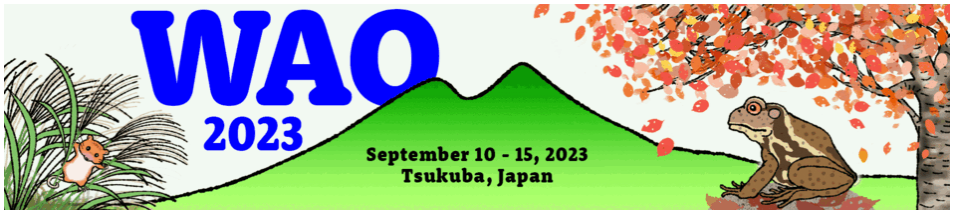
WAO2023 International Workshop on Accelerator Operations



Report of Contributions

Contribution ID: **1** Type: **not specified**

OR01 - How ISIS neutron and muon source does business

Monday, 11 September 2023 09:30 (10 minutes)

The presentation will describe how ISIS neutron and muon source is operated: Layout of accelerator, operation hours/year, structure of operation team, number of operators, shift Schedule, control room layout/occupation, describe the on-call system.

Presenter: RANNER, Jonny (ISIS)

Session Classification: How We Do Business

Contribution ID: **2** Type: **not specified**

OR02 - Four Operations Groups on One Site at TRIUMF

Monday, 11 September 2023 09:40 (10 minutes)

TRIUMF currently has four operations groups spread across our site and between them we run 5 cyclotrons, 4 linear accelerators, 2 target stations and an offline ion source. The Driver Control Room operates the 520 MeV Cyclotron and an electron linear accelerator. The Applied Technology Group operates three compact cyclotrons—two TR30s and the CP42—for commercial production of medical isotopes. The TR13 group operates the fixed energy 13 MeV cyclotron primarily for PET isotopes and radiometals for research purposes. Lastly, the Rare Isotope Beam Operations group is responsible for two target stations, an offline ion source and several linear accelerators. These groups have different responsibilities, stakeholders, and technical support structures, which means under one organization we have four operations groups with significant variation. This talk will describe how each of these operations groups function, while highlighting important differences and how we can learn from each other, better share resources, and encourage collaboration. We will also discuss applying these lessons towards another upcoming operations group at TRIUMF.

Presenter: STAIGER, Spencer (TRIUMF)

Session Classification: How We Do Business

Contribution ID: **3** Type: **not specified**

OR03 - Work coordination at ESS. From Installation to Operations

Monday, 11 September 2023 09:50 (10 minutes)

"The European Spallation Source is in the finishing stages of the construction, with large portions of the project being either in the commissioning phase or already in the operational one. This new situation also presents us with new challenges, in particular in the work coordination between the installation of components, the commissioning of parts of the Accelerator and Target, and maintenance of conventional facilities and other systems. This has driven to a reorganization of the project, with the creation of an Operations Directorate, and inside of it an Operations division, including the operations staff and the work coordination team.
In this talk we present: the new Operational organization; how we arrange the work coordination; and the first results of the 24/7 operation and commissioning of the Normal Conducting part of the Accelerator."

Presenter: MUNOZ, Marc (ESS)

Session Classification: How We Do Business

Contribution ID: **4** Type: **not specified**

OR04 - Operator Retreats and Team Building Opportunities at the Canadian Light Source

Monday, 11 September 2023 10:00 (10 minutes)

"During the twice annual extended maintenance periods operators at the Canadian Light Source are able to get together as an entire team and spend a few days together in what we refer to as a retreat. These retreats are currently a 5-day collection of activities that encompass training, presentations, team building, and opportunities to talk with operators at other facilities. The retreats are typically held off site but close by the CLS and include coffee and lunch. The highlights of each retreat are usually the team building exercises and the chance to talk to another facility's operators. Since we started having these we have spoken to BNL-RHIC operators, the Australian Synchrotron operators, and TRIUMF operators.
Benefits of these retreats include: a moment where activities can be aligned amongst the group, team building and camaraderie within a complete group that often don't get to see each other, centralized training and feedback opportunities, and an opportunity to relieve the sense of isolation that operators often feel. Retreats are strongly supported by management as they see the benefit that this time brings to the group and to the facility as a whole."

Presenter: BILBROUGH, Grant (CLS)

Session Classification: How We Do Business

Contribution ID: **5** Type: **not specified**

OR05 - Operations of the Facility for Rare Isotope Beams

Monday, 11 September 2023 10:10 (10 minutes)

The Facility for Rare Isotope Beams (FRIB) at Michigan State University started operations as a user facility in 2022. The FRIB accelerator is a 400 kW superconducting linear accelerator which can accelerate stable ions up to uranium to energies of at least 200 MeV/u. Rare isotope beams are produced in a graphite target and magnetically separated in the ARIS fragment separator. The facility is currently operating at 5 kW primary beam power with a planned power ramp up over the next years while providing beam for users. The talk will provide an overview of the current status and some of the challenges for the operations group.

Presenter: STOLZ, Andreas (FRIB)

Session Classification: How We Do Business

Contribution ID: **6** Type: **not specified**

OR06 - Operation of accelerators at KEK

Monday, 11 September 2023 10:20 (10 minutes)

At KEK, the proton accelerator complex in Tokai campus and the lepton accelerator complex in Tsukuba campus are continuously operated for several months except the scheduled maintenance days and the machine troubles. The lepton accelerator complex comprises two light sources, two collider rings, a positron damping ring, and an elec-tron/positron injector linac. The five lepton accelerator rings are simultaneously operated with top up injection scheme using one injector linac. Such complex operation scheme has been supported by the high available accelerator components and the well-organized operation team. In this presentation, the simultaneous top up injection technique and operation status are reported.

Presenter: SATOH, Masanori (KEK)

Session Classification: How We Do Business

Contribution ID: **7** Type: **not specified**

OR07 - Control tools developed by the ALBA Synchrotron Operators

Tuesday, 12 September 2023 16:00 (30 minutes)

"ALBA is a third generation 3GeV synchrotron light source. As soon as the operation started in 2012, the Accelerator team has required new GUIs and control tools. The amount of work in the Controls group made many of these requests to pile up in the "to do"list. On the other hand, eight operators are in charge of running the accelerator 6000 h/year, leaving 50% of their time to work for different subsystems and participate in development projects. It's a match.

In this talk we present the different contributions that the accelerator operators have made to the control system (scripts, GUIs, devices⋯) to improve the operation and the different subsystems. We also focus on the organization between the Control and Operation groups regarding this project, as well as some lessons learned."

Presenter: FERNANDEZ, Ferran (ALBA)

Session Classification: Controls - The Interface between Operator and Accelerator

Contribution ID: **8** Type: **not specified**

OR08 - Transitioning to EPICS while involving users and operators

Tuesday, 12 September 2023 16:30 (30 minutes)

The control system of the ISIS Neutron and Muon Source is being moved to EPICS from the current Vsystem control system. This transition affects many different areas of the control system from servers to hardware interfaces. But the most relevant for users and operators are the areas concerning the control screens, alarm displays and data archiving. Early involvement from machine physicists and operators was encouraged in order to not just ease the transition but also to implement their current requirements and preferences into the new control system and give them tools for further development.

Presenter: HERNANDO, Juan Luisa Fernandez (ISIS)

Session Classification: Controls - The Interface between Operator and Accelerator

Contribution ID: **9** Type: **not specified**

OR09 - Optimization tool for RF phase and beam loading distribution among RF stations in SuperKEKB

Tuesday, 12 September 2023 17:00 (30 minutes)

SuperKEKB is an e-/e+ collider which targets the world highest luminosity. It recently achieved a new world record luminocity 4.71 × 10^34 /cm^2/s with beam current 1.4 A. In the future, beam current will be increased further to aim at the design value 3.6A. The RF system consists of 38 cavities (30 klystron stations), which share the huge beam loading brought by the high current beam. It is important to distribute beam loading properly among RF stations. It is equivalent to adjust the acceleration phase of each station. However, it is difficult to evaluate acceleration phase using only the cavity pickup signal. Therefore, we established a method to evaluate and adjust beam loading balance (acceleration phase) through RF feed power measurements. Additionally, we developed a software to evaluate and optimize beam loading balance easily and accurately. This presentation introduces the method and the developed software.

Presenter: OGASAWARA, Shunto (KEK)

Session Classification: Controls - The Interface between Operator and Accelerator

Contribution ID: **10** Type: **not specified**

OR10 - Abort Monitor System at the SuperKEKB Accelerator

Wednesday, 13 September 2023 16:00 (30 minutes)

In order to protect the hardware components of the SuperKEKB accelerator against the high beam currents, we installed the controlled abort system. Beam abort monitor systems were prepared aiming to monitor the machine operation and to diagnose the hardware components in each hardware group. Each monitor takes the data at that moment for each abort and confirms the cause of the abort. As a result, the problem that caused the abort can be resolved. This presentation provides an overview of the SuperKEKB Abort Monitor with real examples.

Presenter: IKEDA, HITOMI (KEK)

Session Classification: Beam Diagnostics

Contribution ID: **11** Type: **not specified**

OR11 - Beam Based Alignment of the LCLS-II Injector Solenoid

Wednesday, 13 September 2023 16:30 (30 minutes)

"Solenoid focusing can be used to compensate for space charge induced emittance growth at low beam energies. However, misalignment of the solenoid field with respect to the beam trajectory will introduce steering effects and poor emittance compensation.

I will present a scheme for the beam-based measurement of solenoid misalignments, using matrix expressions for transport through a rotated, translated solenoid. I will also present results from simulation to estimate the size of the misalignment effect on emittance growth. Finally, I will present results from measurements taken at the LCLS-II injector."

Presenter: OSMAN, Ahmed (SLAC)

Session Classification: Beam Diagnostics

Contribution ID: **12** Type: **not specified**

OR12 - Status of beam commissioning and operation tools in NanoTerasu

Wednesday, 13 September 2023 17:00 (30 minutes)

NanoTerasu is a new 3 GeV compact soft X-ray (SX) light source with a circumference of 350m and an MBA lattice in Japan. The target brilliance is 1021 photons/sec/mm2/mrad2/0.1% b.w. To achieve the highly brilliant source, the storage ring was designed for a stored beam current of 400 mA and a horizontal beam emittance of 1nm rad. The injector linac and the storage ring commissioning was started in April 2023. The first light from 3-Pole wiggler was observed in June 2023. The operation tools in the beam commissioning phase will be presented.

Presenter: UESHIMA, Kota (QST)

Session Classification: Beam Diagnostics

Contribution ID: **13** Type: **not specified**

OR13 - Development of Particle Therapy Database of Operation and Maintenance

Wednesday, 13 September 2023 11:00 (20 minutes)

A database system for operation and maintenance of the accelerator and irradiation system for particle therapy was developed. The main function is to record and search detailed information of machine troubles. Each actual “trouble event”was entered into the database and aggregated into a higher level concept of “trouble class”. Trouble frequency analysis and progress management including communication with machine vendor were carried out in terms of trouble class. In addition, operation results are also entered into the database and machine availability is automatically calculated using the operation and trouble data. The database has been in operation at East Japan Heavy Ion Center, Faculty of Medicine, Yamagata University since January 2021, and in Gunma University Heavy Ion Medical Center since January 2023. In Yamagata University, 13800 trouble events and 950 trouble classes has been entered and efficiently managed.

