ACORN

Functional Requirements

# Revision History

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| --- | --- | --- | --- |
| Revision | Responsible Person | Date | Description of Changes |

# Purpose of this Document

<write the purpose of this document>

# Alarms

## UC-01460.001

The control system shall provide a registry of all the alarms on the system, their triggering conditions, notification channels, etc.

Level: 3

Tags: Alarms; Core

## UC-01460.002

The control system shall provide a mechanism for authenticated and authorized entities to create alarm data in the alarm registry.

Level: 3

Tags: Alarms; Core; Interfaces

## UC-01460.003

The control system shall provide a mechanism for authenticated and authorized entities to update alarm data in the alarm registry.

Level: 3

Tags: Alarms; Core; Interfaces

## UC-01460.004

The control system shall provide a mechanism for authenitcated and authorized entities to delete alarm data from the alarm registry.

Level: 3

Tags: Alarms; Core; Interfaces

## UC-01460.005

The control system shall provide a mechanism for authenticated and authorized entities to read alarm data from the alarm registry.

Level: 3

Tags: Alarms; Core; Interfaces

## UC-01470.001

The control system must notify interested actors through defined channels when alarm conditions are triggered.

Level: 3

Tags: Alarms; Core; Interfaces

## UC-01930.001

The control system shall provide the capability to setup a "heartbeat" alarm, that is, an alarm that is triggered when a device stopped reporting new data.

Level: 3

Tags: Alarms; Core

## UC-01940.001

The control system shall report when data readings from a device are stale, and trigger any notifications if a "heartbeat" alarm was setup.

Level: 3

Tags: Alarms; Core

# Core

The control system shall be fail-safe; Even under failure, the system shall behave at least as safely as if properly working.

Level:

Tags: Core; Operations; Safety

## UC-01770.001

The control system shall provide timestamps for data that can be correlated across systems.

Level:

Tags: Core; Development; Research

## UC-01790.001

Is this a control system requirement or is this an AI/ML requirement?

Level:

Tags:

## UC-01840.001

The control system shall provide the capability to organize, display and adjust related device parameters (Parameter pages).

Level:

Tags: Core

## UC-01840.002

The control system shall keep a registry of parameter pages.

Level:

Tags: Core

## UC-01840.003

The control system shall allow users to search existing parameter pages by name or keywords.

Level:

Tags: Core; Operations

## UC-01840.004

The control system shall provide authenticated and authorized entities the ability to create new parameter page entries in the parameter page registry.

Level:

Tags: Core; Operations; Development

## UC-01840.005

The control system shall provide authenticated and authorized entities the ability to retrieve parameter page entries from the parameter page registry.

Level:

Tags: Core; Operations

## UC-01840.006

The control system shall provide authenticated and authorized entities the ability to update parameter page entries in the parameter page registry.

Level:

Tags: Core; Operations; Development

## UC-01840.007

The control system shall provide authenticated and authorized entities the ability to delete parameter page entries from the parameter page registry.

Level:

Tags: Core; Operations; Development

## UC-02020.001

The control system shall provide a way to apply common statistical functions and transformations to a dataset of readings from devices.

Level:

Tags: Core; Development; Research

## UC-02070.001

The control system should support the automation of smart beam redirection according to changing conditions of the system (downtimes). This is related to UC-01850

Level:

Tags:

## UC-02150.001

FILL IN REQUIREMENTS

Level:

Tags:

## UC-02250.001

The control system shall interface with the Interlocks system, to collect data about its state.

Level:

Tags: Core; Safety; Interlocks

## UC-01210.001

The control system shall provide mechanisms for correlating data from different sources in the accelerator complex.

Level: 2

Tags: Core; Operations; Research

## UC-01900.001

The control system must let operators adjust magnet currents on a machine to keep the beam as close to a nominal path as possible, and minimize beam loss.

Level: 2

Tags: Core; Operations; Research

## UC-01910.001

The control system shall provide the capability to adjust the position of beam targets.

