ARW 2017

Sunday 15 October 2017 - Saturday 21 October 2017

VERSAILLES

Session Abstracts

The ARW provides a venue for individuals from accelerator communities worldwide to meet and share their experiences on operating reliable facilities. The workshop fulfills the need to improve information exchange on technical issues and equipment reliability. It facilitates the opportunity for individuals to share their problems and solutions with their peers from other facilities, worldwide.

Availability Tracking and Metrics

Availability is the amount of time a system is working at its full functionality during the time it is required to do so. The key metrics involved in measuring availability are Mean Time Between Failure (MTBF), sometimes referred to as Mean Time to Failure (MTTF), and Mean Time to Repair (MTTR). The methods for tracking availability and setting performance metrics can be different for each laboratory or institute. They are typically measures of success that can allow for facility performance over time and comparisons between facilities. How are they developed for your facility? How do subsystem metrics influence the overall metrics? The values and methods used by different labs should be shown and explained.

Reliability Before Design

Reliability and availability requirements are taken in consideration long time before the design will actually start. This is a common practice in many industrial applications and is becoming more and more common for new projects in the accelerator domain. A systematic analysis of all machine parameters and scenarios should serve as a basis to establish prediction and calculations to correctly dimension accelerator sub-systems and components. Knowing how to calculate reliability is important, but knowing how to achieve reliability is equally, if not more, important. Reliability practices must begin early in the design process and must be well integrated into the overall product development cycle. The reliability design process is often divided in key activities: 1) Define, 2) Identify, 3) Analyze and Assess, 4) Quantify and Improve, 5) Validate and 6) Monitor and Control.

This session will try to answer how to fold reliability considerations into the early stages of system design by reviewing best practices at different facilities and comparable industrial installations.

Topics to be considered:

Tools, procedures and practices to calculate and predict system reliability during the design phase.
Tools, provide a roadmap that can easily be followed, as well as easily mapped into a Product Development Process (Concept, Design, Assurance, Manufacturing and Launch).
What are the main goals of dependability analysis at the different facilities and who is information presented/distributed?
How to determine the required dependability goals for a subsystem.
Risk assessment (FMEA, STPA...)

Infrastructure

Our facilities primarily focus on the accelerators, however infrastructure such as cryogenic plants, water-cooling, water distribution, and electrical power distribution that supports the facility and accelerators affects their reliability.

Accelerator Systems

Major accelerator systems such as RF, power supplies for accelerator components, vacuum systems, often need to modify to improve performance and reliability. Upgrades can be done incrementally or all at once. What are strategies for implementing improvements particularly for new technology?

Accelerator Control

Controls hardware, software, feedback systems, and machine protection can seriously influence reliability. How do we face compatibility issues for systems that control and protect your equipment? How do you evolve or integrate these systems to improve reliability? Possible solutions; continuous deployment, test-driven development, smooth software upgrades (planning and execution)

Failure Investigation

Looking at failures and going through the investigation process. The investigation process may be different for various types of failures. Can the process start before a failure by utilizing predictive failure monitoring? We do not want to focus on the results but in the process of getting to those results. We encourage presenting uses case scenarios in this session.

Root Cause Failure Analysis (RCFA) is a very useful tool for improving the reliability of equipment or a process. It is a logical, structured, and deductive technique that can identify the causes behind the failure.

Maintenance for High Reliability

Maintenance methods differ facility to facility; strategy will impact on reliability and performance. This session will hopefully highlight, which measures, criteria, strategy, contribute most to improve reliability.

How do you track it? What are best practices?

Compare different facilities and different accelerator cultures.

Medical Accelerators

The thematic of Particle Accelerators in the Medical Applications are mainly in connection with Radiation Oncology. Solutions for photon or electron irradiation are established solutions provided by major industrial companies. The emergent field of Particle Therapy can be now described along two extreme categories: the facilities managed as those for Large Equipment for Physics and the ones completely managed by industrials. Reliability for the particularities of the medical applications is constrained by different context than research facilities. The reliability must be considered in a strong association with the safety and the medical certification requirements. The fractionation of

treatment (a treatment is given in many fractions, then lasting several weeks) leads to the constraint of having a quasi-continuous process along the year. Also the governance and customers are from the "medical" world, where approach of priorities, decisions and management of information is quite different as the ones in the Research facilities.

Insuring Long Term Reliability

How do you ensure long-term reliability? Accelerators and accelerator components deteriorate with age, also from environmental factors such as rust, corrosion, and even radiation. These factors can result in component fatigue, obsolescent issues, and even equipment that is just at the end of life. Dealing with these aging and environmental issues may not be top priority, but they have to be addressed.

Strategies for Continuous Reliable Operations

Stringent reliability requirements are driving the need for perpetual operation. How do you design or adapt systems in situations where even short interruptions to operations are unacceptable? Building facilities using active redundant systems, and automated compensation systems to ensure continuous operations and avoid system shutdown.

High Intensity Accelerator Reliability

This session will try to show how reliability issues are addressed and taken in consideration in all phases of development and operation of High Intensity Accelerators. High Intensity Accelerator systems are often working at the upper limits of their range, reliability requirement is extremely high and machine protection consideration become paramount.

Facility Status and Reliability

Posters with overview of facilities, accelerator activities and related reliability.