Presenter: SOUDA, Hikaru (Yamagata-U)

Session Classification: Operator Made Tools

Contribution ID: **14** Type: **not specified**

OR14 - Enhancing complex automations: Operators empower efficiency with 'Sequencers' tool

Wednesday, 13 September 2023 11:20 (20 minutes)

"Elettra Synchrotron Trieste is a multidisciplinary research center that welcomes the global research community. It specializes in producing high-quality synchrotron and free-electron laser light and applying them in the fields of materials and life sciences. The research center boasts two advanced light sources: the electron storage ring Elettra (2.0 –2.4GeV) and the free-electron laser (seeded FEL) FERMI. These facilities operate around the clock, providing light to over 30 experimental stations.
To carry out intricate tasks involving particle accelerators, physicists and operators must follow a specific sequence of actions typically displayed through numerous graphical panels. The automation logic embedded in the graphical user interfaces (GUIs) often lacks reusability by other programs, which limits the potential level of automation achievable by a control system. To overcome this limitation, we have introduced a new automation framework that shifts the logic from GUIs to the server-side. This approach allows for easy organization, inspection, and stacking of simple tasks, ultimately enabling the construction of more complex actions.
In this instance, we show how this tool, known as ""Sequencers,"" has allowed the operations group to implement complex automations such as recovering the storage ring after a beam dump and the subsequent reinjection, thereby greatly reducing the number of mouse clicks necessary for restoring all devices."

Presenter: TRIPALDI, francesco (Elettra)

Session Classification: Operator Made Tools

Contribution ID: **15** Type: **not specified**

OR15 - Automated Profile and Beam Intensity Measurements at TRIUMF

Wednesday, 13 September 2023 11:40 (20 minutes)

During operation of a particle accelerator, frequent diagnostic checks along the beam path using multiple devices are needed to determine the quality and properties of the delivered beam. A high-level application (HLA) has been built that automates this process, moving devices in and out while collecting and saving diagnostic data, beam properties and all relevant optics settings into a permanent database. Operators can now search through and compare multiple past measurements using tables, graphs, and statistics. A related HLA has been further developed which gives Operators the ability to load any past configuration into the beamline optics with the click of a button. With enough data automatically collected over time we can consider training machine learning agents on this data set toward automated tuning, or simply design more analytic programs using this data for other purposes such as orbit correction.

Presenter: STRINGER, Blair (TRIUMF)

Session Classification: Operator Made Tools

Contribution ID: **16** Type: **not specified**

OR16 - Software and Toolchain in the MAX IV Operations Group

Wednesday, 13 September 2023 12:00 (30 minutes)

"MAX IV is a synchrotron radiation facility based on a 3 GeV linear accelerator, which powers a soft and hard x-ray storage ring, as well as a short pulse facility. At MAX IV, an extensive set of tools developed by operators assists in all aspects of operations. Operator-developed tools are often more targeted and faster implemented than tools developed by a software team. Different tools used in the areas of beam diagnostics, troubleshooting, performance analysis and automatic fault-handling will be presented.

In the MAX IV toolchain, the accessibility and versatility of the Python programming language, combined with the Tango Controls system, allows for seamless interfacing with physical devices. Furthermore, package management with Conda, version control with Git and continuous integration/deployment (CI/CD) facilitate maintaining software. This presentation will showcase the distinct features of the toolchain and outline the standard procedure for developing applications at MAX IV."

Presenter: NIEUWENHUIS, Rutger (MAX-IV)

Session Classification: Operator Made Tools

Contribution ID: **17** Type: **not specified**

OR17 - A Staged Approach to Beam Commissioning of Fermilab's PIP-II Accelerator

Thursday, 14 September 2023 09:00 (20 minutes)

The Proton Improvement Plan II, or PIP-II, project is an essential upgrade to Fermilab's accelerator complex to enable the world's most intense high-energy beam of neutrinos for the international Deep Underground Neutrino Experiment at the Long Baseline Neutrino Facility, and a broad physics program, powering new discoveries for many decades to come. PIP-II features a Warm Front End, Superconducting Linac, and beam transfer line that will provide a beam of 2 mA H- ions up to 800 MeV and inject them into the existing Booster accelerator. PIP-II will be commissioned in stages as the Installation Team hands off hardware to the Commissioning Team. I will discuss the strategy for this staged approach and inclusion of Main Control Room operators into the commissioning tasks.

Presenter: CRAWFORD, Darren (FNAL)

Session Classification: Involving Operators in Accelerator Physics and Commissioning

Contribution ID: **18** Type: **not specified**

OR18 - View points of beam commissioning of J-PARC Main Ring for safe and reliable operation

Thursday, 14 September 2023 09:20 (20 minutes)

"In the J-PARC Main Ring (MR), beam commissioning has been carried out to increase the beam power to achieve 1.3 MW by JFY2028. For this purpose, it is essential to make safe and reliable judgments on the beam and equipment environments. The MR-status-monitoring-system (CSS-based) has been developed and establied, based on the criteria to find the MR status for beam tuning and stablilizing user operation, and on the countermeasures to experiences of various beam troubles.

In this presentation, we will discuss the following 3 topics: (1) The points of interest in the accelerator environment during MR beam tuning and utilization operation, (2) The overlooked experiences in various troubles and their countermeasures, and (3) the actual operation of the MR-status-monitoring-system and the issues to be addressed in the future.

We expect that this presentation provides good view points to improve acclerator performances more safely and reliably."

Presenter: SATO, Yoichi (J-PARC/KEK)

Session Classification: Involving Operators in Accelerator Physics and Commissioning

Contribution ID: **19** Type: **not specified**

OR19 - Development of an Automated Beam Loss Tuning Application in a High-Power Accelerator

Thursday, 14 September 2023 09:40 (20 minutes)

"Oak Ridge National Laboratory's Spallation Neutron Source (SNS), a high-power linear H- accelerator, is increasing its power capability from 1.4 to 2.8 MW and beam energy from 1 to 1.3 GeV through a long-term project called the Proton Power Upgrade (PPU). With an increase in power and energy, there is even more emphasis to reduce errant beam loss and residual activation in the accelerator tunnels. The Automated Beam Loss Tuning (ABLT) application aims to outperform the operators'by-hand tuning for changes from the upgrades and for typical day-to-day variances. The motivation began in Operations but extended to Accelerator Physics and has inspired the transition of physics applications from Java to Python. An in-house application called ScanEngine, developed as a coordinated effort between the Operations and Accelerator Physics groups, scans equipment settings such as magnet currents and RF phases while recording important parameters for future machine learning efforts. The data collected will be used by ABLT to inform a machine-learning model of the accelerator equipment and its relation to losses, and, with the proper protocols in place, the goal is for operators to run ABLT during neutron production.

*ORNL is managed by UT-Battelle, LLC, under contract DE-AC05- 00OR22725 for the U.S. Department of Energy."

Presenter: ELLIOTT, Carrie (SNS)

Session Classification: Involving Operators in Accelerator Physics and Commissioning

Contribution ID: **20** Type: **not specified**

OR20 - Introducing a new machine to an existing team

Thursday, 14 September 2023 10:00 (30 minutes)

"At the Paul Scherrer Institute, we have been operating three very different particle accelerators with a common pool of full time operators for more than a decade. A high intensity proton facility, a proton therapy facility and an electron storage ring.
Incorporating our new free electron laser SwissFEL into this operation framework and transitioning it from commissioning into regular user operation has been challenging, but also very successful.
The new machine can profit from the broad knowledge the operation team has gained over the years on the three existing machines, but also brings along all the typical free-electron laser challenges. The main differences are a larger degree of interaction with the users, many different operation modes and beam parameters that need to be changed frequently. To make the transition from commissioning to user operation successful, there are many questions to address e.g.: When is a good moment to involve operation in day-to-day-business? How to transfer knowledge from the system experts, who developed the complex systems, to operators who do not have this in-depth knowledge? How can we feed the existing knowledge into the development of new procedures and tools? We want to focus on different approaches taken, and point at the pros and cons of them."

Presenter: FACCHETTI, Alessandro (PSI)

Session Classification: Involving Operators in Accelerator Physics and Commissioning

Contribution ID: **21** Type: **not specified**

OR22 - Machine Learning as a tool for accelerator operation: status, pros, cons and futur deployments.

Tuesday, 12 September 2023 09:00 (25 minutes)

"Machine Learning (ML) is now widely used in the Industry. Applications in robotic and autonomous vehicles have proven that control theories can benefit greatly from these technologies. The same is true in science, Deep Learning (DL) offers great expectations for science and has demonstrated its ability to extract unexpected relationships between inputs and outputs in complex data sets. One of the first areas in which deep learning has made a decisive contribution is the analysis of medical images. Computer-aided diagnostic systems are now effectively assisting doctors and researchers.

High-energy physics is already grateful for the faster simulations and refined information extracted from the massive datasets produced by the machines. Decision Trees, Neural Networks and Bayesian Learning are very popular to obtain evidence for new physics, that is, physics beyond the Standard Model (BSM), at accelerators such as the Large Hadron Collider (LHC) at CERN (ref. in full article), but what about the particle accelerators control ? How does ML enter the world of Accelerator Operation? What could we expect from these technologies? How is it perceived by the Accelerator Operators (AO)?

This article presents a survey of the actual ML based applications used in the CERN control rooms. It also gives a list of the pros, cons and limitations as seen by the CERN Operation teams. Finally it quickly presents the futur deployment that are already foreseen."

Presenter: LEFORT, Bertrand (CERN)

Session Classification: How Does the Machine Learning Integrate with Operation?

Contribution ID: **22** Type: **not specified**

OR21 - Online reinforcement learning control of beam collision at IP for BEPCII

Tuesday, 12 September 2023 09:25 (20 minutes)

For BEPCII, operators need to tune the transverse offset in displacement and angular deviation (x, x', y, y') of the two beams at the interaction point (IP) to maintain a high luminosity as the beam current decays in a normal run. Since the optimal offset change with current nonlinearly in a run and varies in each run. It is laborious to keep the best beam offset at IP for high luminosity at any time, thus operators usually use a linear model to tune the offset automatically. In this research, a Deep-Q-Network (DQN) agent is trained by the history data to adjust the beam offset at IP. The kernel of DQN agent is a neural network (NN) with 18 input parameters (IP offset, bpm, current) and 8 output parameters (Q-value, used to choose action). The DQN agent has been put into daily offset tune successful, basically replacing the linear model and manual operation of the operators, and also gains an increase in integrated luminosity than before.

Presenter: FAN, Jiaqi (IHEP)

Session Classification: How Does the Machine Learning Integrate with Operation?