Level: 2

Tags: Core; Operations; Research

## UC-02080.001

The control system should support the configuration of alarms that react intelligently according to changing conditions. e.g. an alarm that doesn't make sense when some part of the accelerator complex is inactive.

Level: 2

Tags: Core; Operations

## UC-02220.001

The control system shall support the setup of smart data loggers, which are triggered under defined special conditions, to capture data to later help troubleshooting and diagnosing.

Level: 2

Tags: Core; Operations; Research

## UC-01420.001

The control system shall allow an authenticated and authorized entity to create a request for data acquisition from a device.

Level: 3

Tags: Core; Operations; Research

## UC-01420.002

The control system shall allow an authenticated and authorized entity to update it's own existing data acquisition request.

Level: 3

Tags: Core; Operations; Research

## UC-01420.003

The control system shall allow an authenticated and authorized entity to delete it's own data acquisition requests.

Level: 3

Tags: Core; Operations; Research

## UC-01420.004

The control system shall allow an authenticated and authorized administrator level entity to manage all data acquisition requests.

Level: 3

Tags: Core; Operations

## UC-01425.001

The control system shall consolidate data acquisition requests that are redundant into one request.

Level: 3

Tags: Core

## UC-01425.002

The control system shall ensure that data acquisition requests do not occur at a frequency greater than the capacity of the devices providing the information requested.

Level: 3

Tags: Core

## UC-01425.003

The control system shall deliver data from consolidated requests to each requestor.

Level: 3

Tags: Core

## UC-01425.004

The data acquisition interface shall have enough capacity to handle all incoming data acquisition requests from applications, both internal and external. A more precise estimation of required capacity shall be calculated based on current and projected traffic.

Level: 3

Tags: Core

## UC-01425.005

The data acquisition interface should scale up it's capacity according to demand increase, requiring minimum human intervention.

Level: 3

Tags: Core

## UC-01640.001

The control system shall generate a beam permit signal only when safety conditions for machine protection are met. Such conditions are defined by each machine protection subsystem.

Level: 3

Tags: Core; Operations; Safety

## UC-01640.002

What are the requirements for when safety conditions are not met? How are safe conditions determined?

Level: 3

Tags: Core; Operations

## UC-01640.003

The control system shall drop the beam permit signal for a device when configured thresholds are violated.

Level: 3

Tags: Core; Operations; Safety

## UC-01640.004

The control system shall provide a mechanism to execute a configurale set of actions in the event that beam permit signal is lost.

Level: 3

Tags: Core; Operations; Safety

## UC-01970.001

The control system shall be able to translate physics-meaningful parameters to engineering operational parameters. For instance translate particle momentum to magnet current according to machine specifications.

Level: 3

Tags: Core; Development

## UC-02140.001

The control system shall allow a front-end / IOC to pull its configurarion data from a centralized registry. UC-01450

Level: 3

Tags: Core

## UC-02240.001

The control system shall support the exporting of readings or internally aggregated data, for external consumption, on common parseable formats such as csv, xml or json.

Level: 3

Tags: Core; Operations; Research

# Development

## UC-01520.003

The control system's code must follow best practices for software development for documentation, readability, maintainability, and division of function.

Level:

Tags: Development; Quality

## UC-01690.001

Out of Scope?

Level:

Tags:

## UC-01150.001

The control system shall provide an environment for new software components to be tested without affecting the production environment or the operation of the accelerator.

Level: 2

Tags: Core; Development; Research

## UC-01150.002

What kinds of testing are we going to expect the control system to support? What are the requirements?

Level: 2

Tags:

## UC-01490.001

The control system software development infrastructure shall provide a common place for documentation of all its APIs

Level: 2

Tags: Development; Operations; Research

## UC-01490.003

The control system shall provide a secure framework for API execution (need requirements for this)

Level: 2

Tags: Development; Security

## UC-01520.001

Infrastructure must provide a common place for documentation of all user applications for the control system.