Contribution ID: **23** Type: **not specified**

OR24 - Application examples of the machine learning in KEK

Tuesday, 12 September 2023 09:45 (20 minutes)

Machine learning (ML) is widely used and several tools are accessible for free so we easily tried them in several accelerator operations in KEK. One of the applications of compact ERL is beam tuning for infrared SASE FEL. It is used to maximize the intensity of the FEL light, which requires bunch compression, transverse beam matching at the undulator, small energy spread, and transverse emittance. ML makes it possible to optimize simultaneously and automatically with 5-6 parameters, therefore it is helpful for reducing the tuning time and human resource. Another application is an estimation of the hysteresis of the electrical magnet. Furthermore, we introduce some examples of beam tuning demonstrations at KEK-ATF for ILC project, and the electron-positron LINAC for SuperKEKB and PF.

Presenter: SHIMADA, Miho (KEK)

Session Classification: How Does the Machine Learning Integrate with Operation?

Contribution ID: **24** Type: **not specified**

OR23 - Transitioning the Use of Machine Learning from Physics Study to Production Operation*

Tuesday, 12 September 2023 10:05 (25 minutes)

"The Spallation Neutron Source (SNS) at the Oak Ridge National Laboratory (ORNL) is a megawatt class neutron production proton accelerator. The facility is undergoing a beam power upgrade from 1.4 MW to 2 MW and increasing the yearly scheduled neutron production operating time from 4500 to 5000 hours. One area of focus is to utilize machine learning to try to help achieve these lofty operational goals. Two areas of focus for machine learning are prediction of potential equipment malfunction with automated beam turn off and automated beam tuning to minimize residual radiation levels. Utilizing archived data machine learning studies have shown the ability to predict upcoming faults, and additional studies are underway to understand whether automated machine learning based beam loss reduction is possible. Even after proof of principle, the difficulty for both cases comes when trying to transition the use of machine learning from physics study to production operations. Processes for making the move to operations at SNS will be discussed.

*ORNL is managed by UT-Battelle, LLC, under contract DE-AC05- 00OR22725 for the U.S. Department of Energy."

Presenter: PETERS, Charles (SNS)

Session Classification: How Does the Machine Learning Integrate with Operation?

Contribution ID: **25** Type: **not specified**

OR25 - Helium Mass Flow Monitor

Friday, 15 September 2023 09:00 (30 minutes)

The SBIR funded Helium Mass Flow Monitor System, developed by Jefferson Lab (CEBAF) and Hyperboloid LLC, is designed to provide real-time measurements of cavity health (Q0) within a Superconducting Radio Frequency Cryomodule. The device uses a component made of superconducting material that is cooled by a 2 K super-fluid helium bath. By varying the current of the heater our superconducting material will become non-superconducting (quench). It is at the point of superconducting to non-superconducting which correlates to the Helium Mass Flow of the system (power dissipated in the cryomodule). The Linux-based control system is an integral part of this device, providing the necessary control and data processing capabilities. The interface monitors sensor voltage, heater current, and diode temperature. From the interface, measurements are carried out in a semi-automatic fashion. In unison, the flow meter and interface provide the ability to monitor the static & dynamic heat load of the CEBAF cryomodules. It will also give the ability to do rapid Q0 measurements without the need for a tunnel access.

Presenter: CHRISTIAN, Dakota (JLAB)

Session Classification: Innovative Solutions for Operations

Contribution ID: **26** Type: **not specified**

OR26 - Development and Overview of Accelerator Safety Configuration Control (ASCC) at the Advanced Light Source

Friday, 15 September 2023 09:30 (30 minutes)

Accelerator Safety Configuration Control (ASCC) is a novel, web-based application developed over the last several years by the Advanced Light Source at Lawrence Berkeley National Laboratory in partnership with Softtek, a leading IT company based in Mexico, to aid operators with controlling and managing accelerator safety processes. ASCC replaces outdated paper-based configuration management tools with a modern, fully digital ecosystem that provides timesaving automation capabilities, incorporates built-in safeguards to reduce the risk of user error, and is designed to be adaptable to meet future requirements. ASCC provides a single, centralized location for Operators, ALS staff, and users to access a comprehensive suite of resources, including forms, checklists, schedules, procedures, and more whether working on-site or remotely. This talk will focus on providing a general overview of ASCC and an examination of some of the challenges faced during the development process.

Presenter: NORD, Sean (ALS/LBNL)

Session Classification: Innovative Solutions for Operations

Contribution ID: **27** Type: **not specified**

OR27 - Classifying and Mitigating Superconducting Cavity Faults in the SRF Linac of the Chinese ADS Front-End Demo Facility

Friday, 15 September 2023 10:00 (30 minutes)

The Chinese ADS Front-end demo superconducting radio-frequency (SRF) linac, CAFe, successfully conducted a 10 mA, 200 kW continuous wave proton beam commissioning in 2021. However, the governing portion (~70%) of total beam trips was attributed to RF cavity faults. When these faults occur, an acquisition process records 8 RF waveforms using digital low-level radio-frequency (LLRF) systems. In order to address the issue, we studied the mechanisms underlying each cavity fault and analyzed time-series data to recognize several fault patterns. Our findings indicate that field emission (FE)-triggered cavity faults and transient beam-loading are the dominant causes of beam trips at CAFe. To identify and mitigate these issues, we have built a real-time classification system to identify the FE-induced Electronic-quench events. In addtion we have developped and implemented several novel LLRF algorithms to suppress the cavity faults at CAFe. This study serves as a significant step towards improving the availability and reliability of the operational beam for the future China initiative Accelerator-Driven System project.

Presenter: QIU, Feng (IMP)

Session Classification: Innovative Solutions for Operations

Contribution ID: **28** Type: **not specified**

OR28 - Redesigning the Accelerator Operator Technical Training Program: A Modular and Collaborative Approach

Monday, 11 September 2023 14:00 (30 minutes)

"The effective training of accelerator operators is essential for ensuring the smooth functioning of complex scientific facilities. This abstract highlights a successful redesign of the Accelerator Operator Technical Training Program, focusing on the reorganization of training materials, standardization of formats, and implementation of a collaborative content creation process. Recognizing the need for a more streamlined and accessible training program, the traditional approach was transformed into a modular structure, with topics categorized under umbrella themes. This reorganization allowed for easier navigation and enhanced the overall learning experience for participants.

To maintain consistency and clarity, each module was standardized with clearly defined learning objectives and a comprehensive list of skills to be acquired. This standardized format not only facilitated understanding but also provided a measurable framework for assessing trainee progress. A workflow was established to guide the creation and maintenance of these modules, ensuring a systematic and efficient approach. This workflow encompassed content development, review, and updates, guaranteeing that the training materials remained up to-date and aligned with evolving accelerator programs and lab practices.

An innovative aspect of this redesign was the incorporation of a crowdsourcing strategy for content creation. By engaging the entire operations group as well as other subject matter experts, the process became collaborative and inclusive. Experts helped vet the technical integrity of the information and provide valuable experiential insights while novice operators ensured the material was accessible at the introductory level needed to onboard new control room staff.

The implementation of a collaborative content creation process not only fostered engagement and ownership among the training participants but also significantly enhanced the group's capacity to create technical training materials without overburdening any individual.

The modular structure, standardized formats, defined workflows, and collaborative content creation approach have resulted in an enhanced training experience, empowering operators with the necessary knowledge and skills to excel in their roles. The lessons learned from this redesign can be valuable for other organizations seeking to revamp their technical training programs in a similarly efficient and engaging manner."

Presenter: SHTALENKOVA, Jane (SLAC)

Session Classification: Advances in Training

Contribution ID: **29** Type: **not specified**

OR29 - The art of communication: Optimizing the information flow between technical and medical staff at the MedAustron Ion Therapy Center.

Wednesday, 13 September 2023 09:00 (30 minutes)

"The MedAustron Ion Therapy Center is an ambulatory for tumour treatment located in the city of Wiener Neustadt, Austria, Europe. The applied therapeutical beams are delivered by the MedAustron Particle Therapy Accelerator (MAPTA), a synchrotron-based and CE-certified medical accelerator providing 60-250 MeV proton and 120-400 MeV/u carbon ion beams to three treatment rooms. Outside of the clinical use, the commissioning of new clinical and non-clinical beams (in particular He2+) and the development of functional upgrades for MAPTA is ongoing.

This contribution describes our efforts to optimize the information flow between our technical and medical staff during clinical operation. In particular, we focus on our communication strategies applied in case of major technical interruptions that pose a tremendous challenge also to the clinical workflow."

Presenter: KRONBERGER-MAYERHOFER, Matthias (MedAustron)

Session Classification: Operating Accelerators in Small Organizations

Contribution ID: **30** Type: **not specified**

OR30 - Operation of accelerator system at The Wakasa Wan Energy Research Center

Wednesday, 13 September 2023 09:30 (30 minutes)

"At the Wakasa Wan Energy Research Center (WERC), we had constructed an accelerator system with a 5 MV tandem accelerator, which is an injector for a 200 MeV proton synchrotron.
After completion of the construction in 2000, we have operated the accelerator system for the ion beam analysis, irradiation for the material and biological sciences. In the period from 2002 to 2009, the study of the cancer therapy with a proton beam from the synchrotron had been performed. Recently, the accelerator beam has been used for testing radiation resistance of the semiconductor devices, especially used in space.
Our system is used for many users with various purposes. Stable operation of the system and efficient sharing of the operation duration are required. The tandem machine is used for all experiments. Large amounts of maintenance work are spent for the tandem accelerator. It is the most important to improve and maintain the withstand voltage performance in the operation of the tandem accelerator.
The system is operated and maintained by 2 researchers and 9 operators. The maintenance of the tandem accelerator is done with no help of the provider of the accelerator."

Presenter: HATORI, Satoshi (WERC)

Session Classification: Operating Accelerators in Small Organizations

Contribution ID: **31** Type: **not specified**

OR31 - Development and operation of a compact, electron accelerator-driven neutron facility AISTANS at AIST, Japan

Wednesday, 13 September 2023 10:00 (30 minutes)

A compact, electron accelerator-based neutron facility has been developed and is now operational at AIST (National Institute of Advanced Industrial Science and Technology) in Tsukuba, Japan. The facility is called AISTANS (Analytical facility for Industrial Science and Technology using Accelerator based Neutron Source)[1,2] and began operations in 2020. AISTANS uses a S-band linear electron accelerator to irradiate a water-cooled tantalum target. The accelerator operates with an electron beam energy of 40 MeV and is designed to deliver a beam power on the target of up to 10 kW (250 mA, 10 micros pulse length at a repetition rate of 100 Hz). The neutrons are cooled via solid-methane moderators and two separate beamlines are available for measurements. AISTANS is particularly suited for neutron transmission imaging (e.g., Bragg-edge imaging) of large samples. All aspects of the initial design, installation, commissioning and now operation of the AISTANS facility were conducted by our small team at AIST, based on our experiences running a similar electron accelerator to produce positrons (also operated by our group at AIST[3]) and with the electron accelerator-based neutron source at Hokkaido University (HUNS)[4]. In this contribution I will outline the AISTANS facility in more detail with emphasis on the accelerator operations and the challenges of operating the facility with limited manpower. This is based on results obtained from a project commissioned by the New Energy and Industrial Technology Development Organization (NEDO). [1] K. Kino et al., Nuclear Instruments and Methods in Physics Research A 927 (2019) 407 [2] B.E. O'Rourke et al., Nuclear Instruments and Methods in Physics Research B 464 (2020) 41 [3] B.E. O'Rourke et al., JJAP Conf. Proc. 2 (2014) 011304 [4] M. Furusaka et al., Phys. Procedia 60 (2014) 167

Presenter: O'ROURKE, Brian (AIST)

Session Classification: Operating Accelerators in Small Organizations

Contribution ID: **32** Type: **not specified**

OR32 - The crucial role of the Software Interlock System at CERN's Super Proton Synchrotron

Tuesday, 12 September 2023 11:00 (30 minutes)

"The SPS accelerates beams at intensities and energies which are potentially damaging to the machine and therefore machine protection interlocks are essential.

A rigid system of hardware interlocks is required to reliably avoid these dangerous circumstances, however, with the multicycling nature of CERN's accelerator complex today a flexible, software based system with more complex logic is also required to cater for all of the different operating modes, scenarios and configurations by continually monitoring key device states and parameters based upon a predetermined logic. By its nature the software interlock system immediately highlights any abnormal condition and as such often significantly reduces time needed for fault diagnosis.

This presentation will describe the SIS (Software Interlock System) and its interface which is widely used for both protection and diagnostics in all Cern accelerators."

Presenter: MASSOT, Serge (CERN)

Session Classification: System Monitoring and Alarm Response

Contribution ID: **33** Type: **not specified**

OR33 - Operations of cryogenic systems of SuperKEKB final focusing superconducting system

Tuesday, 12 September 2023 11:30 (30 minutes)

"SuperKEKB is an accelerator to collide electron and positron particles with a nano-beam collision scheme and is equipped with two cryostats to accommodate 55 superconducting magnets for final focusing. Each cryostat is cooled by an independent cryogenic system employing a refrigerator of 250 W at 4.41 K and a subcooler to supply subcooled liquid helium (LHe). The cryogenic systems are monitored and controlled by a dedicated program for all operation modes: cooldown, steady state, warm-up and emergency (or fault mode) responses, under unattended conditions. In this study, we will present the system monitoring and response strategies for some alarms and failures with actual examples, from which we learned quite a few lessons. As important subsystems of the SuperKEKB
accelerator, the two cryogenic systems have run for about 28 000 hours and experiences of operation and maintenance will be introduced in this presentation."

Presenter: ZONG, Zhanguo (KEK)

Session Classification: System Monitoring and Alarm Response

Contribution ID: **34** Type: **not specified**

OR34 - Managing The Alarm Load at SNS

Tuesday, 12 September 2023 12:00 (30 minutes)

"Operators at Oak Ridge National Laboratory's Spallation Neutron Source (SNS) must handle alarms from a diverse set of systems with different response needs. The accelerator systems rely on annunciation and management through Control System Studio's Best Ever Alarm System Toolkit (BEAST) and operator-developed EPICS screens. In addition, there are separate non-EPICS based systems for building alarms and fire alarms. This presentation will cover the methods we use during alarm design and implementation to manage the alarm load.

*ORNL is managed by UT-Battelle, LLC, under contract DE-AC05- 00OR22725 for the U.S. Department of Energy."

Presenter: MILANOVICH, Geoff (SNS)

Session Classification: System Monitoring and Alarm Response

Contribution ID: **35** Type: **not specified**

OR35 - Experience Acquired from Two Major Incidents at Synchrotron SOLEIL

Monday, 11 September 2023 11:30 (30 minutes)

Synchrotron SOLEIL is the 3rd generation French Synchrotron Radiation light source located south of Paris. It has been in operation since 2007 providing photon beams to 29 beamlines with a maximum intensity of 500 mA, 5000 hours per year. Besides its high overall performance (98.95% beam availability, 139 hours mean time between failure), the SOLEIL accelerators have experienced two major incidents in 2022 and 2023, which had a strong impact on either the user beam quality or availability. The first incident concerned the high voltage charging power supply of a storage ring injection kicker system, that proved challenging to identify leading to several beam instabilities, poor injection rate, and low availability during the week. More recently, a severe overheating of the bending magnets of the Linac-to-Booster transfer occurred due to an accumulation of malfunctions, including the failure of the equipment interlock system. Consequently, three days of user beam were canceled out. This presentation will describe and analyze the causes that led to these incidents, how these crises were handled to deliver quality beam back to users as quickly as possible with minimal short-term risk on equipment integrity and machine reliability. We will conclude with the lessons learned and the series of actions taken to improve our organization and our quality of work to prevent a recurrence of such failures.

Presenter: TOURNIER, Clement (SOLEIL)

Session Classification: Lessons Learned from Unforeseen Events

Contribution ID: **36** Type: **not specified**

OR36 - The double-edge of a ”perfectly efficient” Operations staff

Monday, 11 September 2023 12:00 (30 minutes)

“The NSLS-II Operations group runs with 12 shift-roles, consistently and historically filled by 12 people. This method of running, with operators and floor-coordinators on shift over 100% of ‘full time’ makes NSLS-II an outlier among large-accelerators. This mode of operations staffing comes with advantages, and disadvantages.

Like most labs, COVID added numerous new stressors to our Operations routine. While we have managed to avoid much impact to accelerator reliability, we have seen effects on our Operations staff, scheduling, morale, etc. The perturbation on top of our Operations status-quo has taught us several major lessons, which I would like to illustrate and share.”

Presenter: SMITH, Reid (NSLS-II/BNL)

Session Classification: Lessons Learned from Unforeseen Events

Contribution ID: **37** Type: **not specified**

PO01 - Dual disciplinary beam injections for particle physics and photon science experiments

Tuesday, 12 September 2023 15:10 (20 minutes)

The electron and positron accelerator complex at KEK provides experimental opportunities for elementary particle physics with SuperKEKB collider and photon science with two light sources. In order to maximize the experimental performances at those facilities the injector linac delivers beams with widely differing properties in pulse-to-pulse modulation at 50 Hz. Different beam flavors are managed with the event-based control system. This injection scheme has been fully employed since 2019. Many further improvements were introduced every year. As the event-based controls are tightly coupled with RF, machine protection systems and so on, their modifications need deliberate plan. However, the requirements from particle physics and photon science are very different because of the nature of experimental users. Patient arbitration is often required to satisfy users from those distinct fields.

Presenter: FURUKAWA, Kazuro (KEK)

Session Classification: Poster / Demo Sessions

Contribution ID: **38** Type: **not specified**

PO02 - Operation group redeployment during extended shutdown (dark time) - The CLS case

Tuesday, 12 September 2023 15:10 (20 minutes)

In March 2024, CLS plan is to shutdown its facility to replace its S-Band US frequency injector with a new S-band injector which frequency synchronizes with our Booster and Storage ring ~500MHz. During the first 10 weeks needed to dismantle and install the new injector, the operator group members shall be redeployed to new tasks. While in principle it is obvious, one shall take into consideration limitation due to job description within the employee's contracts and union contract with management. I will present the direction taken at CLS to take full benefit of the workforce.

Presenter: PIMPEC, Frédéric Le (CLS)

Session Classification: Poster / Demo Sessions

Contribution ID: **39** Type: **not specified**

PO03 - Summary of the operation of CSNS accelerator since its official opening in 2018

Tuesday, 12 September 2023 15:10 (20 minutes)

"The China Spallation Neutron Source (CSNS) is a large-scale scientific research facility located in Dongguan, China. It is a pulsed neutron source that uses a proton accelerator to produce neutrons, which are then used to study the structure and properties of materials at the atomic and molecular level.
Since its opening, CSNS has steadily improved its operating efficiency and beam power year by year. In particular, during the 2021-2022 operating year, the beam time and beam efficiency reached their highest levels, and was also the advanced level of similar facilities. The report will present the operation and commissioning of the CSNS accelerator in the past five years since its official opening in 2018."

Presenter: YUAN, Yue (IHEP)

Session Classification: Poster / Demo Sessions

Contribution ID: **40** Type: **not specified**

PO04 - General organization for LIPAc beam operation

Tuesday, 12 September 2023 15:10 (20 minutes)

"Neutron sources will be needed to characterize the material of future fusion reactors. The Linear IFMIF Prototype Accelerator (LIPAc) is a full scale prototype aiming at validating the low energy part of such neutron sources up to their first cryomodule. Built under the Broader Approach (BA) agreement between Japan and Europe, LIPAc will produce a deuteron beam of 125 mA at 9 MeV in continuous wave.

The development of LIPAc followed a staged approach during which construction phases alternated with commissioning campaigns. After completing the first injector commissioning campaign in 2017 and producing a 125 mA 5 MeV D+ beam at 0.1% duty cycle in 2019, a 5 MeV beam reached the high energy beam dump for the first time in 2021. The evolution of LIPAc configuration over that time was accompanied by the development of the operational organization to allow safe operation of the machine.

This poster presents the LIPAc general layout and describe the current organization put in place to operate the accelerator. It focuses in particular on the structure of operation team."

Presenter: GEX, Dominique (F4E)

Session Classification: Poster / Demo Sessions

Contribution ID: **41** Type: **not specified**

PO05-The operation status of linac and multi-beamlines and beam tuning procedure for beam service

Tuesday, 12 September 2023 15:10 (20 minutes)

The Korea Multi-Purpose Accelerator Complex (KOMAC) started operating the 100 MeV proton linac in 2013. Currently, the linac is equipped with four proton irradiation beamlines and it provides 20 MeV and 100 MeV proton beams to a wide range of users. The annual accelerator operation can be divided into beam service running according to a user's request and the machine study run. For the stable operation of the accelerator, we regularly performed beam tuning to meet the specific user requirements. In addition, performance improvement plans are set up and anti-aging programs are prepared. This paper describes the operating status of the KOMAC proton accelerator along with the beam tuning procedure for the beam service.

Presenter: YOON, Sang-pil (KOMAC)

Session Classification: Poster / Demo Sessions

Contribution ID: **42** Type: **not specified**

PO06 - How we do business at Los Alamos Neutron Science Center

Tuesday, 12 September 2023 15:10 (20 minutes)

The Los Alamos Neutron Science Center (LANSCE) provides 100 MeV - 800 MeV protons to five experimental facilities, each with different requirements, capabilities, and mission. This presentation will provide information regarding facility background, organization, schedules, staffing, priorities, execution of operations and maintenance, and challenges. Additional emphasis will be placed on actual control room activities and responsibilities during various stages of maintenance, startup, and operation.