Level: 2

Tags: Development; Operations

## UC-01520.002

The control system must provide a common mechanism (framework / libraries / APIs) for developing user applications on the control system, following the usability guidalines.

Level: 2

Tags: Development

## UC-01520.003

Infrastructure must provide a common place for documentation of all central services for the control system.

Level: 2

Tags: Development; Operations

## UC-01680.001

The control system should provide APIs (libraries) that allow the development of instrumentation code in modern programming languages (C/C++, python, go?).

Level: 2

Tags: Development; Research

## UC-01680.002

The control system should provide a framework for the development of API libraries for new languages as technologies evolve.

Level: 2

Tags: Development

## UC-01750.001

The control system shall provide APIs for data acquisition in modern programming languages (C++, Python, JavaScript, Rust, Jupyter Notebooks) that can be used to write external user applications.

Level: 2

Tags: Development; Research

## UC-01750.002

The control system shall provide APIs for base functionality (read and write) for modern programming languages and tools (C++, Python, Rust) that can be used to write internal system applications.

Level: 2

Tags: Development

## UC-01980.001

The control system shall provide mechanisms, libraries, templates for developing and testing instrumentation drivers for front-ends / IOCs without affecting the production control system or the accelerator system itself.

Level: 2

Tags: Development; Operations; Security

## UC-01990.001

The software development infrastructure shall provide means to automate deployment of drivers to front-ends / IOCs.

Level: 2

Tags: Development; Security

## UC-02090.002

The control system shall support the building an execution of a finite state machine for control actions, e.g. machine protection systems.

Level: 2

Tags: Development; Operations; Security

## UC-02160.001

The control system shall allow testing of a timeline generator script and verify it's integrity and effects before applying to the accelerator. This is related to UC-01850

Level: 2

Tags: Development; Operations

## UC-02300.001

The control system shall limit the number of interfaces for data acquisition exposed to applications and outside systems, to reduce the effort on support and maintenance.

Level: 2

Tags: Development; Operations; Security

## UC-02300.002

The control system shall expose standard interfaces for data acquisitions from applications.

Level: 2

Tags: Development; Operations; Security

## UC-02310.001

The control system shall provide a test environment for data acquisition applications that doesn't affect, nor depend on the production accelerator system.

Level: 2

Tags: Development; Research; Security

## UC-02320.001

The control system shall support the collection of datasets for the development of machine learning models.

Level: 2

Tags: Development; Research

## UC-02321.001

The control system shall support storing data (through Data logger or an equivalent mechanism) and retaining it for time needed to train and evaluate AI/ML models.

Level: 2

Tags: Development; Research

## UC-01450.001

The control system shall provide mechanisms, libraries, templates for developing and testing Front-ends / IOCs without affecting the production control system or the accelerator system itself.

Level: 3

Tags: Core; Development

## UC-01450.002

The control system shall have a front-end / IOC registry for new instances to be added to the system.

Level: 3

Tags: Core; Development

## UC-01450.003

The control system shall provide a mechanism for authenticated and authorized entities to create a new entry in the front-end/IOC registry for new front-ends/IOCs.

Level: 3

Tags: Core; Development

## UC-01450.004

The control system shall provide a mechanism for authenticated and authorized entities to update an existing entry in the front-end/IOC registry.

Level: 3

Tags: Core; Development

## UC-01450.005

The control system shall provide a mechanism for authenticated and authorized entities to read an entry from the front-end/IOC registry.

Level: 3

Tags: Core; Development

## UC-01450.006

The control system shall provide a mechanism for authenticated and authorized entities to delete an entry from the front-end/IOC registry.

Level: 3

Tags: Core; Development

## UC-01490.002

The control system shall provide documentation describing the best practices to follow when developing a new API.

Level: 3

Tags: Development; Operations; Research

## UC-01490.004

The control system must provide APIs that securely verify authentication and authorization of entities prior to performing requested actions

Level: 3

Tags: Development; Security

## UC-01490.005

The control system shall provide APIs which allow components (e.g. AI/ML models or applications) to temporarily obtain elevated roles.