Presenter: KERSTIENS, Eron (LANL)

Session Classification: Poster / Demo Sessions

Contribution ID: **43** Type: **not specified**

PO07 - The Control and Data Acquisition for HEPS Linac High-Power RF Source System

Tuesday, 12 September 2023 15:10 (20 minutes)

The High Energy Photon Source is a fourth-generation light source under construction in China and is currently undergoing beam commissioning in the linear accelerator section. It is worth mentioning that the control and data acquisition design for the all-solid-state pulse modulator and the electron gun pulse power supply. It realizes wide range and high precision control of the beam current, and the high repetition stability of the solid-state output pulse voltage. To verify the performance of the linac key subsystems, several test platforms were built before the installation of the HEPS project. The designed control system has completed the whole process of automatic conditioning for the key components, from low power to rated high power. With a cumulative time of more than 10000 hours, which verifies the reliability. As a result, the implementation and commissioning process in the HEPS linac construction went very smoothly. This can also provide reference cases for the construction of other subsequent projects.

Presenter: LIU, Jingdong (IHEP)

Session Classification: Poster / Demo Sessions

Contribution ID: **44** Type: **not specified**

PO08 - The Fermilab Accelerator Division Electronic Logbook (ADEL) at 10 Years, Lessons Learned and Looking Ahead

Tuesday, 12 September 2023 15:10 (20 minutes)

"The current Fermilab Accelerator Division (AD) Electronic Logbook (ADEL) was first released in 2013. Its creation a decade ago represented a marked improvement over the previous electronic logbook (eLog) and brought about the first consolidated Fermilab AD eLog built upon a relational database. Over the past ten years, ADEL has performed admirably, logging nearly one million user entered entries, comments and
files, undergoing a couple revisions and adding many additional features. However, as the work of Fermilab has changed, so has the use of ADEL, some of which it had not been designed for. This paper outlines ADEL's success, accomplishments as well as it's short comings, and discusses what a next generation ADEL may look like."

Presenter: HAZELWOOD, Kyle (FNAL)

Session Classification: Poster / Demo Sessions

Contribution ID: **45** Type: **not specified**

PO09 - How to rejuvenate personnel protection system of SuperKEKB

Tuesday, 12 September 2023 15:10 (20 minutes)

"The personal protection system (PPS) of SuperKEKB takes care of many accelerators. Since they are closely related with each other, the PPS cannot be modified or updated during the accelerator operation period. The period for the system upgrade suffers great restrictions by the accelerator operation schedule. Fur-thermore, due to the construction of PF-AR/BT line and PDR and Super-KEKB, PPS must be updated to fit the corresponding accelerator operation. This paper describe how the system has responded these request."

Presenter: MIMASHI, Toshihiro (KEK)

Session Classification: Poster / Demo Sessions

Contribution ID: **46** Type: **not specified**

PO10 - The LIPAc Operation Logbook: a monitoring and reporting asset for operation supervision

Tuesday, 12 September 2023 15:10 (20 minutes)

"Accelerator-based high energy neutron sources are foreseen to characterize the material of future fusion reactors. The Linear IFMIF Prototype Accelerator (LIPAc) is a full-scale prototype aiming at validating the production of a deuteron beam of 125 mA at 9 MeV in continuous wave under the Broader Approach (BA) agreement between Japan and Europe.

Just as an orchestra needs a conductor, LIPAc operation team needs an Operation Supervisor (OS). A dedicated monitoring tool was developed to support the person assigned to this role: the LIPAc Operation Logbook (LOL). This new asset can be summed up as a synthetic and user-friendly ELog (Electronic Logbook) for operation supervision. It centralizes all information and events related to the on-going operation, including objective of the day, assigned operators, beam status, key parameters, alarms, and interlocks.
This poster will show an overview of the LIPAc Operation Logbook, and it will expose how this tool facilitates the monitoring of the operation (for the OS and any operator in the control room or connecting remotely) and the reporting process for the operation supervision (for the OS only)."

Presenter: MAINDIVE, Lucas (U-Granada)

Session Classification: Poster / Demo Sessions

Contribution ID: **47** Type: **not specified**

PO11 - Design of the web Application for improving the management of the data at KOMAC

Tuesday, 12 September 2023 15:10 (20 minutes)

A control system based on Experimental Physics and Industrial Control System (EPICS) has been implemented for the 100 MeV linear proton accelerator at the Korea Multi-purpose Accelerator Complex (KOMAC). Our control system is operated with over 20,000 Process Variables (PVs) and utilizes several services such as Phoebus alarm, Archiver Appliance and, Channel Access gateway, among others. The data, which includes the PVs value and the logs of service, need to be managed to identify the status of system. A web application has been developed using React and Elasticsearch, Logstash, Kibana, and Filebeat (ELK+Filebeat). This paper introduces the web services for archiving service logs. Especially, the data analysis web application is also introduced that we are developing using React with D3 library.

Presenter: CHO, SungYun (KOMAC)

Session Classification: Poster / Demo Sessions

Contribution ID: **48** Type: **not specified**

PO12 - User interface of operation status and beam permit system for beam service at KOMAC

Tuesday, 12 September 2023 15:10 (20 minutes)

The 100-MeV proton accelerator has been performing a variety of beam services seamlessly with multiple beamlines for 10 years at KOMAC. An improvement method for repeated operating mistakes during beam service has been applied to the user interface. These efforts have been partially applied to the user interface, and new ideas are still being created and prepared for application. Since automation technology for KOMAC proton accelerator and beam service operation is still in the research stage, we want to utilize various user interfaces to minimize human error. This paper describes the user interface for accelerator operation and beam service.

Presenter: SONG, Young-gi (KOMAC)

Session Classification: Poster / Demo Sessions

Contribution ID: **49** Type: **not specified**

PO13 - The Beam Diagnostics System in the J-PARC 3 GeV Rapid Cycling Synchrotron

Tuesday, 12 September 2023 15:10 (20 minutes)

The J-PARC 3-GeV Rapid Cycling Synchrotron (RCS) aims to deliver 1 MW proton beam to the materials and life science experimental facility (MLF) and the main ring synchrotron. In such a high intensity beam , there is a possibility to cause a severe radiation accident. To detect and prevent the radiation accident in the accelerator system, we developed the beam diagnostics system in RCS. This system includes a monitoring and interlock system of an abnormal state of the extraction beam to the mercury target of MLF. The radiation level of the gas in the tunnel were able to always observed by connecting radiation safety system and accelerator control system. Various kind of parameters, such as dump temperatures, radiation monitors, beam positions can be checked by one monitor to compare the influence each other.

Presenter: YAMAMOTO, Kazami (J-PARC/JAEA)

Session Classification: Poster / Demo Sessions

Contribution ID: **50** Type: **not specified**

PO14 - Timestamp synchronization of beam diagnosis system

Tuesday, 12 September 2023 15:10 (20 minutes)

At the large accelerator, hundreds of diagnostic systems are installed along the long beamline. And sometimes, we unify the information from the diagnostic systems which are installed separately, and understand the beam condition or anomaly. For this purpose, the synchronization of the timestamp of the individual diagnostic system works effectively to link the necessary information. The accelerator timing system, such as Event Timing System or White Rabbit, provides the common timestamp to the all hardware which belongs to its optical network. Therefore, the recorded data of the individual diagnostic systems can be linked and analyzed together in the offline analysis by using the attached common timestamp. The application examples of the timestamp synchronization at SuperKEKB are introduced in this presentation.

Presenter: KAJI, Hiroshi (KEK)

Session Classification: Poster / Demo Sessions

Contribution ID: **51** Type: **not specified**

PO15 - Challenging quest of three-dimensional spiral injection scheme to store the 80 keV electron beam in 12 cm diameter ring

Tuesday, 12 September 2023 15:10 (20 minutes)

Demonstration experiment by use of strongly X-Y coupled electron beam into the solenoid magnetic field will be introduced. Our goal is to validate newly developed three-dimensional beam injection scheme and formulate strategy of beam commission for the original experiment "muon g-2/EDM experiment at J-PARC". In our system, several beam diagnostic methods are available to understand different levels of commissioning steps. For instance, visualization of three-dimensional trajectory helps understanding of highly X-Y coupled Twiss parameters. Monitor by metallic wires and plastic scintillating fibers monitor system are useful to detect time-wise and spatial distribution of DC/pulsed beam. By combining these diagnostic methods, the beam is successfully injected and stored inside of the storage solenoid magnet, however, we have been facing with bunch of unforeseen events. The current biggest issue is how to align our beam center to the solenoid field center. Many challenges to hold the electron beam into 12 cm diameter ring for several micro-seconds will be given by small organization: "Six Samurai".

Presenter: IINUMA, Hiromi (Ibaraki-U)

Session Classification: Poster / Demo Sessions

Contribution ID: **52** Type: **not specified**

PO16 - CLS Operation Visual Aids

Tuesday, 12 September 2023 15:10 (20 minutes)

Visual aids play a crucial role in the operation of Canadian Light Source, providing valuable information to scientists, engineers, and operators. Multiple screens represent real time data about the machine's status, its parameters, and diagnostics in an easy to read and understandable form. These visual aids allow operators in particular to monitor and control various aspects of the synchrotron operation, such as beam energy, current, stability, determine the position of the beam, measure its shape and intensity distribution. Available software allows operators to customize screens that display data accounting for personal preferences and visual challenges. Ionizing radiation monitoring systems help ensure safety of the personnel and users working on the experimental floor. Visualization of potential radiation level increases can improve alarm response times. Operational statistics visualization makes it possible to determine trends in equipment reliability by utilizing data analysis and applying measures to improve beam availability. Visualization of maintenance tasks planning and progress tracking allows personnel to have a better understanding of the interferences of the affected systems and the overall systems readiness. Overall, visual aids play a vital role in synchrotron operation, providing essential information and helping in achieving high-quality results.

Presenter: NIKOLAICHUK, Alexander (CLS)

Session Classification: Poster / Demo Sessions

Contribution ID: **53** Type: **not specified**

PO17 - Operational tool for management of electromagnet power supplies at RIBF

Tuesday, 12 September 2023 15:10 (20 minutes)

"At RIKEN RIBF, a large number of electromagnet power supplies are implemented. In the control system, these electromagnet power supplies are managed in a database on a per-experimental-beamline basis, and programs are created based on this database. However, during operation, it took much work to determine the location of the controlled power supplies and what was used for the control controller. For example, when there was a malfunction in an electromagnet power supply during operation, it sometimes took time for the accelerator operator to go to the site for confirmation. Therefore, we decided to create a web application based on the database, which was previously only used for program creation, to solve these problems.

In practice, a list of electromagnet power supplies is output in the order of the experimental beamlines, allowing easy identification of which electromagnet power supplies are connected to which electromagnets. Additionally, it became possible to incorporate photos, drawings, and features of the power supplies into the web application without HTML coding, thus supporting the management of electromagnet power supplies. These systems will be reported in meetings to provide detailed information."

Presenter: UCHIYAMA, Akito (RIKEN)

Session Classification: Poster / Demo Sessions

Contribution ID: **54** Type: **not specified**

PO18 - Development of Web Applications for SRILAC Operation

Tuesday, 12 September 2023 15:10 (20 minutes)

At the RIKEN Nishina Center, a superconducting RIKEN Linear Accelerator (SRILAC) project was started in 2019 to synthesize a new superheavy element 119 and above. This project's control system is constructed based on Experimental Physics and Industrial Control System (EPICS). To store the data for SRILAC operation, the Archiver Appliance (AA) has been introduced as a new data archive system for EPICS-based control system. As one of the features of the AA, Web APIs are implemented to obtain the stored data, manage the PVs, and so on. Using these Web APIs, we developed Web applications to visualize the archive data using JavaScript libraries such as D3.js and React. These web application technologies are also used to display the alarm logs of the Machine Protection System (MPS). From the viewpoint of accelerator operators, the developed web application is helpful during beam tuning because a mechanism has been implemented to provide a convenient notification of MPS alerts. In this presentation, we will introduce the development status and actual operation of these web applications in SRILAC operations.

Presenter: KANEKO, Kenta (SHI)

Session Classification: Poster / Demo Sessions

Contribution ID: **55** Type: **not specified**

PO19 - Preparing the commissioning of FAIR

Tuesday, 12 September 2023 15:10 (20 minutes)

"The FAIR International Accelerator Facility, one of the largest science projects in the world, is being built at the GSI Helmholtz Center in Darmstadt, Germany. With construction work on the main buildings and accelerator tunnels for the FAIR first science stage nearing completion, the project is soon entering its final phase. Installation of the accelerator components will begin next year, and the first commissioning activities are scheduled for 2025.

For this reason, the planning and preparations for the commissioning phase are currently gathering pace. The GSI accelerator operations team has been involved in these activities at various levels from the very beginning, as they have a high level of practical experience on this topic from their everyday work. In this presentation, the current planning status and challenges will be presented, with a focus on the specific involvement of the operations team."

Presenter: REIMANN, Stephan (FAIR/GSI)

Session Classification: Poster / Demo Sessions

Contribution ID: **56** Type: **not specified**

PO20 - Impact of Accelerator Physics Involvement for Accelerator Operations

Tuesday, 12 September 2023 15:10 (20 minutes)

Accelerator operators expose to various knowledge that composes an accelerator complex, making operators a versatile workforce. The versatility is enhanced with additional accelerator physics knowledge and can benefit the duties in accelerator operation. Such knowledge can be intuitively obtained by involving in projects led by accelerator physicists. In this presentation, my involvement in Brookhaven National Laboratory's unique spin physics and accelerator physics research using various simulation codes: Zgoubi, MAD-X, and FLUKA, and their impact on my performance as an accelerator operator will be discussed.

Presenter: OH, Minwoong (BNL)

Session Classification: Poster / Demo Sessions

Contribution ID: **57** Type: **not specified**

PO21 - Fermilab Accelerator Complex Evolution & the Main Injector Synchrotron

Tuesday, 12 September 2023 15:10 (20 minutes)

"Fermilab is working to make the highest power proton beam for neutrino production. To that end we have committed to building a superconducting RF linac (aka PIP-II) to replace the existing Linac. On the experimental end we are building new detector enclosures and beam line (DUNE/LBNF) from the FNAL Main Injector (MI). The goal of the projects is to produce and utilize a 1.2 MW proton beam for neutrino physics.

The existing FNAL Main Injector (MI) synchrotron has a minimum ramp period of 1.13 seconds. We are considering upgrading the existing MI infrastructure to enable ramp period of about 0.6 seconds. This change, coupled with other improvements would become part of the FNAL Accelerator Complex Evolution (ACE) project and would almost double average beam power on target.

As an Engineering Physicist in the MI department my presentation will focus on proposed changes to the Main Injector and how these changes will be implemented across accelerator operations."

Presenter: MURPHY, Martin (FNAL)

Session Classification: Poster / Demo Sessions

Contribution ID: **58** Type: **not specified**

PO22 - Accelerator Operators involvement with commissioning the BRIGHT beamlines

Tuesday, 12 September 2023 15:10 (20 minutes)

In 2017 the Australian Synchrotron secured funding to build 8 new beamlines to accompany the existing 10 that have been in operation since 2007. After initial delays due to the COVID-19 pandemic many of these beamlines have started to come online in some capacity over the past 12 months. The accelerator operators have been actively involved in this process, which has included: commissioning new insertion devices, dealing with significant drops in beam lifetime, contributing to the new user interfaces and recovering from the inevitable beam dumps related to these new beamlines. This poster will present some of these challenges faced and solved when commissioning new beamlines at the Australian Synchrotron.

Presenter: SANDERS, Thomas (AS/ANSTO)

Session Classification: Poster / Demo Sessions

Contribution ID: **59** Type: **not specified**

PO23 - The Accelerator Operators role in making adaptive tuning effective.

Tuesday, 12 September 2023 15:10 (20 minutes)

The LANSCE accelerator has been in operation since the early 1970's at the Los Alamos National Laboratory, in the past running up to 4 beams of different charge, current and flavors to 800 MeV. Much of this operation has been accomplished by iterative tuning following the primary physics tune that occurs initially at machine start up. Initially, physicists and operators utilize emittance measurements, phase scans, Delta-T measurements, wire scans and harp measurements to set transverse and longitudinal parameters to establish an initial tune. Following this, operators begin ramping current toward production levels while iteratively adjusting steering, phase and amplitude of the accelerator amplifiers as well as adjustment to the quadrupole settings to reduce losses and maximize transmission. This iterative process is expert based and informed by trial and error and is fraught with opportunities to degrade the broad tune space established by the earlier transverse and longitudinal tune establishment. We continue to explore why this initial physics tune is not more effective at establishing a tune that can be taken to full power without interference and strive to establish a more repeatable and reliable way of getting to production current levels without the expert based iterative tuning. In this talk, we will explore some of what has made tuning iteratively sustainable in the past but more importantly, look towards the prospects of machine learning and adaptive tuning algorithms and the promise of iterative methods that can be applied consistently and reliably and examine what role the beam operators play in implementing this methodology.

Presenter: NAFFZIGER, Peter (LANL)

Session Classification: Poster / Demo Sessions

Contribution ID: **60** Type: **not specified**

PO24 - An S-Band Variable Waveguide Power Divider and Combiner for High-Vacuum and High-Power Applications

Tuesday, 12 September 2023 15:10 (20 minutes)

In theory, a 180° hybrid bridge can be used as a variable power divider and combiner. This study focuses on applying the variable power divider and combiner to a high-vacuum and high-power environment, aiming at realizing future applications in particle accelerators. Beginning from theoretical derivation, it reports the design of an S-band variable waveguide power divider and combiner based on a Magic Tee. The simulation results are consistent with those predicted by theory. A prototype of the variable power divider was fabricated for the microwave cold test, and the measurement results verify the variable power division. The power division ratio curve is consistent with the theoretical and simulated curves. The variable power combiner was experimentally verified by combining the Magic Tee and coaxial components. The measurement results are consistent with those of numerical analysis. Simulations evaluating the high-power performance reveal that the matching probe of the Magic Tee and the phase shifting plate tip of the straight waveguide phase shifter could not satisfy the high-power requirement. Thus, the structure of the Magic Tee is improved in the proposed design, and a 3-dB bridge waveguide phase shifter was adopted. The simulation results show qualified performance for high-power applications, and other microwave performance characteristics also show great improvement. The study lays a good foundation for application in future high-vacuum and high-power environments, and some possible important applications are also illustrated.

Presenter: HE, Xiang (IHEP)

Session Classification: Poster / Demo Sessions

Contribution ID: **61** Type: **not specified**

PO25 - Dependency Tracking Tools for Outage Planning

Tuesday, 12 September 2023 15:10 (20 minutes)

SLAC now operates four large particle accelerators (LCLS, LCLS-II, FACET-II, and SPEAR3). These four machines are somewhat independent, but share some infrastructure (water cooling systems, electrical power distribution, networking, etc). As the user availability demands increase for these accelerators, planning outages for preventative maintenance and upgrades becomes quite challenging. In the Accelerator Operations and Safety Division, we are developing a database-driven tool to track the complex network of dependencies and assist with outage planning.

Presenter: GIBBS, Matt (SLAC)

Session Classification: Poster / Demo Sessions

Contribution ID: **62** Type: **not specified**

PO26 - Operation and Maintenance at a Compact Synchrotron Radiation Facility SAGA-LS

Tuesday, 12 September 2023 15:10 (20 minutes)

The SAGA Light Source (SAGA-LS) is a compact synchrotron radiation facility. The SAGA-LS accelerator complex consists of a 255 MeV linac and a 1.4 GeV electron storage ring of 75.6 m in circumference. The accelerator research group is responsible for the operation and maintenance of the accelerator system. The annual operation time for synchrotron radiation experiments has been around 1700 hours. The daily operation is carried out in collaboration with SPring-8 Service Co., Ltd. Besides the routine operation for user time, the accelerators are operated for machine conditionings and studies on every Monday. In addition to the machine operation and the machine study, we are responsible for many other tasks such as radiation safety control and facility management. In recent years, we have continued efforts to identify and replace aging components. The RF cavity and the main power supplies for the ring magnets are planning to be replaced in next three years. In this workshop, we will report on the current status of accelerator operation and maintenance, as well as some examples of machine troubles.

Presenter: IWASAKI, Yoshitaka (SAGA-LS)

Session Classification: Poster / Demo Sessions

Contribution ID: **63** Type: **not specified**

PO27 - Current Status of UVSOR-III Synchrotron Radiation Facility

Tuesday, 12 September 2023 15:10 (20 minutes)

We present the current status of UVSOR-III electron storage ring. It is a 750 MeV machine dedicated to synchrotron radiation in UV, VIS, IR and SX region, including LCS gamma-rays. We are accepting about 4,000 person-day researchers yearly from nationwide and outside Japan. The accelerator complex consists of a 15 MeV linear accelerator, a 750 MeV booster synchrotron and a storage ring of 53 m circumference, in which 6 undulators are operational. The operation time is from 9 am to 9 pm from Tuesday to Friday, including overnight bonus operation on Thursday night. All 60 hours operation is in top-up mode. Eight technical staffs with several beamline scientists are managing total 14 beamlines, while four technical staffs operate all accelerators. Most of the beamline control softwares and some of the accelerator control softwares are made in-house. UVSOR-III is reaching 40 years old and facing severe aging problems, especially of cooling water leakage from electromagnets and vacuum leakage from beam ducts. We are managing the troubles with various solutions, including partial replacement of coils, applying sealants, and so on.

Presenter: HAYASHI, Kenji (UVSOR)

Session Classification: Poster / Demo Sessions

Contribution ID: **64** Type: **not specified**

PO28 - Current Status of Refurbished Target Irradiation System for Radioactive Isotope Production Using an Electron Linear Accelerator at Research Center for Electron Photon Science, Tohoku University

Tuesday, 12 September 2023 15:10 (20 minutes)

60 MeV electron linac has been used for radioisotope (RI) production via photo-nuclear reaction at Research Center for Electron Photon Science (ELPH) at Tohoku University. Operation hours of the linac is 834 hours in 2022 despite refurbished former 300 MeV linac built in 1967. Four engineers together with researchers in beam physics and radiochemistry are in charge of accelerator operation and its development including other two linacs. In addition to eight-hour operation that is usually performed by two works shifts, we respond to requests of users for development of accelerators and applications. Since we have refurbished the target irradiation system for RI production including cooling system, interlock system, and accelerator operation system in 2018, details and current status of our irradiation system for RI production using the linac will be reported in the presentation.