Level: 3

Tags: Development; Security

## UC-01490.006

The control system shall provide APIs for components to adjust settings on other devices in the system.

Level: 3

Tags: Development; Operations; Security

## UC-01490.007

The control system shall provide APIs which allow an authenticated and authorized entity to raise alarms

Level: 3

Tags: Development; Operations; Security

## UC-01490.008

The control system shall provide APIs which allow an operator to feed parameters to an AI/ML model or application.

Level: 3

Tags: Development; Operations; Research

## UC-01520.004

The control system should not use any deprecated libraries or frameworks that are in their end-of-life phase, and/or are not currently supported by an active community.

Level: 3

Tags: Development

# Interfaces

## UC-02130.001

The control system should provide a mechanism for providing data at rates relevant to beam instrumentation.

Level:

Tags: Interfaces

## UC-01960.001

The control system shall be able to interface with FESS control systems (Metasys) through their defined protocol (BACNET).

Level: 3

Tags: Development; Interfaces

## UC-02050.001

The control system shall let operators monitor radiation readings on enclousures. see UC-02170

Level: 3

Tags: Development; Interfaces

## UC-02060.001

The control system shall support the monitoring of temperature and humidy data.

Level: 3

Tags: Development; Interfaces

## UC-02100.001

The control system shall provide a common standard interface for data acquisition for ACNET devices and EPICS process values.

Level: 3

Tags: Development; Interfaces

## UC-02170.001

The control system shall interface with the MUX network to let users access radiation monitoring data.

Level: 3

Tags: Development; Interfaces

## UC-02210.001

The control system shall support the monitoring of humidity and temperature on the main computer room

Level: 3

Tags: Development; Interfaces

## UC-02280.001

The control system should allow the customization of audible alarms and messages for the main control room.

Level: 3

Tags: Development; Interfaces

## UC-02280.002

The control system should support playing an audible alarm on the main control room sound speakers when certain conditions are triggered.

Level: 3

Tags: Development; Interfaces

# Logging

## UC-01190.001

The control system shall provide a mechanism for authenticated and authorized entities to retrieve and read stored data that conforms to a specified criteria (i.e. date or time range, origin device or parameter)

Level: 3

Tags: Development; Operations; Research; Security

## UC-01190.002

The control system shall provide a mechanism for authenticated and authorized entities to specify criteria which will be used to select data to be retrieved from the logging system.

Level: 3

Tags: Development; Logging; Operations; Research; Security

## UC-01480.001

The control system shall allow the recording of data acquired from devices, for later consumption.

Level: 3

Tags: Development; Logging; Operations; Research; Security

## UC-01480.002

The control system shall keep a registry of data logging tasks, aka "data loggers".

Level: 3

Tags: Development; Logging; Operations; Research; Security

## UC-01480.003

The control system shall allow authenticated and authorized entities to create entries in the data logger registry for new data loggers.

Level: 3

Tags: Development; Logging; Operations; Research; Security

## UC-01480.004

The control system shall allow authenticated and authorized entities to retrieve entries in the data logger registry.

Level: 3

Tags: Development; Logging; Operations; Research; Security

## UC-01480.005

The control system shall allow authenticated and authorized entities to update entries in the data logger registry for data loggers.

Level: 3

Tags: Development; Logging; Operations; Research; Security

## UC-01480.006

The control system shall allow authenticated and authorized entities to delete entries from the data logger registry.

Level: 3

Tags: Development; Logging; Operations; Research; Security

# Operations

## UC-01160.001

The control system shall allow an authenticated and authorized entity to read values on a device's parameters.

Level:

Tags: Core; Development; Operations; Research

## UC-01160.002

The control system shall allow an authenticated and authorized entity to set values on a device's parameters.

Level:

Tags: Core; Development; Operations

## UC-01160.003

The control system shall validate values to ensure the values are within acceptable formats, boundaries, and ranges before attempting to set the value on a device parameter.