Presenter: TAKAHASHI, Ken (Tohoku-U)

Session Classification: Poster / Demo Sessions

Contribution ID: **65** Type: **not specified**

PO29 - Consolidated Alarm Panel –Improving Alarm Management and Operator Response

Tuesday, 12 September 2023 15:10 (20 minutes)

Control rooms rely on alarms to alert operators of abnormal conditions and failures. In the event of major failures, it is essential that operators identify the causes and respond quickly. The ATG control room at TRIUMF routes all alarms to a physical consolidated alarm panel. As the centre-piece of the control room, the panel clearly indicates the system(s) in alarm state, allows all alarms to be silenced at once, and allows operators to immediately address the causes of the alarm(s). By streamlining alarm response, the consolidated alarm panel can help minimize the effects of failures and reduce recovery times.

Presenter: YOUNG, Steven (TRIUMF)

Session Classification: Poster / Demo Sessions

Contribution ID: **66** Type: **not specified**

PO30 - Report on Alarm Management of synchrotron SOLEIL

Tuesday, 12 September 2023 15:10 (20 minutes)

"The SOLEIL synchrotron radiation facility was commissioned in 2006 and today supplies photon beams to 29 beamlines, with a maximum intensity of 500 mA during 5000 hours per year. Over the last few years the operation group, with the help of the Acquisition and Control Systems Engineering group, has been heavily involved in the fine integration of the new PANIC alarm management system into the control room. This system is a very valuable tool for the operators and contributes to the global effort to ensure the availability and reliability of the electron and photon beams: to achieve a beam availability of more than 99%, a mean time between failures (MTBF) of 100 hours, and a mean time to recover (MTTR) of 1 hour.

To reach such ambitious goals, it is essential to design seamless tools, well integrated into the control system, tailored the safety operators'needs, linked to our knowledge database. The alarm system must be finely tuned to monitor at the good level accelerator systems such as power supplies, pulsed elements, diagnostics, utilities and radiation protection based on our knowledge of the equipment and our software portfolio.

The integration process involved the custom design of the PANIC alarm management system based on these identified needs, as well as the meticulous installation of sensors and monitoring devices. For example, temperature and pressure sensors are installed to monitor the accelerator cooling systems, and the storage ring emittances are monitored to take action if the measurement fails. The fundamental importance of training control room operators in the use of the PANIC alarm management system and providing them with quick access to the procedures and associated documentation is also emphasized to ensure its continued proper functioning. These concrete measures help to maintain the desired level of availability and reduce MTTR.

The successful integration of the PANIC alarm management system into the control room of the SOLEIL synchrotron helps us to improve our efficiency and responsiveness in emergency situations. For example, if an alarm is triggered due to overheating of the power supplies, the PANIC system immediately sends a notification to the operators, opens the documentation in our Confluence-based knowledge database, and allows us to quickly take preventive measures. By sharing our work and experiences, we aim to actively contribute to collective learning and performance improvement in other similar facilities."

Presenter: TREVARIN, Didier (SOLEIL)

Session Classification: Poster / Demo Sessions

Contribution ID: **67** Type: **not specified**

PO31 - LANSCE Fast Protect System Modernization

Tuesday, 12 September 2023 15:10 (20 minutes)

The LANSCE accelerator facility has been in operation for 51 years, and the Fast Protect System has been monitoring systems site-wide since the early 80's. The premise of Fast Protect is to provide machine protection by monitoring all critical devices at the facility on a pulse-by-pulse basis. In the event of a malfunction, beam is terminated prior to acceleration to minimize activation of beam line components. This discussion will focus on the redesign of that system, weighing off-the-shelf versus purpose-built hardware, running-in-parallel concept of system verification, phased approach to installation, and overall system improvements. I will also cover the nearly unlimited logic flexibility of a custom bare metal FPGA, future proofing aspects of the design, new system performance, and ability to accommodate future upgrades.

Presenter: SNYDER, Joseph (LANL)

Session Classification: Poster / Demo Sessions

Contribution ID: **68** Type: **not specified**

PO32 - Responding to Alarms and Warnings

Tuesday, 12 September 2023 15:10 (20 minutes)

"Effectively responding to alarms and warnings is paramount for ensuring safety and mitigating potential risks. This talk will shed light on the practices employed at SLAC National Accelerator Laboratory to promptly and cohesively respond to critical alerts.
1. Identify the Source: Quickly identify the source of the alarm or warning. Determine whether it is a false alarm or an actual threat.
2. Follow Established Procedures: Each Alarm or Warning channel has an associate responses procedure.
3. Prioritize Safety and Communicate Effectively: In all circumstances, safety must be the top priority. It is essential that Operators use clear and concise communication.
4. Record and Report: Record the details of the incident and escalate as needed.
I will also present the types of systems integrated into our alarms and warnings chassis (e.g. PPS Zone loss of security), and the equipment used to generate the alerts. Finally, the talk will briefly discuss the benefits of simulated, tabletop training exercises. By engaging in such training, we hope to enhance preparedness and response efficacy, ensuring that staff is well-equipped to handle various emergency scenarios."

Presenter: WARREN, Jonathan (SLAC)

Session Classification: Poster / Demo Sessions

Contribution ID: **69** Type: **not specified**

PO33 - Importance of first response learned from a water leak trouble in vacuum

Tuesday, 12 September 2023 15:10 (20 minutes)

"Cooling water leakage occurred in the vacuum chamber of an ECR ion source. It has taken plenty of time to determine the cause of the pressure increase and realize the cooling-water leakage in the vacuum chamber, because there were a lot of possibility to cause the pressure increase, such as a vacuum leak from air and the gas lines. The delay time to realize the water leakage led to spreading damage. We totally took three weeks to recover the performance of the ECR ion source. In this trouble, we confirmed that, to reduce the damage caused by the water leakage in the vacuum chamber, we need to develop a method to notice the water leakage by using a quadrupole mass spectrometer."

Presenter: FUKUSHIMA, Keita (AEC)

Session Classification: Poster / Demo Sessions

Contribution ID: **70** Type: **not specified**

PO34 - Some Like It Hot: Lessons Learned at RHIC from Summer Running

Tuesday, 12 September 2023 15:10 (20 minutes)

RHIC Run 23 faced numerous challenges, largely caused by running in the heat of the summer. This talk covers the plethora of unexpected issues experienced during the run, and our attempts to address and mitigate them.

Presenter: BLACKLER, Ian (BNL)

Session Classification: Poster / Demo Sessions

Contribution ID: **71** Type: **not specified**

PO35 - AGILE REGULATORY OVERSIGHT: ADAPTING REGULATIONS TO ACCOMMODATE RAPIDLY CHANGING ACCELERATOR TECHNOLOGY

Tuesday, 12 September 2023 15:10 (20 minutes)

"Canadian nuclear facilities of all types are migrating from nuclear substances to accelerator-based facilities, mirroring the trend first observed in the medical sector in the 1980's and 90's. This shift has been motivated by the need for more flexible and higher throughput facilities, as well as a desire to move away from nuclear-substance-based facilities that may require more thorough security requirements. In order to meet this demand, accelerator manufacturers are devising increasingly novel designs and applications, sometimes testing the limits of the current regulatory system.
The Canadian Nuclear Safety Commission (CNSC) is currently in the process of proposing amendments to the regulations which govern the use of particle accelerators in Canada. The intent is to provide modernized and flexible regulations, which will not unnecessarily restrict or hinder innovation in the nuclear industry, while still ensuring that these facilities continue to operate in a safe and secure manner.
This presentation will describe some of the novel new applications of accelerators in Canada, and provide a high level description of the proposed new methods the CNSC is considering in the regulation of these facilities.

***NOTE TO ORGANIZERS: PLEASE LET ME KNOW IF THIS TOPIC DOES NOT FIT WITH YOUR CONFERENCE THEME"

Presenter: HEIMANN, Mike (CNSC)

Session Classification: Poster / Demo Sessions

Contribution ID: **72** Type: **not specified**

PO36 - Sequencer tool for automatisation of repetitive HW tasks

Tuesday, 12 September 2023 15:10 (20 minutes)

Accelerator operation is very manpower demanding. Control system tools could overtake repetitive tasks during commissioning and beamtime like device scanning, beam optimization or device steering nowadays. A Sequencer tool has been developed to automate accelerator devices steering for different purposes. Main use cases up to now cover HW Commissioning and Power Saving. We report on software architecture of the tool and first usage results.

Presenter: GEITHNER, Oksana (GSI)

Session Classification: Poster / Demo Sessions

Contribution ID: **73** Type: **not specified**

PO37 - Development of remote participation tools for LIPAc operation

Tuesday, 12 September 2023 15:10 (20 minutes)

Accelerator-based high energy neutron sources are studied to characterize future fusion reactors material. The Linear IFMIF Prototype Accelerator (LIPAc) is a full-scale prototype aiming at validating the production of a deuteron beam of 125 mA at 9 MeV in continuous wave in an international collaboration between Japan and the European Union. The accelerator is located in Rokkasho, Japan, and many experts all around Japan and Europe are participating to LIPAc operations. For this reason, we have developed a web-based remote participation system, which can be used by experts to monitor the status of the operation in real-time from anywhere in the world. Our solution provides to each user a virtual desktop with the same environment and tools as the control room in Rokkasho, and a real-time, read-only copy of the accelerator data. This presentation will explain the technical and organizational challenges met during the development, and the solution adopted to ensure the security and safety of the operation, balanced against the ease of use for our experts.

Presenter: CAMPOS, José Franco (QST)

Session Classification: Poster / Demo Sessions

Contribution ID: **74** Type: **not specified**

PO38 - Measurement of temperature and humidity in accelerator tunnel by Raspberry Pi

Tuesday, 12 September 2023 15:10 (20 minutes)

"It is important to measure and control the temperature and humidity in the accelerator tunnel to keep this accelerator component healthy.
We have developed the inexpensive measurement system in the tunnel consisting of a Raspberry Pi and an I2C sensor with temperature and humidity.
This compact system can measure humidity as well as temperature in real time based on EPICS system and is easy to install.
The results of hanging up of the systems due to the radiation during the beam operation and the counter measure to protect the system is reported.
Also the stability during the long shut down time where the air conditioning system in the tunnel been turned off is discussed."