Level:

Tags:

## UC-01160.004

The control system shall reject with an appropriate error message any attempt to changing values on device parameters by unauthenticated and/or unauthorized entities.

Level:

Tags:

## UC-01160.005

The control system shall reject with an appropriate error message any attempt to changing values which are outside the acceptable formats, boundaries, and/or ranges as defined in the device registry. (assuming devices are registered in the device registry)

Level:

Tags:

## UC-01170.001

Add a requirement for value, range, or threshold comparison. Add requirements for actions to take when a reading is outside the boundary. Add requirements for levels of importance for monitoring alerts.

Level:

Tags:

## UC-01170.002

The control system shall allow an authenticated and autorized user to remotely monitor devices an machines from a location outside the lab, following security requirements.

Level:

Tags:

## UC-01220.001

The control system should allow an operator to access visual monitor devices (cameras) in the accelerator complex.

Level:

Tags:

## UC-01230.001

The control system should support the operation of visual monitoring devices (cameras).

Level:

Tags:

## UC-01230.002

The control system should support streaming video from visual monitoring devices to applications executed within the appropriate security domain.

Level:

Tags:

## UC-01230.003

The control system should support acquiring still images (photos) from visual monitoring devices.

Level:

Tags:

## UC-01230.004

The control system should provide a place to stored acquired video and still images

Level:

Tags:

## UC-01230.005

The control system should provide a mechanism to index stored video and still images

Level:

Tags:

## UC-01230.006

If the control system provides a place to store acquired video and still images, the control system shall require entities to be authenticated and authorized in order to access the videos and still images.

Level:

Tags:

## UC-01240.001

Level:

Tags:

## UC-01250.001

The control system shall support authenticated and authorized users to decomission a device, so it's marked as "decomissioned" in the system, but it's history is kept.

Level:

Tags:

## UC-01410.001

The control system must support the real-time data acquisition of readings from devices.

Level:

Tags:

## UC-01410.002

The control system should support handling data acquisition from devices in complex structures, so users can access that information in an intuitive way.

Level:

Tags:

## UC-01410.002

The control system should support data flexible data acquisition: on a certain frequency (up to kilo hertz), on certain clock events, and on clock events plus a time delay.

Level:

Tags:

## UC-01430.001

The control system shall have a device registry for registering all devices associate with the accelerator, along with any documentation needed about their functionality and location.

Level:

Tags:

## UC-01430.002

The control system shall provide a mechanism for setting an enforcing a device naming convention that facilitates understanding of a device function and characteristics.

Level:

Tags:

## UC-01430.003

The control system shall provide the ability for authenticated and authorized entities to be able to set attributes for a device to be used as criteria to search on for a device

Level:

Tags:

## UC-01430.004

The control system shall provide the ability for authenticated and authorized entities to create device meta-data in the device registry

Level:

Tags:

## UC-01430.005

The control system shall provide the ability for authenticated and authorized entities to read device meta-data from the device registry

Level:

Tags:

## UC-01430.006

The control system shall provide the ability for authenticated and authorized entities to update device meta-data in the device registry

Level:

Tags:

## UC-01430.007

The control system shall provide the ability for authenticated and authorized entities to delete device meta-data from the device registry

Level:

Tags:

## UC-01430.008

The control system shall allow an authenticated and authorized entity to create a new parameter names for a device in the device registry.

Level:

Tags:

## UC-01430.009

The control system shall allow an authenticated and authorized entity to update existing parameter names for a device in the device registry.

Level:

Tags:

## UC-01430.010

The control system shall allow an authenticated and authorized entity to delete parameter names for a device from the device registry.

Level:

Tags:

## UC-01430.011

The control system shall allow an authenticated and authorized entity to create acceptable formats, boundaries, and ranges for parameters of a device in the device registry.