Presenter: IWABUCHI, Shuhei (KEK)

Session Classification: Poster / Demo Sessions

Contribution ID: **75** Type: **not specified**

PO39 - RF Control for Suppression of Beam Instabilities due to Accelerating Mode in SuperKEKB

Tuesday, 12 September 2023 15:10 (20 minutes)

"SuperKEKB aims for high luminosity on the order of 10^35 cm^-2s^-1 with high beam currents of 2.6 A for electron and 3.6 A for positron to search a new physics beyond the Standard Model in the B meson regime. In recent operations, we achieved new record of the luminosity of 4.7x10^34 cm^-2s^-1 with 1.1 A for electron and 1.3 A for positron.
For high current beam storage, beam instabilities due to accelerating mode is one of the significant issues in RF System, although the accelerating mode of an RF cavity is indispensable for acceleration. Therefor the beam instabilities must be suppressed by advanced RF signal control with acceleration voltage control.
In the SuperKEKB operation, direct RF feedback control technique is applied for suppression of the static Robinson instability into the cavity voltage control loop. Additionally, advanced damper system of coupled bunch instability is adopted in the RF control. The details and tuning method of the RF control system for suppression of the beam instabilities will be presented, and the performance of the system in the beam operation will be also reported."

Presenter: KOBAYASHI, Tetsuya (KEK)

Session Classification: Poster / Demo Sessions

Contribution ID: **76** Type: **not specified**

PO40 - Topup injection in the collision operation of BEPCII and key technology

Tuesday, 12 September 2023 15:10 (20 minutes)

"The BEPCII is designed as an e+/e- attenuating operational collider. In order to improve the BESIII data acquisition, BEPCII has carried out an upgrade project of topup injection operation of high-energy physics experiments. Based on the injection rate, injection interval, beam lifetime and luminance evolution of e+ and e-, the optimized data acquisition time can be calculated. The collision mode topup injection operation has been realized in 2019.
The positron target is the core equipment to realize e+/e- beam switching. The positron target has been improved in the case that the positron source system is not expanded. The beam performance index and operation function have reached the expected result."

Presenter: CHEN, GuangHui (IHEP)

Session Classification: Poster / Demo Sessions

Contribution ID: **77** Type: **not specified**

PO41 - Modernization of the GSI Pager System for the FAIR Control Room

Tuesday, 12 September 2023 15:10 (20 minutes)

"During the beam time a failure can occur at any time and the operators have to solve it as fast as possible. If they are not able to solve the problem, they need the support of an expert and during the normal working hours at GSI they can use the existing pager system. A call is initiated by simply pressing a button on a keypad in the main control room.
Previously, the keypad was limited to a small number of pager numbers. Since the keypad could not be expanded, additional experts had to be paged by phone. Some groups even had to share the same pager number.
From FAIR's perspective, with its predominantly digital control room, we developed a new software and hardware interface to meet the needs of such a large facility. At the same time, we optimized the existing hardware in preparation for the upcoming challenges ahead until FAIR's completion."

Presenter: SCHMIDT, Christian (GSI)

Session Classification: Poster / Demo Sessions

Contribution ID: **78** Type: **not specified**

PO42 - Incidents caused by earthquakes and storms, and how to detect them

Tuesday, 12 September 2023 15:10 (20 minutes)

"At the National Institutes for Quantum Science and Technology (QST), carbon-ion therapy has been carried out since 1994, and a total of more than 15,000 patients have been treated to date. Japan, where QST is located, is prone to disasters such as earthquakes and storms, which can cause equipment failures: Earthquakes can cause misalignment in equipment, and storms can cause power outages due to lightning strikes.
Currently at our facility, inspections in the event of a disaster are limited to those devices that have experienced failures due to disasters in the past and are based on operators' judgment. In fact, even if operating is started with failures due to a disaster, equipment alarms can detect them. However, if possible, we should detect them before they become serious. For this purpose, it is necessary to assume in advance what kind of the failures may occur due to each disaster, and to conduct appropriate inspections that have been studied in advance, when or before a disaster occurs. In addition, it is desirable to divide inspection items by the scale of the disaster, so that appropriate inspections can be performed depending on the situation.
The points that should be on alert for failure due to earthquakes are those where small misalignments lead to serious failures, in other words, those subjected to high stresses. Therefore, when an earthquake occurs, cooling water piping, vacuum equipment, and rotating gantries should be inspected. On the other hand, measures to prepare for earthquakes are largely dependent on the building, and there is little that can be done proactively.
The threats in storms are power outages caused by lightning strikes and lightning strikes themselves. While equipment shutdowns due to power outages are inevitable, UPSs and other equipment should be inspected regularly to avoid critical failures of system. Also, the failures caused by lightning strikes can be prevented to some extent by anticipating and taking countermeasures against surge entry paths as much as possible.
In this presentation, we will assume failures which can be caused by earthquakes and storms, and discuss inspection items to detect signs of failure, such as misalignment of markings and strange drive noises."

Presenter: GOTO, Tatsuki (AEC)

Session Classification: Poster / Demo Sessions

Contribution ID: **79** Type: **not specified**

PO43 - Bunch length monitoring using a spectrum analyzer

Tuesday, 12 September 2023 15:10 (20 minutes)

A method to measure relative changes of the bunch length based on the spectrum of the induced voltage on a BPM button has been developed at ALBA. The bunch length has been calibrated using a Streak Camera for different filling patterns and beam currents. The idea is to have an alternative, redundant and readily available measurements of the bunch length during machine operation, avoiding the continuous use of the Streak Camera.

Presenter: SÁNCHEZ, Javier Bañuelos (ALBA)

Session Classification: Poster / Demo Sessions

Contribution ID: **80** Type: **not specified**

PO44 - Unexpected failures and their conequences during beam time

Tuesday, 12 September 2023 15:10 (20 minutes)

The GSI Helmholtz Center for Heavy Ion Research is known for its parallel operation, in which up to 8 experiments are simultaneously supplied with beams from up to 4 different ion sources. The beamtime blocks of the last few years were about 6 months long and packed with weekly changing experiments and intensities. During the beam times at GSI, there are always unexpected failures of devices, cavities or experiments. As a consequence, beam schedules are changed at short notice, experiments are postponed or alternative beams are offered. This causes a significant additional effort for the operators. Larger failures and their effects of the last beamtime are shown in this poster.

Presenter: VOSSBERG, Markus (GSI)

Session Classification: Poster / Demo Sessions

Contribution ID: **81** Type: **not specified**

PO45 - New and old methodology of alingnment and instruments used for Elettra and Elettra 2.0

Tuesday, 12 September 2023 15:10 (20 minutes)

For the First machine Elettra we used and optical method and reached a presion of tenths of millimetres. For Elettra 2.0 we Will use Absolute tracker, a network for inserting objects and an appropriate software. In this case we would reach a centesimal millimetres precision.

Presenter: CORONICA, ALESSANDRO (Elettra)

Session Classification: Poster / Demo Sessions

Contribution ID: **82** Type: **not specified**

PO46 - Tools / Developments done by the ESRF Operators

Tuesday, 12 September 2023 15:10 (20 minutes)

"Since the start of ESRF, the tasks entrusted to machine operators have not been only confined to operating, monitoring and ensuring the safety of installations.
Depending on their level of computer knowledge and availability, they develop interfaces and servers to control equipment (in collaboration with the experts), and complement those created by the dedicated group.

These in-house developments motivate operators to maintain their level of machine knowledge, and also help maintain communication with other groups.

Tools such as Python, Jdraw and Java provide graphical solutions for monitoring one or more parameters (voltage, supply current, etc.), or analyzing cluster failures to trace the source of a fault.
The applications created also serve as mock-ups for future high-level applications, with an Operation point of view in addition to that of the Expert, and the programmer…"

Presenter: CHAZOT, Gilles (ESRF)

Session Classification: Poster / Demo Sessions

Contribution ID: **83** Type: **not specified**

PO47 - Current Status of the Control System at Research Center for Electron Photon Science, Tohoku University

Tuesday, 12 September 2023 15:10 (20 minutes)

Research Center for Electron Photon Science (ELPH) of Tohoku University operates three electron linear accelerators (linacs) and an electron synchrotron for various scientific fields, such as radioisotope production, proton radius measurement, and hadron physics experiments. One of the linacs, operational since 1967, is outdated and frequently malfunctions. Our team of about eight people, consisting of faculty and technical staff, responds to these malfunctions. In addition, we handle the maintenance and modification of all other accelerators as well. Notwithstanding the small number of members, the team also takes care of a wide variety of tasks including control system development. In order to carry out control system development under these conditions, we have been reducing the workload. In this presentation, we will discuss the pros and cons of the current control system at ELPH so as to share our approach for maintaining and improving these systems.

Presenter: NAGASAWA, Ikuro (Tohoku-U)

Session Classification: Poster / Demo Sessions

Contribution ID: **84** Type: **not specified**

PO48 - Python-based Operator Tools and Interfaces at SNS

Tuesday, 12 September 2023 15:10 (20 minutes)

"Tools developed for the control room need to be fast, effective, and modular. At the Spallation Neutron Source (SNS), operators have developed software to test tuner motors on the superconducting linac and a graphical user interface (gui)-based application to automatically tune beam losses and lower residual activation levels in the tunnels. Future plans include an app to automatically condition RF cavities during startup. All of these applications share common themes of being intuitive, easy to use, and adaptable. With this uptick in python-based tools being written, the physics group has rewritten the physics model interface applications in Python to make them more accessible in the control room. With tools such as Python and Qt and the clear migration towards them, it is easier than ever to produce high-level, interactive applications specific to the operator's ever-changing needs.
*ORNL is managed by UT-Battelle, LLC, under contract DE-AC05- 00OR22725 for the U.S. Department of Energy."

Presenter: RYE, Jonathan (SNS)

Session Classification: Poster / Demo Sessions

Contribution ID: **94** Type: **not specified**

Invited Talk - ANA's Predictive Maintenance (Uniting the world in wonder)

Monday, 11 September 2023 16:30 (1 hour)

ANA promotes Predictive Maintenance to enhance the prediction as a part of aircraft maintenance. In 1968, with the goal of creating a more efficient maintenance program according to the Logical Decision Processes, the Maintenance Steering Group (MSG) developed a handbook, MSG-1, "Maintenance Evaluation and Program Development" for the B747. Further, the frequent revisions have been made for the MSG up to now.

The objectives of the maintenance program are to (1) ensure the design safety and reliability level, (2) restore the design safety and reliability level when degradation occurs, (3) collect information necessary to make design improvements when design reliability is insufficient, and (4) achieve these objectives at the lowest total cost (sum of maintenance cost and lost cost when failure occurs). The total cost of maintenance and the total cost of loss in the event of a failure should be minimized.

Of course, ANA will continue to implement the maintenance requirements based on the current handbook, MSG-3, but has begun predictive maintenance using aircraft sensor data and failure management data. ANA is using artificial intelligence to analyze aircraft sensor data, maintenance data, manufacturer data, and other big data. ANA analyzes such the big data to find signs of malfunctions and respond to them before they occur. The goal is to find the signs that lead to defects and respond to them before they occur. ANA's management new vision is "Uniting the world in wonder". ANA will expand the possibilities of air safety through predictive maintenance.

Presenter: KAYA, Junichiro (ANA)