Level:

Tags:

## UC-01430.012

The control system shall allow an authenticated and authorized entity to read the acceptable formats, boundaries, and ranges for parameters of a device in the device registry.

Level:

Tags:

## UC-01430.013

The control system shall allow an authenticated and authorized entity to update acceptable formats, boundaries, and ranges for parameters of a device in the device registry.

Level:

Tags:

## UC-01430.014

The control system shall allow an authenticated and authorized entity to delete acceptable formats, boundaries, and ranges for parameters of a device in the device registry.

Level:

Tags:

## UC-01430.015

Level:

Tags:

## UC-01440.001

The control system shall provide a mechainsm to save an entire set of parameters for a device in the system.

Level:

Tags:

## UC-01440.002

The control system shall provide a mechanism to retrieve a previously saved set of parameters for a device in the system.

Level:

Tags:

## UC-01440.003

The control system shall provide a mechanism to compare two sets of parameters for a device in the system.

Level:

Tags:

## UC-01440.004

The control system shall provide a mechanism to retrieve an entire set of parameters from a device in the system.

Level:

Tags:

## UC-01440.005

The control system shall provide a mechanism to set the values for multiple parameters on a device in the system.

Level:

Tags:

## UC-01440.006

The control system should keep historics of device settings for an adecuate period of time to allow future correlation of settings and machine behavior, and develope AI/ML models.

Level:

Tags:

## UC-01510.001

The control system shall have a registry of some kind to register control system applications

Level:

Tags:

## UC-01510.002

The control system shall have the ability to search for an application based on name or keyword.

Level:

Tags:

## UC-01510.003

The control system shall be able to set attributes for an application to be used as criteria to search on for an application

Level:

Tags:

## UC-01510.004

The control system shall have a place to store meta-data about applications

Level:

Tags:

## UC-01510.005

The control system shall have the ability to create application meta-data in the registry for authenticated and authorized entities

Level:

Tags:

## UC-01510.006

The control system shall have the ability to read application meta-data from the registry for authenticated and authorized entities

Level:

Tags:

## UC-01510.007

The control system shall have the ability to update application meta-data in the registry for authenticated and authorized entities

Level:

Tags:

## UC-01510.008

The control system shall have the ability to delete application meta-data from the registry for authenticated and authorized entities

Level:

Tags:

## UC-01530.001

The control system must operators to continuously evaluate beam performance at different points of the accelerator complex, to know throughput, loss, among other beam properties.

Level:

Tags:

## UC-01540.001

The control system should provide the means for operators to evaluate performance on a single bunch.

Level:

Tags:

## UC-01550.001

The control system shall provide the means to analyze aggregate data over long periods.

Level:

Tags:

## UC-01760.001

The control system shall support the programming and execution of control command sequences (complex commands) that automate repetitive or complex operational tasks.

Level:

Tags:

## UC-01760.002

The control system should allow operators to execute step-by-step commands that affect the accelerator.

Level:

Tags:

## UC-01760.003

The control system shall provide operators for an interactive way of execute pre-programmed routines and automated instructions in an interactive way.

Level:

Tags:

## UC-01780.001

The control system shall support the program and execution of decision trees for control tasks based on available data.

Level:

Tags:

## UC-01800.001

Level:

Tags:

## UC-01810.001

Level:

Tags:

## UC-01820.001

The control system should support the integration of movable equipment (robots), that are not attached to static network links.

Level:

Tags:

## UC-01820.002

The control system should support the monitoring and control of movable equipment (robot).

Level:

Tags:

## UC-01830.001

The control system must monitor and report the amount of total beam delivered to each end target (detector / facility).

Level:

Tags:

## UC-01850.001

The control system must provide the ability to adjust and edit the running timeline of the system.

Level:

Tags:

## UC-01850.002

The control system should allow the automatization of timeline adjusting according to conditions of the system (downtimes).

Level:

Tags:

## UC-01860

Level:

Tags:

## UC-01870.001

The control system shall have a registry for machine experts which contains the expert's contact info, the machine they are responsible, and other meta-data

Level:

Tags:

## UC-01870.002

The control system shall have the ability for an authenticated and authorized entity to create machine expert information in the registry

Level:

Tags:

## UC-01870.003

The control system shall have the ability for an authenticated and authorized entity to read machine expert information from the registry

Level:

Tags:

## UC-01870.004

The control system shall have the ability for an authenticated and authorized entity to update machine expert information stored in the registry

Level:

Tags:

## UC-01870.005

The control system shall have the ability for an authenticated and authorized entity to delete machine expert information from the registry

Level:

Tags:

## UC-01870.006

The control system shall have the ability for an authenticated and authorized entity to search for an expert

Level:

Tags:

## UC-01880.001

The control system shall provide the capability of plotting device readings, as they are produced, across time, and visually compare them, according to usability guidelines.

Level:

Tags:

## UC-01880.001

The control system shall support the data acquisition and plotting from devices out to the range of Kilo-Hertz, or more, if the device supports it.

Level:

Tags:

## UC-01890.001

The control system shall provide the capability of plotting device readings from archived data, across time, and visually compare them, according to usability guidelines.

Level:

Tags:

## UC-01920.001

The control system shall provide the capability to monitor and operate mechanical systems for beam targets.

Level:

Tags:

## UC-02010.001

Level:

Tags:

## UC-02030.001

The control system shall generate weekly / monthly / yearly beam delivery reports.

Level:

Tags:

## UC-02040.001

The control system shall support the correlation of beam position with power supply settings.

Level:

Tags:

## UC-02120.001

The control system shall allow a user to setup a the ramp or waveform to be executed by a power supply.

Level:

Tags:

## UC-02180.001

The control system shall allow operators to share plots and configuration details with experts through the operations log in an easy way, according to the usability guidelines.

Level:

Tags:

## UC-02190.001

The control system should let hardware developers obtain internal logs of controls hardware to diagnose errors.

Level:

Tags:

## UC-02190.001

The control system should let experts / engineers adjust internal parameters of hardware to troubleshoot or operate under nuance conditions.

Level:

Tags:

## UC-02190.002

The control system should let experts / engineers debug and access live status of hardware deployed in the field. (i.e. Debug a motion control routine on a PLC)

Level:

Tags:

## UC-02200.001

The control system should report the status of its services, and trigger alarm notifications on anomalous conditions.

Level:

Tags:

## UC-02260.001

The control system shall provide an interface to allow an operator to diagnose which Interlock's conditions are inhibiting beam.

Level:

Tags: Operations; Interlocks; Safety

## UC-02290.001

The control system shall provide a mechanism to start an AI/ML model or application

Level:

Tags:

## UC-02290.002

The control system shall provide a mechanism to stop an AI/ML model or application

Level:

Tags:

## UC-02290.003

The control system shall provide a mechanism to update/deploy an AI/ML model or application

Level:

Tags:

## UC-01200.001

The control system shall provide the ability for a user to be able to search for a device by name, location, function, keyword, or front-end it is attached to.

Level:

Tags:

## UC-01900.002

The control system shall let machine specialist to setup auto-tune parameters.

Level:

Tags:

## UC-01900.003

The control system shall perform automatic tuning of magnet currents on a machine to minimize loss.

Level:

Tags:

# Research

## UC-02000.001

Level:

Tags:

## UC-02230.001

The control system shall allow users to compare live acquired readings with historic logged readings from devices, according to usability guidelines.

Level:

Tags:

## UC-02240.001

The control system shall support the comparison between live readings from devices, to a model or nominal behavior, according to usability guidelines.

Level:

Tags:

# Security

## UC-01180.001

The control system shall record all operations attempted by user

Level:

Tags:

## UC-01180.002

The control system shall record the status of all operations attempted by user

Level:

Tags:

## UC-01180.003

The control system shall record all operations attempted by an AI/ML model or application.

Level:

Tags:

## UC-01180.004

The control system shall record the status of all operations attempted by an AI/ML model or application.

Level:

Tags:

## UC-01195.001

The control system shall provide a mechanisms or APIs for software and / or devices to centrally log data.

Level:

Tags:

## UC-01195.002

The control system shall provide a format for data being sent to the central log.

Level:

Tags:

## UC-01195.003

The control system shall define standard events or types of triggers which may determine when data may be logged

Level:

Tags:

## UC-01195.004

The control system shall provide a mechanism by which non-standard events or non-standard triggers may be used to determine when data is logged

Level:

Tags:

## UC-01195.005

The control system shall store data in a manner that follows best practices for searching and correlating logged data

Level:

Tags:

## UC-02330.001

The control system shall not authenticate a user. Authentication is performed by the central authentication services managed by the computing division.

Level:

Tags:

## UC-02330.002

The control system shall verify the authorization level of a user trying to access the system

Level:

Tags:

## UC-02330.003

The control system shall deny an operation if the user attempting the operation does not have the correct authorization.

Level:

Tags:

## UC-02330.004

The control system shall define roles and the permissions that are associated with a role

Level:

Tags:

## UC-02330.005

The control system shall enforce role permissions

Level:

Tags:

## UC-02330.006

The control system shall record user information at login time such as username, first name, last name, and any other information required by the system to function or required by security polices

Level:

Tags:

## UC-02330.007

The control system shall record the timestamp of a users login and role request.

Level:

Tags:

# User Interface

## UC-01600.001

The control system shall provide the means, libraries, frameworks, and/or screens for a non-expert user (operator, scientists, EPICS expert) to develop their own display screens and plots, according to usability standards.

Level:

Tags:

## UC-01720.001

Level:

Tags:

## UC-01730.001

The control system shall let expert users create displays according to the usability guidelines.

Level:

Tags:

## UC-01730.002

The control system shall let expert users customize displays according to the usability guidelines.

Level:

Tags:

## UC-01740.001

The control system will provide an index of programs, scripts, and tools that make up the control system.

Level:

Tags:

## UC-01740.002

The control system will provide a mechanism to set categories of programs, scripts, and tools within the index.

Level:

Tags:

## UC-01740.003

The control system will provide a mechanism to display specified categories from the index.

Level:

Tags:

## UC-02110.001

The control system shall be accessible via web, according to authorization and authentication requirements.

Level:

Tags:

## UC-02110.002

The control system shall support access from mobile devices (phones / tablets), according to authentication and authorization requirements.

Level:

Tags:

## UC-02340.001

The control system should provide a mechanism to build displays based on a graphical representation of the system, to show live data acquired from the system. I.e. a thermometer that shows temperature on a machine at different points.

Level:

Tags:

## UC-02340.002

The control system should provide a mechanism to build controls based on the graphical representation of devices or machines (i.e. a slider that would change the value of a parameter), according to the usability guidelines.

Level:

Tags:

## UC-02350.001

The operations user interface shall follow the usability and accessibility guidelines.

Level:

Tags:

## UC-02350.002

The operations user interface shall allow a new user discover and learn the basic functionality with a minimum amount of training. Details should be addressed in the usability guidelines.

Level:

Tags:

## UC-02350.001

The operations user interface should respond to modern user interaction patterns that are common among current software applications (i.e. buttons to execute actions, links to navigate, "right-click" to display options). Details should be addressed in the usability guidelines.

Level:

Tags:

## UC-02350.002

The control system's user interface shall be accessible to users with at least minor color impairments. (i.e. a user with pronatopia should be able to distinguish between "errors", "warnings" and "information").

Level:

Tags:

## UC-02350.003

The control system's user interface should allow some flexibility in the usage of fonts and character size for users with some visual impairments (i.e. resizing the font should be easy). Details should be addressed in the usability guidelines

Level:

Tags:

## UC-02350.004

The control system's user interface should not limit the amount of available screens or applications than an operator can open.

Level:

Tags: