The APS Upgrade Component Database + Tools

EPICS Collaboration Meeting - April 2023

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Abstract

- The Component Database (CDB) (developed for the Advanced Photon Source Upgrade) and a tightly coupled version of the eTraveler (originally developed at FRIB) have been in use for over 5 years to support the design, fabrication, and installation of thousands of components. This talk will provide a brief introduction to the applications and then describe the numerous ways the captured data has been used … many of which are beyond what was originally envisioned. A summary will include important “lessons learned” for future users of the tools.

- **EPICS Collaboration Meeting – June 2018:** Database Applications for the APS-U

Agenda

- Brief overview of CDB & eTraveler
- How it is being used at APS-U
  - Provides a common repository to capture & track component information (model #, specs, drawings, pictures, …)
  - Tracks inventory of individual components and APS-U warehouse. Tracks status, location, and eTravelers
  - QA – incoming inspection/non-conformance logging
  - Captures a machine design – a simple hierarchical model of accelerator components and support equipment
  - Captures cables that connect machine elements together (17000+ cables)
    - Supports the creation of a cable “pull-book” for contractors (API)
  - Captures “Control Flow” between machine elements
  - Tracks measurements by linking to archives of thousands of files of measurement, calibration, and analysis
  - Captures IOC development areas in a searchable index
  - Captures “software applications” in a searchable index
  - Defines & tracks assemblies consisting of numerous components
    - Tracks which specific components (serial # or QR code) go into specific locations in the machine
  - Defines “Installation kits” and captures inventory items that go in each kit
  - Automates update of CDB entries based on an entry into a field in an eTraveler
  - Provides an index to thousands of eTravelers
  - Tracks calibration of equipment (API)
  - Supports custom web-based displays (API)
- Lessons Learned

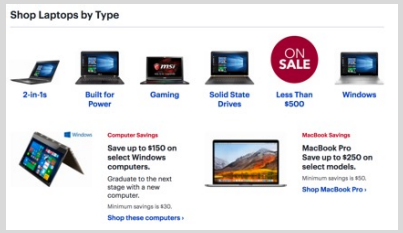
Motivations

- Uninstall / Install / Test / Commission APS-U accelerator in 12 months
  - "Do we have all the parts? Do you know where they are?" [Project]
- Engineers of all disciplines "manage" components … wouldn't it be convenient if they all use the same tool (and the tool was helpful)? [Staff]
  - specify, design, buy, build, test, repair, install, track spares, calibrate, find manuals, troubleshoot, swap, revise, update firmware, replace batteries, ...
- Allows for "Project-wide" processes to be applied. [Project]
  - Naming conventions
  - QA Processes and work-flow
  - Organizing of eTravelers
  - Warehouse
- Controls can take advantage of a global capture of components and develop "end-to-end" tools [Controls]

Component Database (CDB) - Domains

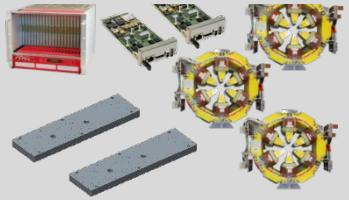
Component Catalog

A listing of each unique ***type of component*** or *component design or COTS item* + properties, drawings, specifications, ...



Component Inventory

Tracks each unique ***instance of component*** procured or fabricated + properties such as serial #, QR code, eTravelers, pictures, …



MAARC

Links to external files, associated with CDB elements, where measurements and analysis results are archived.

Machine Design

A simple hierarchical model of the ***components to be installed*** to perform a particular function (e.g. APS-U) + inventory items installed + properties, pictures, locations, …

Cable Design

Defines each required cable and properties; including cable type (from the catalog), two endpoints (machine design elements), length*, …

Control Hierarchy

Defines a different relationship between machine elements representing ”control flow”

Cable Catalog

A listing of each unique ***type of cable*** + properties, drawings, specifications, ... Cables that use the same raw cable with different connectors are different cable types (but specifying connectors is optional)

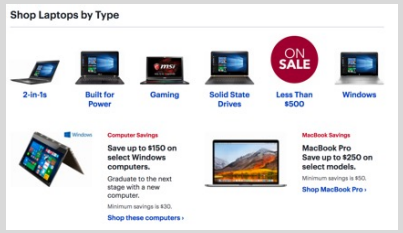
Cable Inventory

Tracks each unique ***instance of a cable,*** whether procured or fabricated, + properties such as length*, …

Component Database (CDB) - Domains

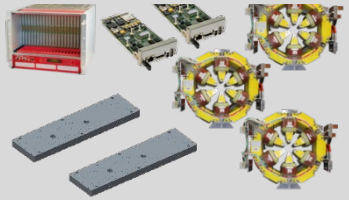
Component Catalog

A listing of each unique ***type of component*** or *component design or COTS item* + properties, drawings, specifications, ...



Component Inventory

Tracks each unique ***instance of component*** procured or fabricated + properties such as serial #, QR code, eTravelers, pictures, …



Machine Design

A simple hierarchical model of the ***components to be installed*** to perform a particular function (e.g. APS-U) + inventory items installed + properties, pictures, locations, …

What we need …
Where it goes …
(not just a location change) …

How is connected
How is it controlled

What we have … Where it is …

Cable Catalog

A listing of each unique ***type of cable*** + properties, drawings, specifications, ... Cables that use the same raw cable with different connectors are different cable types (but specifying connectors is optional)

CDB elements, where measurements and analysis results are archived.

Cable Inventory

Tracks each unique ***instance of a cable,*** whether procured or fabricated, + properties such as length*, …

Cable Design

Defines each required cable and properties; including cable type (from the catalog), two endpoints (machine design elements), length*, …

Control Hierarchy

Defines a different relationship between machine elements representing ”control flow”

Component Catalog

Browse | Catalog | Inventory | Design | MAARC | Search | Login | About

Choose a Technical System

- Controls/Instrumentation
- Diagnostics
- Experimental Facilities Ops
- Front Ends
- Generic Functions/Placeholders
- Insertion Devices
- IT
- Lattice Elements
- Magnets
- Mechanical/Beamlines

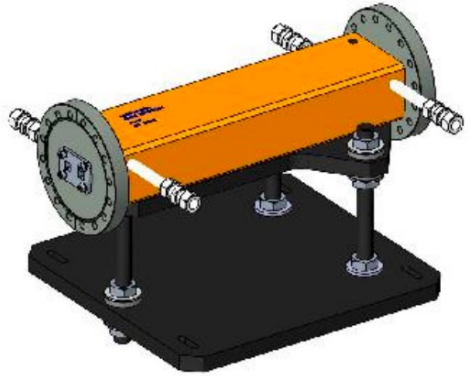
Functions

- Absorber
- Bellows
- Beryllium Window
- Cable
- Calibrated M&TE
- Collimator
- Diagnostic
- Frontend Component
- Mask
- Mirror

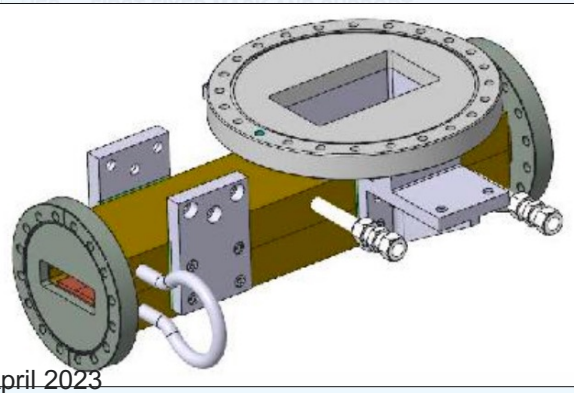
1 2

Assy	Primary Image	Name	Model Number	Alternate Name	Description	Inventory
		CUFE B1 US GRID MASK ASSEMBLY	A099-B10300		B1 US GRID MASK ASSEMBLY	2709 2710 2711 2712 2713
		CUFE B2 DS GRID MASK ASSEMBLY	A099-B20300		B2 DS GRID MASK ASSEMBLY	2726 2727 2728 2729 2730
		CUFE BURN THROUGH MONITOR FIRST FIXED MASK ASSEMBLY	A099-M60100	CUFE BTFM1	BURN THROUGH FIXED MASK 1 ASSEMBLY	
		CUFE EXIT MASK AND SUPPORT ASSEMBLY	A099-M40100	CUFE EM	FRONT ENDS & INSERTION DEVICES; FRONT ENDS; CANTED FRONT ENDS (CFE); CFE PHOTON COMPONENTS	3981 3982 3983 3984 3985
		CUFE EXIT MASK BRA			T MASK BRAZED ASSEMBLY	
		CUFE EXIT MASK SUP			ENTAL FACILITIES; CANTED UNDULATOR 2.0 FRONT END; EXIT MASK AND ; -; SUPPORT ASSEMBLY	
		CUFE FIRST AND SEC SUPPORT TABLE			ST AND SECOND FIXED MASK SUPPORT TABLE	4322
		CUFE FIRST FIXED MA			ONENT	2641
		CUFE FIRST FIXED MA			ONENT	
		CUFE FIRST/SECOND ASSEMBLY			FIXED MASK	
		CUFE GRID MASK BO ASSY				
		CUFE GRID MASK BO				
		CUFE PRE-MASK ASS			E-MASK	Unit: 1
		CUFE SECOND FIXED MASK AND SUPPORT	A099-M20100	CUFE FM2	ONENT	2772 2773 2774 2775 2776

CUFE EXIT MASK AND SUPPORT ASSEMBLY

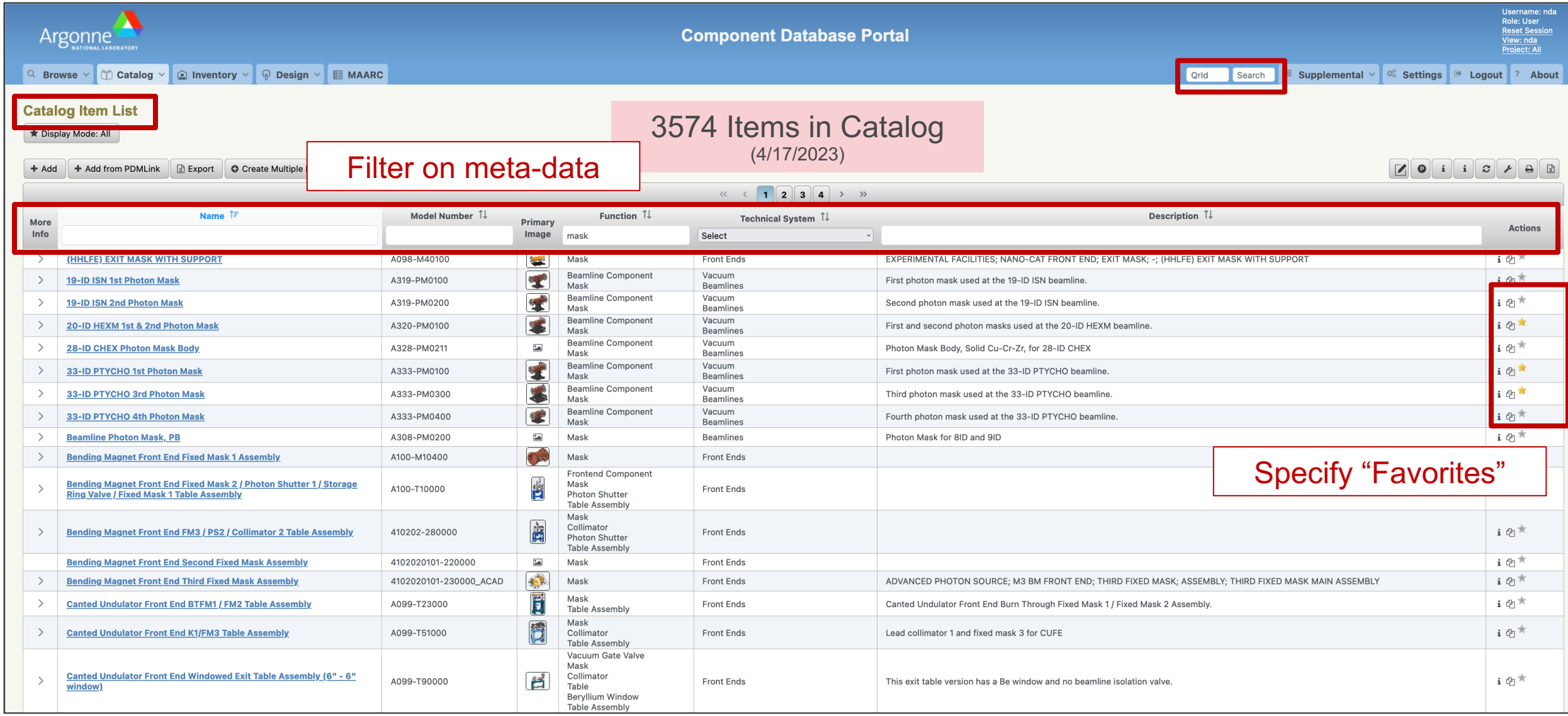


CUFE B2 DS GRID MASK ASSEMBLY



Dictionary

Component Catalog



Component Catalog Entry

Component Database Portal

Username: nda
Role: Administrator
Reset Session
View: nda
Project: All

Qrld | Search | Administrative | Settings | Logout | About

Common Properties

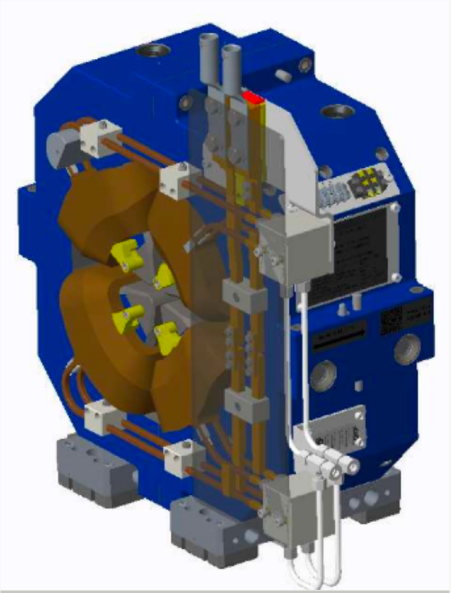
Catalog Item Details

Name	Q1 Production Magnet
Model Number	U2330101-100000
Alternate Name	
Project	APS-U Production
Description	Q1 250mm Quadrupole Magnet with vanadium permendur pole tips
Technical System	Magnets
Function	Quadrupole
Created from template	N/A

Edit | Delete | More Info | Permalink | Return

Gallery

+ Add



Log Entries

Ports

Optional Properties

Properties

+ Add

Type	Tag	Value	Description	Actions
PDMLink Drawing		U2330101-100000.DRW		
PDMLink Drawing		U2330101-100000		
Image				
Image				
Image				
Purchase Requisition	First Production Units	F7-187061		
Document (Upload)				
Document (Upload)	Q1 Pole Tip Measurements	document.8007914271828599552.xlsx	Q1 Pole Tip Measurements	
Document (Upload)	Q1 Magnetic Field Analysis	document.6197652256565908684.pptx	Q1 Magnetic Field Analysis	
Document (ICMS)	ICD	APSU_1708377		
Document (ICMS)	SOW	APSU_1702775	STATEMENT OF WORK FOR Q1 QUADRUPOLE MAGNET	
Document (ICMS)	ESD	APS_1702778	APS-U Q1 Quadrupole Magnet Engineering Specifications	
Inventory Quantity Planned	Magnet Group	82	Total Required by APS-U	
Document (Upload)				
MAARC File	Survey Fiducials for All Magnets	APS_U_MagnetFiducials_All.xlsx		

eTraveler Templates

eTraveler Templates

+ Add

Title	Preferred Version	Created By	Created On	Updated By	Updated On	Actions
Component Discrepancy Traveler	latest	tbarsz	Tue Feb 06 14:09:12 CST 2018	tbarsz	Fri Jul 12 13:05:51 CDT 2019	
Quadrupole Magnet Q1 Incoming Inspection Traveler	latest	dwilkin	Tue Feb 12 11:42:54 CST 2019	dwilkin	Mon Sep 16 09:22:24 CDT 2019	
Thermocouple and Thermal Switch HI-POT Traveler Supplement	latest	adonnelly	Tue Jul 02 14:10:14 CDT 2019	adonnelly	Tue Jul 02 14:27:44 CDT 2019	
Magnet Rotating Coil and Hall Probe Map Measurements	latest	dwilkin	Fri Jul 19 08:33:31 CDT 2019	dwilkin	Wed Jun 22 15:06:30 CDT 2022	
Magnet Rotating Wire and Survey Measurements for Q1	latest	dwilkin	Fri Jul 19 10:59:28 CDT 2019	dwilkin	Wed Feb 26 15:31:40 CST 2020	

Assembly Listing

Sources

+ Add

Name	Part Number	Cost [$]	Description	Manufacturer	Vendor	Actions
Danfysik				✔	✔	

Inventory Items

Inventory

+ Add | + Create M

More Info	Tag	Qrld	Serial Number	Primary Image	Description	Location	Housing	Status	Actions
	DQ101	100 011 001	DQ101		Q1 250mm Quadrupole Magnet - First Article	981-S6-E-102	DLMA Magnet Module - [DLMA-1250]	Installed	
	DQ102	100 011 002	DQ102		Q1 250mm Quadrupole Magnet	981-S6-D-102	DLMB Magnet Module - [DLMB-1120]	Installed	
	DQ103	100 011 003	DQ103		Q1 250mm Quadrupole Magnet	981-S6-B-101	DLMA Magnet Module - [DLMA-1410]	Installed	
	DQ104	100 011 004	DQ104		Q1 250mm Quadrupole Magnet	981-S6-E-106	DLMB Magnet Module - [DLMB-1350]	Installed	
	DQ105	100 011 005	DQ105		Q1 250mm Quadrupole Magnet	981-S6-B-105	DLMA Magnet Module - [DLMA-1160]	Installed	

Component Inventory Detail

Common Properties

Optional Properties

eTraveler Instances

Component's Catalog Properties

Qrld | Search | Administrative | Settings | Logout | About

Q1 Production Magnet - [DQ102]

Tag	DQ102
QR Id	100 011 002
Catalog Item	Q1 Production Magnet
Serial Number	DQ102
Project	APS-U Production
Description	Q1 250mm Quadrupole Magnet
Location	981-S6-D-102
Location Details	Assigned to assembly
Housing	DLMB Magnet Module - [DLMB-1120]
Status	Installed

Edit | Delete | More Info | Permalink | Return

Gallery

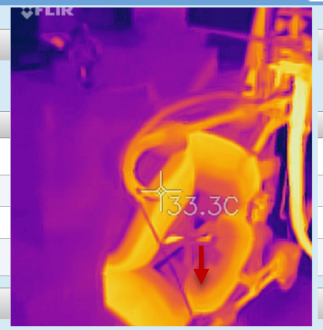
+ Add

Log Entries

Properties

+ Add

Type	Tag	Value	Description	Actions
Document (Upload)	Vendor QA Documents			
Image				
Image				
Document (Upload)	APS Pole Tip Measurements			



eTraveler Instances

+ Add | + Create Bin

Title	Description	Created By	Updated By	Created From Template	Estimated Progress	Version	Action
DQ102		mrj	dwilkin	Quadrupole Magnet Q1 Incoming Inspection Traveler	100%		
Q102 Magnet Rotating Coil Data		malas	dwilkin	Magnet Rotating Coil and Hall Probe Map Measurements	100%		
DQ1-02 Thermocouple and Thermal Switch HI-POT Traveler Supplement		furst	dwilkin	Thermocouple and Thermal Switch HI-POT Traveler Supplement	100%		
DQ1-02 Magnet Rotating Wire and Survey Measurements		gcurescu	dwilkin	Magnet Rotating Wire and Survey Measurements for Q1	100%		

Assembly Listing

Item Membership

Part Of	Domain	Description	Owner	Group
DLMB Magnet Module - [DLMB-1120]	Inventory		bechtold	APSU_MODULE_ASY

Catalog Item Properties

		Value	Description	Actions
Image				
Purchase Requisition	First Production Units	F7-187061		
PDMLink Drawing		U2330101-100000		
Image				
Document (ICMS)	SOW	APSU_1702775	STATEMENT OF WORK FOR Q1 QUADRUPOLE MAGNET	
Document (ICMS)	ESD	APS_1702778	APS-U Q1 Quadrupole Magnet Engineering Specifications	
Image				
Document (ICMS)	ICD	APSU_1708377		
PDMLink Drawing		U2330101-100000.DRW		
Document (Upload)	Q1 Pole Tip Measurements	document.8007914271828599552.xlsx	Q1 Pole Tip Measurements	
Document (Upload)				
Document (Upload)	Q1 Magnetic Field Analysis	document.6197652256565908684.pptx	Q1 Magnetic Field Analysis	
Inventory Quantity Planned	Magnet Group	82	Total Required by APS-U	
MAARC File	Survey Fiducials for All Magnets	APS_U_MagnetFiducials_All.xlsx		
Document (Upload)				

Related MAARC Items

CDB Integration with eTraveler

Browse | Catalog | Inventory | Design | MAARC | Qrid | Search | Supplemental

DLMA Magnet Module - [DLMA-1020]

Tag	DLMA-1020
QR Id	000 031 890
Catalog Item	DLMA Magnet Module
Serial Number	
Project	APS-U Production
Description	
Location	981-S6-B-102
Location Details	
Housing	
Status	Acceptance In Progress

More Info | Permalink | Return

Gallery

Properties

Type	Tag	Value	Description
Document (Upload)	DLMA-1020_X_module_shim_change_00	document.14968014019551611707.xlsx	
Document (Upload)	DLMA-1020_Y_module_shim_change_00	document.15205498177577039933.xlsx	
Document (Upload)	DA02 X SHIM CHANGE ITERATION 1	document.15026079901823336113.xlsx	
Document (Upload)	DA02 Y SHIM CHANGE ITERATION 1	document.15852731415298156638.xlsx	
Image			
Image			

eTraveler Instances

Title	Description	Created By	Updated By	Created From Template	Estimated Progress
DLMA-1020 Magnets Installation/Assembly		bechtold	dwilkin	DLMA Magnets Installation/Assembly	100%
DLMA-1020 Ground Bar Installation		bechtold	dwilkin	Ground Bar Installation	100%
DLMA-1020 Cable Tray Installation		bechtold	dwilkin	Cable Tray Installation	100%
DLMA-1020 Magnet Alignment Verification		bechtold	dwilkin	DLMA Magnet Alignment Verification	100%
DLMA-1020 Water Manifold Installation		bechtold	bechtold	Water Manifold Installation	0.00/4.00

Assembly Listing

Catalog Item Details

Name	DLMA Magnet Module
Model Number	A420-000001
Alternate Name	
Project	APS-U Production
Description	This DLMA Magnet Module has two build variants: "DLMA Magnet Modulde - S40" and "DLMA Magnet Module - S01,S37,S38,S39"
Technical System	Supports
Function	Magnet Module Assembly
Created from template	N/A

More Info | Permalink | Return

Gallery

Properties

Type	Tag	Value	Description	Actions
Inventory Quantity Planned		41		
Documentation (WEB)		Magnet Module Bill of Material (BOM) Spreadsheet		
PDMLink Drawing		A420-000003.DRW	Vacuum Assembly for DLMA	
Document (ICMS)		A420-000003.DRW	Vacuum Assembly for DLMA	
Image				
Image				
Documentation (WEB)		Module Assembly Status Page		
Document (ICMS)	Build Variant Documentation	APSU_2188403	Special Modules Addendum to Module Assembly ESD	
Document (Upload)				

eTraveler Templates

Title	Preferred Version	Created By	Created On	Updated By	Updated On	Actions
DLMA Magnets Installation/Assembly	latest	dwilkin	Thu Aug 27 11:39:25 CDT 2020	nbechtold	Fri Jun 17 09:11:09 CDT 2022	
Ground Bar Installation	latest	dwilkin	Fri Jul 16 15:52:10 CDT 2021	dwilkin	Thu Oct 27 09:21:29 CDT 2022	
Cable Tray Installation	latest	dwilkin	Fri Jul 16 16:03:59 CDT 2021	dwilkin	Tue Feb 28 08:17:14 CST 2023	
DLMA Magnet Alignment Verification	latest	dwilkin	Tue Jul 13 10:19:17 CDT 2021	dwilkin	Mon Feb 27 19:20:56 CST 2023	
Water Manifold Installation	latest	dwilkin	Wed Oct 13 10:07:58 CDT 2021	dwilkin	Fri Feb 17 12:16:05 CST 2023	
BPM Feedthrough/Cable Testing	latest	dwilkin	Mon Dec 06 14:39:35 CST 2021	dwilkin	Fri Jan 13 08:39:46 CST 2023	
DLM-A Magnet Reassembly Traveler	latest	nbechtold	Fri Feb 04 10:11:33 CST 2022	dwilkin	Fri Feb 17 08:12:14 CST 2023	
SPECIAL DLMA-S40 Magnets Installation/Assembly	latest	dwilkin	Mon Sep 12 08:28:23 CDT 2022	dwilkin	Mon Sep 12 08:36:35 CDT 2022	
DLMA Vacuum Staging Traveler	latest	nbechtold	Fri Oct 28 07:46:22 CDT 2022	dwilkin	Tue Apr 04 09:16:39 CDT 2023	
DLM-A/B Magnet Splitting Traveler	latest	nbechtold	Fri Dec 17 08:23:26 CST 2021	dwilkin	Tue Jan 31 09:23:51 CST 2023	
DLMA Vacuum Assembly Traveler	latest	nbechtold	Wed Nov 09 10:19:24 CST 2022	dwilkin	Mon Feb 27 19:36:33 CST 2023	
		nbechtold	Wed Nov 09 09:30:22 CST		Mon Feb 27 19:35:38 CST	

Assigned Item

FRIB Traveler v3.0

A Web application to design, carry out and organize processes

You might find the previous version document at github is still helpful before I have all the sections finished in this document.

- Basics
- Travelers
- Forms
- Binders
- API
- FAQ
- Contact

How to use this document

There is an Audience statement on the top of each section. If you are not the target audience, then you can skip the section.

Basics of the traveler application

Audience: all users

The traveler application is a Web application for design, carry out, and organize electrical process documents, which we call travelers. It provides a Web interface for edit and manage forms. Furthermore, users can organize travelers by binder. The application provides a limited HTTP API to read the traveler information.

What is a traveler?

A traveler is an electrical document that is designed to support the execution of a predefined process and to collect user input data and notes in the process. A typical traveler user case is to implement a work instruction that specifies all the steps to accomplish a work.

A traveler has properties like title, description, deadline, locations, and tags. The user can add/remove a tag into the tag list. The tag can be a device name defined in CCDB or any string. A traveler is **initialized** when it is created. Its state can be changed to **active**, **submitted for completion**, **completed**, and **frozen**. A traveler can be archived. Only the traveler owner can access the traveler when it is archived. A traveler owner can share her/his traveler with other users/groups. A user can also transfer the ownership of a traveler to other user.

The process and inside user inputs are defined in a form. The users with written permission can input values into an active traveler. The input history is kept in the traveler, and shown under each input. Each input can also have user notes attached to it. A traveler can be considered as the composition of a form, the input data, and the notes:

traveler = form + data + notes

The travelers section provides more detailed information about how to use and manage travelers.

What is a form?

A form is a user-designed template in order to create travelers. We implement it with HTML form elements as the name suggests. A user can create forms, edit them, and make copies. A user can share her/his forms with other users with read or write permission. A user can create a new form based on the form shared with her/him. The traveler application provides a WYSIWYG (what you see is what you get) editor for form design. A form can be archived. An archived form can only accessed by its owner. The forms section describes the details of how to work with forms.

What is a binder?

A binder is a collection of travelers that a user put together to manage or present them together. For example, an engineer can put all the travelers related to a specific device into one binder. A workshop manager can put all the traveler involving the workshop into one binder. A traveler can be put into different binders.

When a traveler is added into a binder, it has properties like sequence, priority, value, and color. The sequence and priority help to sort the travelers. The value can be used to estimate the binder's progress. The color defines a flag for attention. It is possible to add a binder into another binder. This is useful for higher management to oversee the progress of sub teams. For more details, see the binders section.

Log in and out

Besides this document and the main page, all other resources are only accessible to authenticated users. Users can use their lab computer user name and password to log in. Users are encouraged to log out when they do not work with the application. If not log out, a user's session will expire after a period. When a user tries to access a resource URL on a browser with no live session, the user will be directed to the log in page, and be redirected back to the requested URL if login succeeds.

Argonne NATIONAL LABORATORY

Machine Design Example (Magnet Module)

Machine Element Name (S02A:DLMA)	Machine Element Description	Assigned Catalog & Inventory Item	Location
APS-U Facility Design - April 2023	APS-U equipment - as planned		
APS-U: SR Tunnel			400_SR_Tunnel
Sector-02			SR_Tunnel_S02
S02 DLMA Area			SR_Tunnel_02_DLMA
S02A:DLMA	DLMA Magnet Module Assembly	DLMA Magnet Module	SR_Tunnel_02_DLMA
S02A:DLMA:SUPP	DLMA Support assembly	DLMA Support Assembly	SR_Tunnel_02_DLMA
S02A:GV1	Gate Valve	Gate Valve - 4.5" All Metal with RF-Liner	SR_Tunnel_02_DLMA
S02A:VC1	Vacuum Chamber	A:VC1 NEG-Coated Aluminum Vacuum Ch	SR_Tunnel_02_DLMA
S02A:Q1	Quadrupole	Q1 Production Magnet	SR_Tunnel_02_DLMA
S02A:Q1:TS1	Thermal Switch		SR_Tunnel_02_DLMA
S02A:Q1:TC1	Thermocouple		SR_Tunnel_02_DLMA
S02A:P1	BPM	Standard Beam Position Monitor with RF	SR_Tunnel_02_DLMA
S02A:P1:BPP	BPM SMA Patch Panel	BPM SMA Patch Panel (P1-P11)	SR_Tunnel_02_DLMA
S02A:FC1	Fast Corrector	8-Pole Fast Corrector Production Magne	SR_Tunnel_02_DLMA
S02A:FH1	Fast Horizontal Corrector		SR_Tunnel_02_DLMA
S02A:FV1			SR_Tunnel_02_DLMA
S02A:SQ1			SR_Tunnel_02_DLMA
S02A:FC1:TC1			SR_Tunnel_02_DLMA
S02A:FC1:TC2			SR_Tunnel_02_DLMA
S02A:VC2		nconel Vacuum Char	SR_Tunnel_02_DLMA

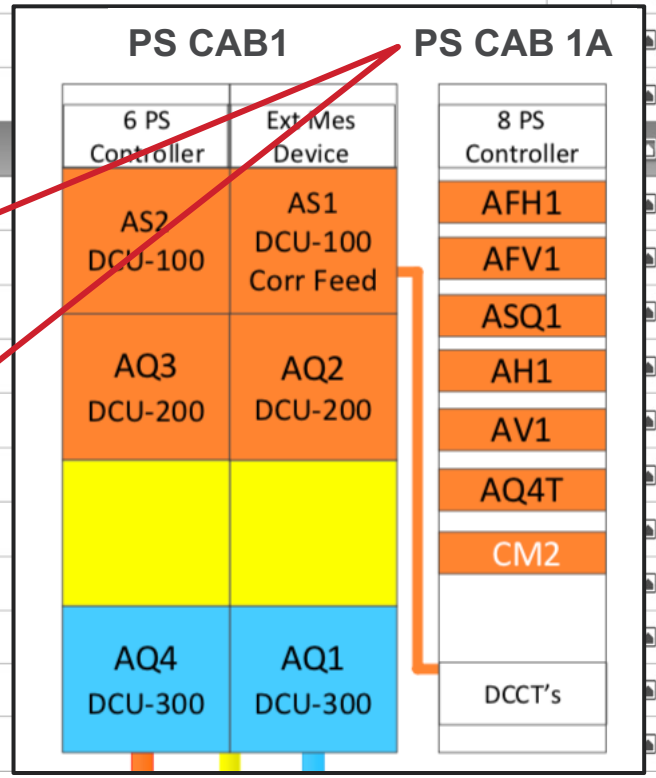
Catalog Item to be Installed at This Location

Machine Design (Power Supply Rack)

Machine Designs

A simple hierarchical model of the ***components to be installed*** to perform a particular function (e.g. APS-U) + inventory item installed + properties, pictures, locations, …

Machine Element Name	Description	Assigned Catalog & Inventory Item
APS-U Facility Design		
APS-U: SR Mezzanine		
Area-01		
sr leak detection system	tenance	Generic: Enclosure
PS-SR-T1-S40&01		T1-T4 SR Raw Supply
RF1 Rack 11	RF	
RF1 Rack 12	RF	
SR-RR 40&01	Power Systems	
PS-SR-T2-S40&01	Power Systems	
PS-SR-S01-CAB1A	Power Systems	Generic: Rack
PS-SR-S01-CAB1A Template	Template of cabinet 1A contents	Generic: Rack
S01-PS:BPSC1A	PS Controller in Slot A	Bipolar Power Supply Controller
S01A:FH1:PS	Power Supply in Slot 1	APS-U FAST CORRECTOR POWER SUPPLY
S01A:FV1:PS	Power Supply in Slot 2	APS-U FAST CORRECTOR POWER SUPPLY
S01A:SQ1:PS	Power Supply in Slot 3	APS-U DC BIPOLAR POWER SUPPLY
S01A:H1:PS	Power Supply in Slot 4	APS-U DC BIPOLAR POWER SUPPLY
S01A:V1:PS	Power Supply in Slot 5	APS-U DC BIPOLAR POWER SUPPLY
S01A:Q4T:PS	Power Supply in Slot 6	APS-U DC BIPOLAR POWER SUPPLY
S01:vacant		
S01:vacant		
S01-PS:BPSECM1A	DCCT chassis in Slot B	BPS Ext. Meas System



Catalog Item to be Installed at This Location

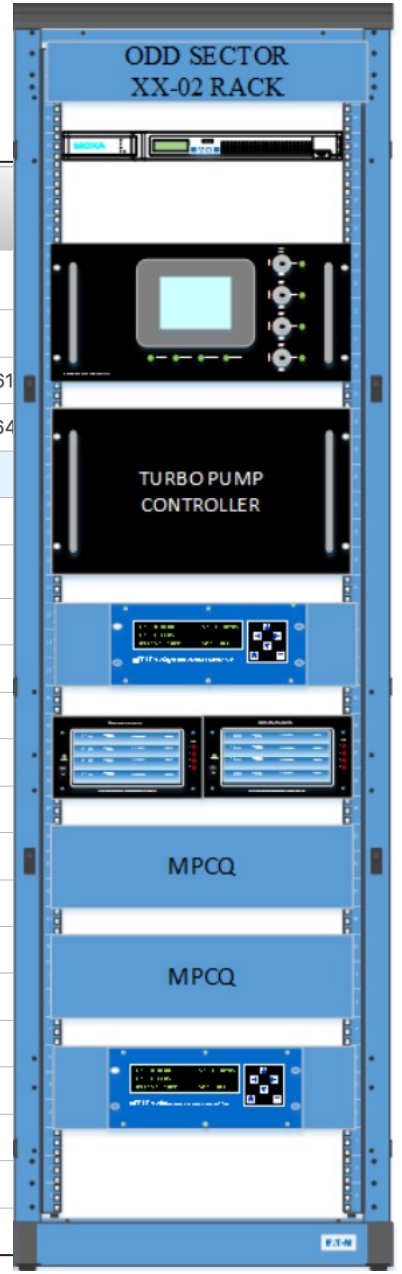
Machine Design – Vacuum Rack

https://ctlnaming.aps.anl.gov/

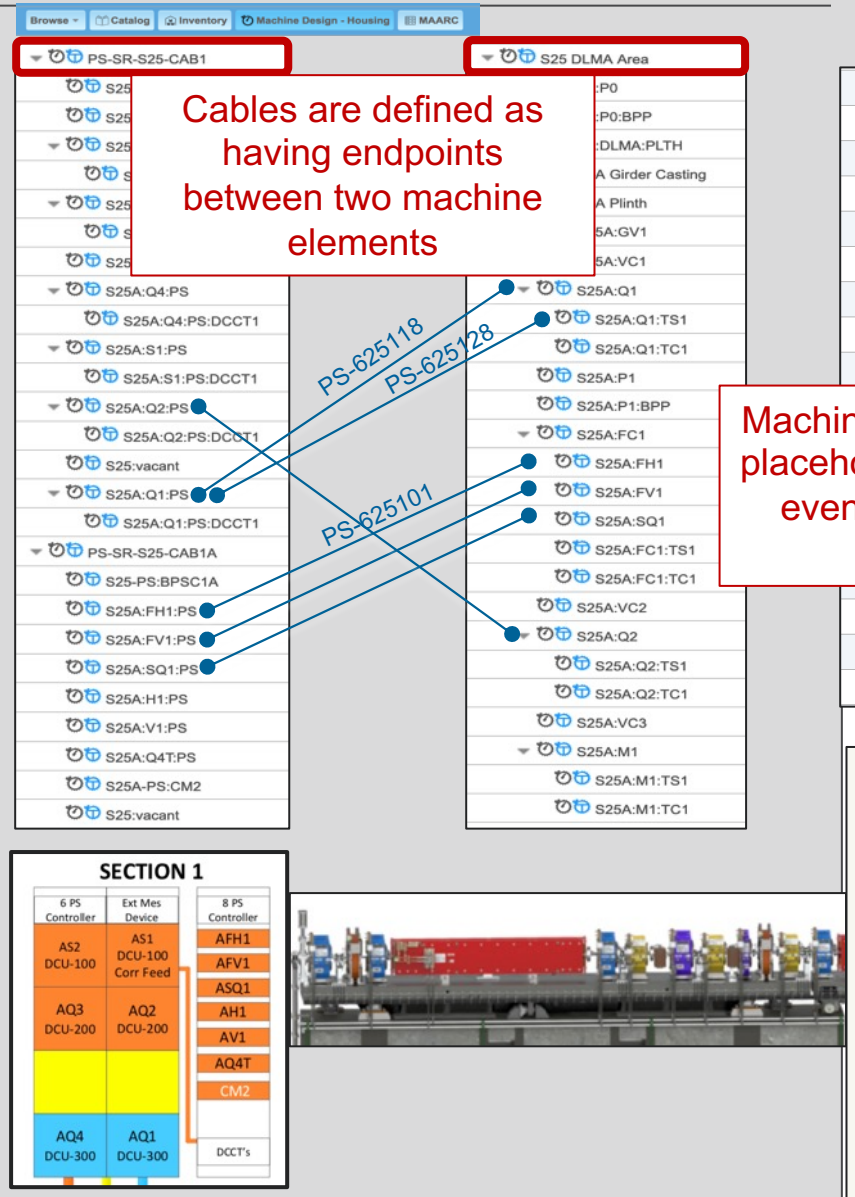
Naming Convention for Machine Elements

Catalog Item to be Installed at This Location

Machine Element Name :RM		Installed QrId	Machine Element Description	Assigned Catalog & Inventory Item	Location
APS-U Facility Design - April 2023			Hit icon image for search help		
APS-U: SR Mezzanine					400_SR_Mezz
Area-01					SR_Mezz_Area-01 [C58-61
Area-02		-			SR_Mezz_Area-02 [C61-64
01-02		-	Mechanical Operations & Maintenance	Generic: Rack	01-02
S01:RR0102:LP1		-	Light Panel	Commscope Fixed Light Panel	01-02
S01:SDS1		000 030 617 (Planned)	Moxa	Moxa 6650-32 - [Unit: 0002]	01-02
S01:VVC1		-	Valve Controller	VVC210	01-02
S01-TPS:TSC1		-	Turbo PumpSystem Controller	Turbo Pump System Controller	01-02
S01:VGC1		-	Televac	Vacuum Gauge Controller- Televac MX200	01-02
S01:IPC1		-	QPC	Ion Pump Controller - QPC	01-02
S01:IPC2		-	QPC	Ion Pump Controller - QPC	01-02
S01:IPC3		-	MPCQ	Ion Pump Controller- MPC	01-02
S01:IPC4		-	MPCQ	Ion Pump Controller- MPC	01-02
S01-TPS:VGC1		-	Televac	Vacuum Gauge Controller- Televac MX200	01-02
S01-TPS:TPC1			Turbo Pump Control		01-02
S02-TPS:TPC1			Turbo Pump Control		01-02
S01:RM1		-		ADM610 Rad Monitor	01-02
01-03		-	Controls	Generic: Rack	01-03
01-04		-	Diagnostics	Generic: Rack	01-04
02-04		-	Diagnostics	Generic: Rack	02-04



Machine Cables (Cable Type, Endpoints)



Machine elements are “permanent” placeholders, they continue to exist even if you swap the inventory item.

List of Required Cables (Design)

PS-625101		Power Systems	S25A:FH1:PS | S25A:FH1	#14/2c (corrector)
PS-625102		Power Systems	S25A:FV1:PS | S25A:FV1	#14/2c (corrector)
PS-625103		Power Systems	S25A:SQ1:PS | S25A:SQ1	#14/2c (corrector)
PS-625104		Power Systems	S25A:H1:PS | S25A:H1	#14/2c (corrector)
PS-625105		Power Systems	S25A:V1:PS | S25A:V1	#14/2c (corrector)
PS-625106		Power Systems	S25A:Q4T:PS | S25A:Q4T	#14/2c (corrector)
PS-625111		Power Systems	S25A:S2:PS | S25A:S2	DLO #2 (pair)
PS-625112		Power Systems	S25A:Q3:PS | S25A:Q3	DLO 4/0 (pair)
PS-625114		Power Systems	S25A:Q4:PS | S25A:Q4	DLO 444 (pair)
		Systems	S25A:S1:PS | S25A:S1	DLO #2 (pair)
		Systems	S25A:Q2:PS | S25A:Q2	DLO 4/0 (pair)
		Systems	S25A:Q1:PS | S25A:Q1	DLO 444 (pair)
		Systems	S25A:S2:PS | S25A:S2:TS1	#18/2c (klixon)
		Systems	S25A:Q3:PS | S25A:Q3:TS1	#18/2c (klixon)
		Systems	S25A:Q4:PS | S25A:Q4:TS1	#18/2c (klixon)
PS-625125		Power Systems	S25A:S1:PS | S25A:S1:TS1	#18/2c (klixon)
PS-625126		Power Systems	S25A:Q2:PS | S25A:Q2:TS1	#18/2c (klixon)
PS-625128		Power Systems	S25A:Q1:PS | S25A:Q1:TS1	#18/2c (klixon)

List of Cable Types (Catalog)

Cable Catalog Item List

Display Mode: All

Export

« ‹ 1 › »

Name	Primary Image	Project	Function	Technical System
4				Power Systems
#14/2c (corrector)		APS-U Production		Power Systems
4/0 DLO (Black)		APS-U Production	Bulk	Power Systems
444 MCM DLO (Black)		APS-U Production	Bulk	Power Systems
DLO 4/0 (pair)		APS-U Production		Power Systems
DLO 4/0 (red)		APS-U Production		Power Systems
DLO 444 (pair)		APS-U Production		Power Systems
DLO 444 (red)		APS-U Production		Power Systems
THHN 4/0 (green)		APS-U Production		Power Systems

Usage

- How it is being used at APS-U
  - Provides a common repository to capture & track component information (model #, specs, drawings, pictures, …)
  - Tracks inventory of individual components and APS-U warehouse. Tracks status, location, and eTravelers
  - QA – incoming inspection/non-conformance logging
  - Captures a machine design – a simple hierarchical model of accelerator components and support equipment
  - Captures cables that connect machine elements together (17000+ cables)
    - Supports the creation of a cable “pull-book” for contractors (API)
  - Captures “Control Flow” between machine elements
  - Tracks measurements by linking to archives of thousands of files of measurement, calibration, and analysis
  - Captures IOC development areas in a searchable index
  - Captures “software applications” in a searchable index
  - Defines & tracks assemblies consisting of numerous components
    - Tracks which specific components (serial # or QR code) go into specific locations in the machine
  - Defines “Installation kits” and captures inventory items that go in each kit
  - Automates update of CDB entries based on an entry into a field in an eTraveler
  - Provides an index to thousands of eTravelers
  - Tracks calibration of equipment (API)
  - Supports custom web-based displays (API)

Common Repository to Document Components

Browse | Catalog | Inventory | Design | MAARC | Search | Login | About

Choose a Technical System

- Controls/Instrumentation
- Diagnostics
- Experimental Facilities Ops
- Front Ends
- Generic Functions/Placeholders
- Insertion Devices
- IT
- Lattice Elements
- Magnets
- Mechanical/Beamlines

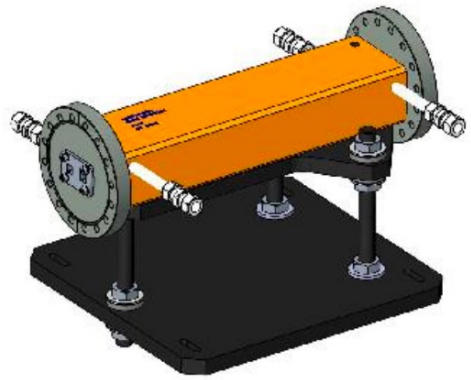
Functions

- Absorber
- Bellows
- Beryllium Window
- Cable
- Calibrated M&TE
- Collimator
- Diagnostic
- Frontend Component
- Mask
- Mirror

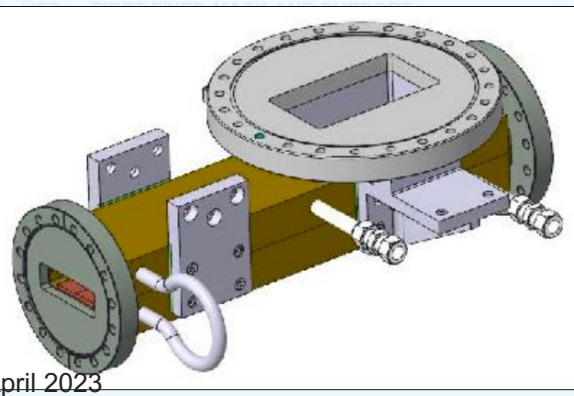
1 2

Assy	Primary Image	Name	Model Number	Alternate Name	Description	Inventory
		CUFE B1 US GRID MASK ASSEMBLY	A099-B10300		B1 US GRID MASK ASSEMBLY	2709 2710 2711 2712 2713
		CUFE B2 DS GRID MASK ASSEMBLY	A099-B20300		B2 DS GRID MASK ASSEMBLY	2726 2727 2728 2729 2730
		CUFE BURN THROUGH MONITOR FIRST FIXED MASK ASSEMBLY	A099-M60100	CUFE BTFM1	BURN THROUGH FIXED MASK 1 ASSEMBLY	
		CUFE EXIT MASK AND SUPPORT ASSEMBLY	A099-M40100	CUFE EM	FRONT ENDS & INSERTION DEVICES; FRONT ENDS; CANTED FRONT ENDS (CFE); CFE PHOTON COMPONENTS	3981 3982 3983 3984 3985
		CUFE EXIT MASK BRA			T MASK BRAZED ASSEMBLY	
		CUFE EXIT MASK SUP			ENTAL FACILITIES; CANTED UNDULATOR 2.0 FRONT END; EXIT MASK AND ; -; SUPPORT ASSEMBLY	
		CUFE FIRST AND SEC SUPPORT TABLE			ST AND SECOND FIXED MASK SUPPORT TABLE	4322
		CUFE FIRST FIXED MA			ONENT	2641
		CUFE FIRST FIXED MA			ONENT	
		CUFE FIRST/SECOND ASSEMBLY			FIXED MASK	
		CUFE GRID MASK BO ASSY				
		CUFE GRID MASK BO				
		CUFE PRE-MASK ASS			E-MASK	Unit: 1
		CUFE SECOND FIXED MASK AND SUPPORT	A099-M20100	CUFE FM2	ONENT	2772 2773 2774 2775 2776

CUFE EXIT MASK AND SUPPORT ASSEMBLY



CUFE B2 DS GRID MASK ASSEMBLY



Dictionary

Inventory Tracking

Bldg 981 – 100,000+ sq Ft of Upgrade!
> 26,000 items

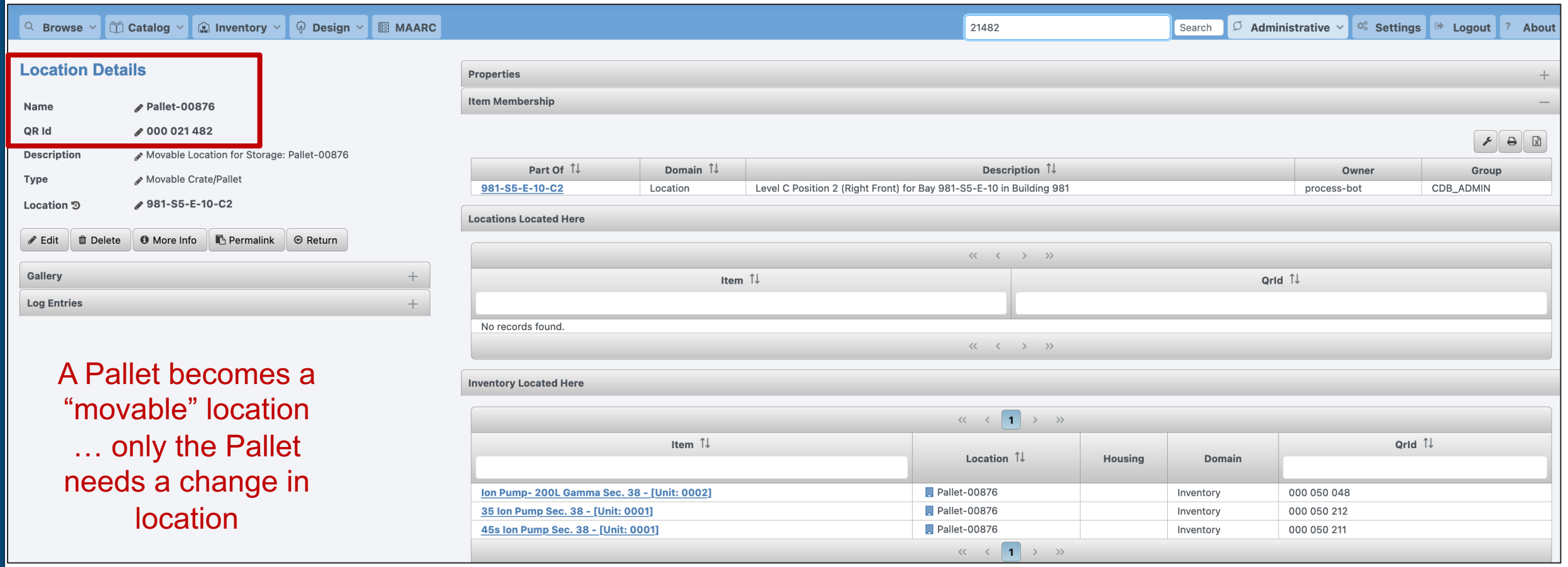
	Serial Number	Primary Image	Description	Location	Housing	Status
				981-S6-C-104		Acceptance In Progress
				981-S6-F-101		Acceptance In Progress
DLMB-1340	000 032 261			981-S6-E-106		Acceptance In Progress
DLMB-1150	000 032 241			981 Highbay Section 1		Acceptance In Progress
DLMB-1030	000 032 236			981-S6-A-107		Acceptance In Progress
DLMB-1220	000 032 248			981-S6-C-101		Acceptance In Progress
DLMB-1280	000 032 255			981-S6-F-101		Acceptance In Progress
DLMB-1260	000 032 253			981-S6-E-103		Acceptance In Progress
DLMB-1350	000 032 262			981-S6-E-106		Acceptance In Progress
DLMB-1180	000 032			981-S6-A-107		Acceptance In Progress
DLMB-1040	000 031			981-S6-C-104		Acceptance In Progress
DLMB-1230	000 032			981-S6-C-101		Acceptance In Progress
DLMB-1130	000 04			981-S6-E-106		Acceptance In Progress
DLMB-1360	000 032			981-S6-A-107		Acceptance In Progress
DLMB-1200	000 032			981-S6-D-105		Acceptance In Progress
DLMB-1050	000 032			981-S6-B-103		Acceptance In Progress
DLMB-1210	000 032			981-S6-E-103		Acceptance In Progress
DLMB-1120	000 032			981-S6-D-102		Acceptance In Progress
DLMB-1290	000 032 256			981-S6-F-101		Acceptance In Progress

DLMB Magnet Module - [DLMB-1280]

Bldg 981 Locations

- 401
- 981
  - 981-FloorSpace
    - 981 Highbay Section 1
    - 981 Highbay Section 2
    - 981 Highbay Section 3
    - 981 Highbay Section 4
    - 981 Highbay Section 5
    - 981 Highbay Section 6
  - 981-Racks
    - 981-S1-A
      - 981-S1-A-01
        - 981-S1-A-01-A
          - 981-S1-A-01-A1
          - 981-S1-A-01-A2
          - 981-S1-A-01-A3
          - 981-S1-A-01-A4
        - 981-S1-A-01-B
        - 981-S1-A-01-C
        - 981-S1-A-01-D
        - 981-S1-A-01-E
      - 981-S1-A-02
      - 981-S1-A-03
      - 981-S1-A-04
      - 981-S1-A-05
      - 981-S1-A-06
      - 981-S1-A-07
      - 981-S1-A-08

Inventory Tracking



A Pallet becomes a "movable" location … only the Pallet needs a change in location

000 021 482

Pallet-00876

APS/APS-U Warehouse Operations **Pallet-00876**

Description	QR Id	Item Code
35 Ion Pump Sec. 38 - Unit: 0001	000 050 212	299073
45s Ion Pump Sec. 38 - Unit: 0001	000 050 211	299064
Ion Pump- 200L Gamma Sec. 38 - Unit: 0002	000 050 048	299047

QA Non-conformance

Traveler title: DQ7-001

Status: completed; *41* inputs finished out of *47* inputs

Devices: Q7 Production Magnet [DQ701] (QRID: 100017001)

template version: 9:0

DQ7-001 +

Show | Hide validation | Show | Hide notes | Details

Discrepancy log

sequence	Description	Accept	Rework	Reinspect	Scrap	Return	Other_actions	Other_details	Justification	Supplier_problem	Documented by	On
1	Crate damage		on						There is quite a bit of damage to the crate. This damage was cause during shipping. Shock sensor was triggered. There was no damage to the magnet. Pictures in the gallery document the damage. The crate will be fix and suitable for use.	Check here if the discrepancy was caused by the supplier. (The Project QA Coordinator will use the checkbox below to monitor supplier performance)	M	2 years ago

Every eTraveler has a “built-in” Discrepancy Log that is filled out for any non-conformance

QA Non-conformance

Index Status	
Data Current As Of	2023-04-17 04:23:01
Number of Log Entries	1192

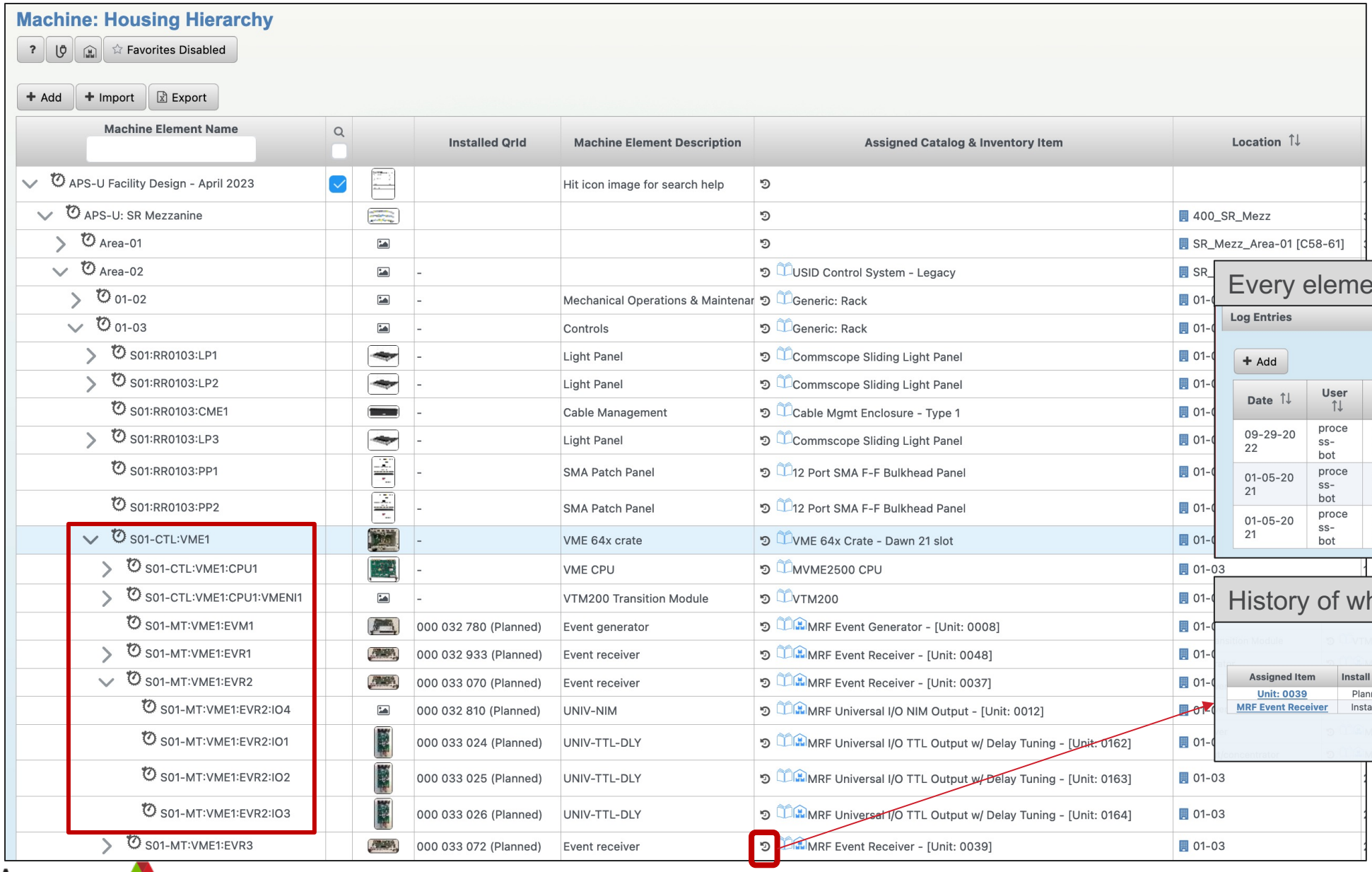
Display Status	
Last Updated	2023-04-17 14:04:17
Email Contact	Diane Wilkinson
CDB Engineering Display	Index

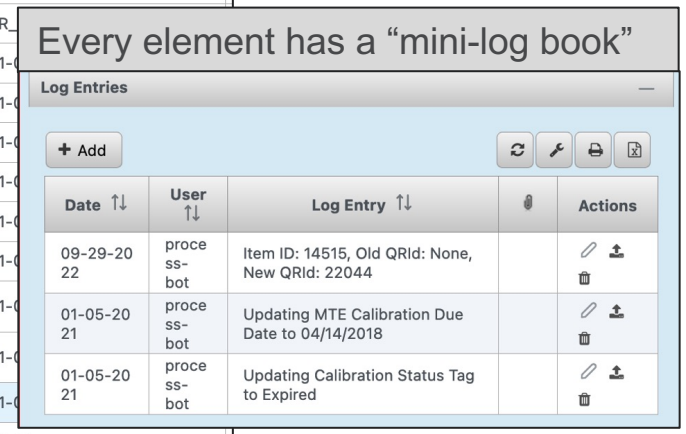
eTraveler Discrepancy Log

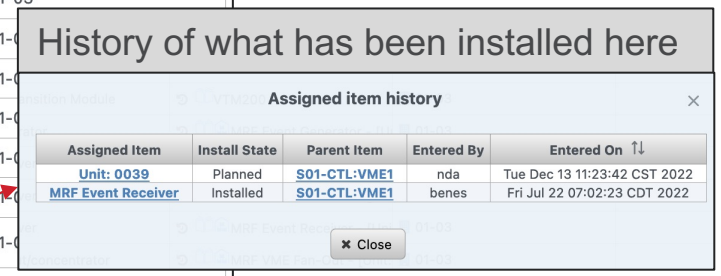
REJECT TAG	ETRAVELER LAST UPDATE	ETRAVELER LINK	CDB INVENTORY ITEM	ITEM STATUS	LOG COUNT	LAST DISCREPANCY DESCRIPTION	LAST DISCREPANCY DISPOSITION	LAST DISCREPANCY JUSTIFICATION	LAST DISCREPANCY SUPPLIER CAUSED
REJECT TAG	2023-04-13T15:46:19.590	APS-U SCU Cryostat Components Receipt Inspection	CANTED SCU Liquid Helium Tank - UNIT 1	Rejected	2	Close-out of non-conformance in sequence 1.		Confirmed with EIC (Ethan Anliker) that the non-conforming item was returned to the vendor. repaired/replaced item from the vendor will be reinspected under a new instance of this eTraveler. See ANL-626A-1532 for Lab level reporting.	No
REJECT TAG	2023-04-13T14:42:32.979	Q8-68 Magnet Rotating Wire and Survey Data	Q8 Production Magnet - EQ868	Ready For Use	2	Close-out of non-conformance in sequence 1.		SME Animesh Jain has provided a disposition of Use As Is. Offset will be corrected later with shimming. See ANL-626A-1504 for Lab level reporting.	No
REJECT TAG	2023-04-13T14:42:21.193	Q8-67 Magnet Rotating Wire and Survey Data	Q8 Production Magnet - EQ867	Ready For Use	2	Close-out of non-conformance in sequence 1.		SME Animesh Jain has provided a disposition of Use As Is. Offset will be corrected later with shimming. See ANL-626A-1504 for Lab level reporting.	No
REJECT TAG	2022-10-24T18:32:56.927	M4-18 Magnet Rotating Wire and Survey Measurements Data	M4 Production Magnet - TM418	Installed	2	Close-out of non-conformance in sequence 1.	Accept	SME Animesh Jain has provided a disposition of Use As Is. Offset will be corrected later with shimming. See ANL-626A-1382 for Lab level reporting.	No
REJECT TAG	2022-10-24T14:59:05.165	DQ7-001	Q7 Production Magnet - DQ701	Installed	1	Crate damage	Rework	There is quite a bit of damage to the crate. This damage was cause during shipping. Shock sensor was triggered. There was no damage to the magnet. Pictures in the gallery document the damage. The crate will be fix and suitable for use.	Yes
REJECT TAG	2022-10-18T15:55:40.993	QR Code: 33686 Front End Vacuum Assembly for CDB Catalog ID 124325	High Heat Load Front End GRID XBPM1 Table Assembly - 33686	Post-Acceptance/Test /Certification in Progress	1	Final testing - right angle gearbox failed to move granite to specified limits.	Other_actions	A gearbox from a Grid that had a full range of motion was swapped with a grid gearbox that failed to move properly. The failed grid worked properly with the new gearbox. Subsequenlty the good grid failed with the rejected gearbox.	No
REJECT TAG	2022-10-14T16:47:08.896	Hydro Test	Pencils - Unit: 0005	Planned	1	Test of new traveler discrepancy		Rework at ANL by mechanical techs	Yes
REJECT TAG	2022-10-12T14:01:33.517	Hydrostatic Leveling System Sensor and Reservoir Assembly Acceptance - Unit #101	HLS Sensor/Reservoir Assembly - Unit: 0101	Rejected	2	Close-out of non-conformance in sequence 1.		Patricia Weghorn (Technician Sr - Electronics) identified the non-conformance in sequence 1 and dispositioned Return to Supplier. See ANL-626A-1356 for Lab Level reporting.	No
REJECT TAG	2022-10-12T14:01:01.423	Hydrostatic Leveling System Sensor and Reservoir Assembly Acceptance - Unit #13	HLS Sensor/Reservoir Assembly - Unit: 0013	Rejected	2	Close-out of non-conformance in sequence 1.	Return	Patricia Weghorn (Technician Sr - Electronics) identified the non-conformance in sequence 1 and dispositioned Return to Supplier. See ANL-626A-1355 for Lab Level reporting.	No
REJECT TAG	2022-09-30T13:53:36.048	EQ8-033	Q8 Production Magnet - EQ833	Installed	3	Close-out of non-conformance in sequence 1.		Sequence 1 Lab Level reporting in ANL-626A-1359	No

- **Other tools track the Discrepancy entries in the eTravelers**

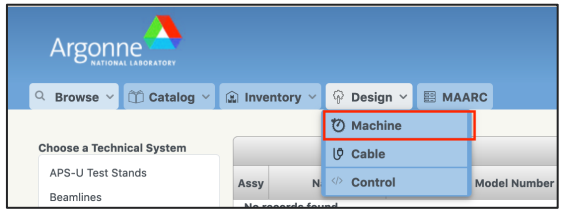
Captures “Machine Design”



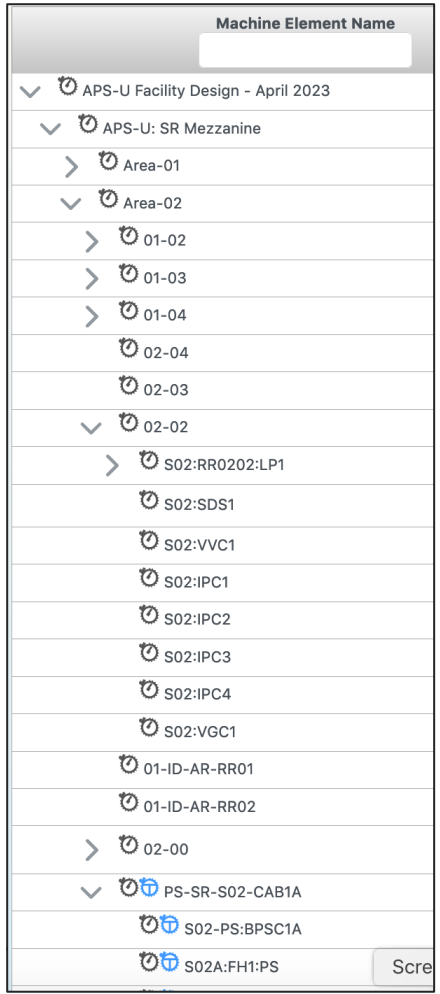


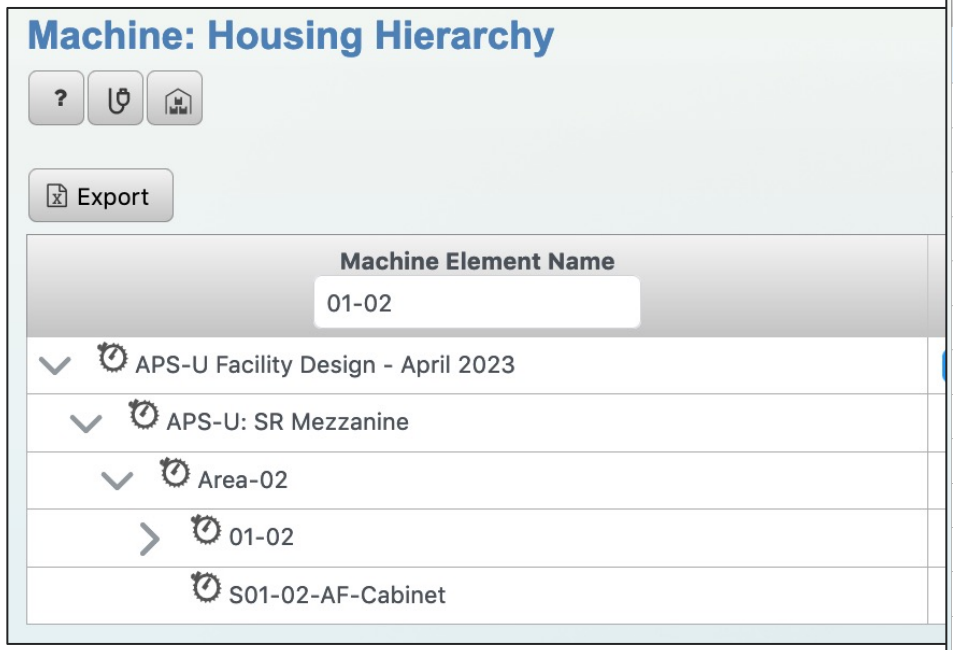


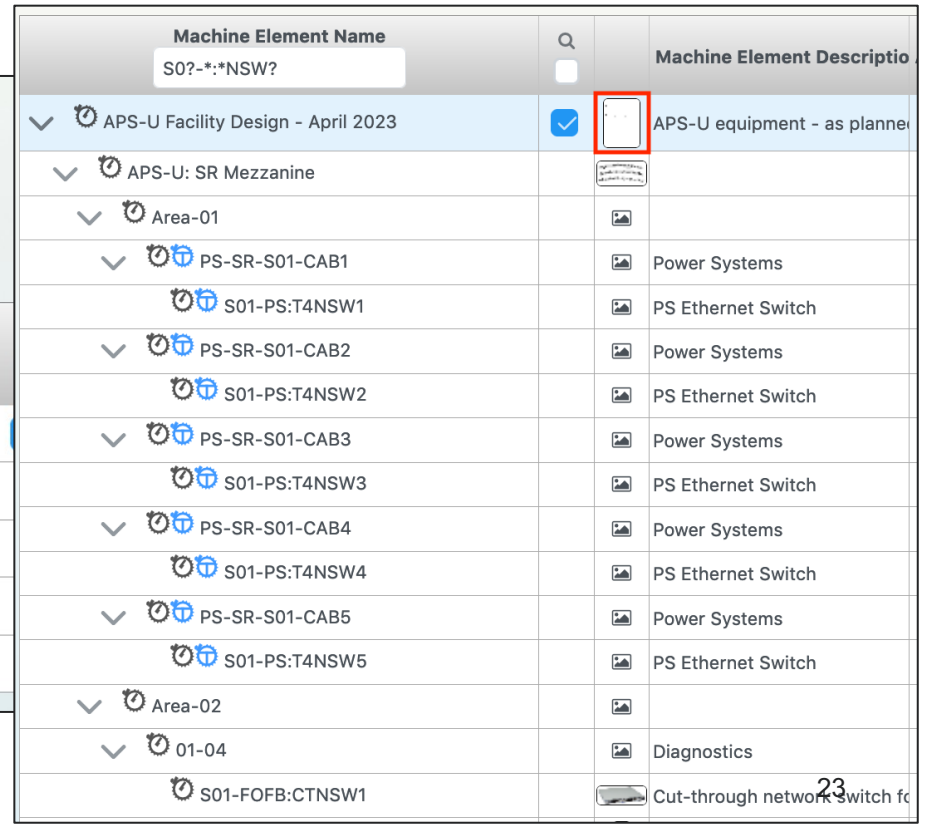
Machine Design – Navigation



- Browse the hierarchy
  - Expand hierarchy to drill down
  - CTL E Expands/Collapse all children if selected tree node.
- "Filter" on the element name
  - Expands hierarchy to display all elements that contain the filter string
    - E.g. 01-02, S01A:Q, VGC
  - Using '*' (0 or more) or '?' (single) allows for more specific filtering
    - S0?-*:*NSW?
    - If too many matches are found it will prompt you to narrow your search.







Captures Cables

Cable Design List

Display Mode: All

+ Add | + Import | Export

1 2 3 4 5 6 7 8 9 10

Name	Alternate Name	Primary Image	Technical System	Description	Endpoints	Cable Type	End1 Primary Device Port	End2 Primary Device Port	Import Cable ID	Total Required Cable Length (ft)	Actions
DG-021074	<02-ID-AR-RR00><S02_FODO>:DG-021074		Diagnostics	S02:LB1 / A:P6 / BO_D	S02-DIAG:RR00:PP1 | S02A:P6:BPP	SPF-250	LB12_BO_D	BO_D	100105	90.2231	
DG-211044	<20-ID-AR-RR00><S21_DLMA>:DG-211044		Diagnostics	S20:LB4 / A:P3 / BO_D	S20-DIAG:RR00:PP1 | S21A:P3:BPP	SPF-250	LB41_BO_D	BO_D	101176	44.29134	
DG-291032	<28-ID-AR-RR00><S29_DLMA>:DG-291032		Diagnostics	S28:LB3 / A:P2 / TI_B	S28-DIAG:RR00:PP1 | S29A:P2:BPP	SPF-250	LB34_TI_B	TI_B	101626	44.29134	
DG-051032	<04-ID-AR-RR00><S05_DLMA>:DG-051032		Diagnostics	S04:LB3 / A:P2 / TI_B	S04-DIAG:RR00:PP1 | S05A:P2:BPP	SPF-250	LB34_TI_B	TI_B	100258	44.29134	
DG-351053	<34-ID-AR-RR00><S35_DLMA>:DG-351053		Diagnostics	S34:LB4 / A:P4 / BI_C	S34-DIAG:RR00:PP1 | S35A:P4:BPP	SPF-250	LB42_BI_C	BI_C	101977	49.2126	

Machi

+ Add

01-02	Mechanical Operations & Maintena	Generic: Rack	01-02
01-03	Controls	Generic: Rack	
S01:RR0103:LP1	Light Panel	Commscope Sliding Light Panel	
S01:RR0103:LP2	Light Panel	Commscope Sliding Light Panel	
S01:RR0103:CME1	Cable Management	Cable Mgmt Enclosure - Type 1	
S01:RR0103:LP3	Light Panel	Commscope Sliding Light Panel	
S01:RR0103:PP1	SMA Patch Panel	12 Port SMA F-F Bulkhead Panel	
01			
	SR_Inject - S01B:P5 (LS1)	CT-010116	
02			
	P0 - S01B:P5 (LS1)	CT-010115	
03			
	Bunch_Select - S01B:P5 (RFSW1)	CT-010117	
04			
05			
06			
07			
08			
09			

Screenshot

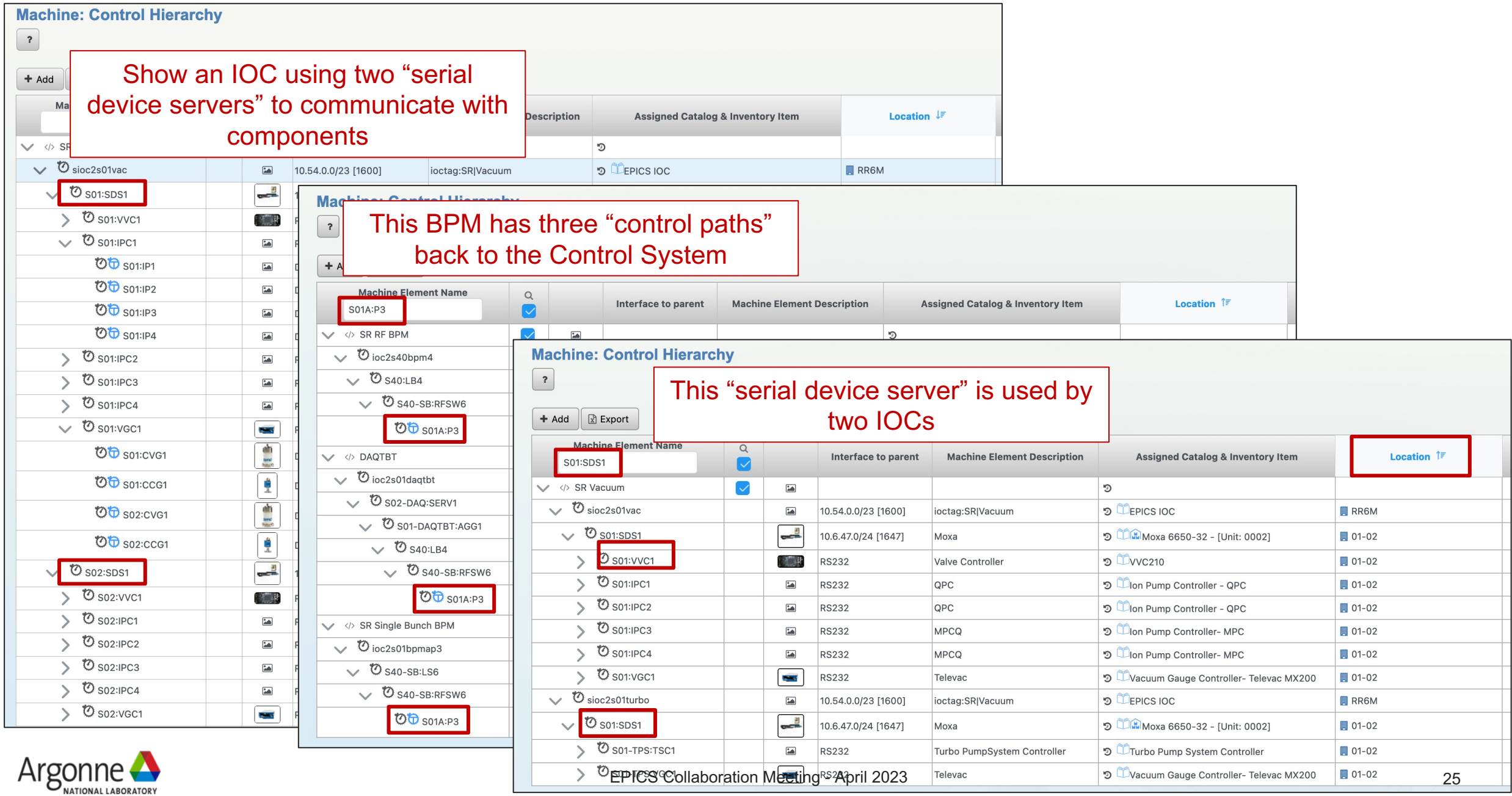
Supports the creation of a cable “pull-book” for contractors (API)

Referencing the following sample pull-card:

Cable ID	PS-601128	End1 Length (ft)	10.0
End1 | End2	S01A:Q1:PS | S01A:Q1:TS1	End2 Length (ft)	2.0
Type / Laying	#18/2c (klixon) / M	Routed Length (ft)	13.0
Cable Info	<PS-SR-S01-CAB1><S01_DLMA>:PS-601128	Total Length (ft)	25.0
Route	01-C01 | CT-TT-PS . A:Q1	Modified On	2023-04-04
Kabel Name	SR_M_A01_C58_61_PS-SR-S01-CAB1[8] | SR_T_S01_S01_DLMA[A:Q1:TS1]		

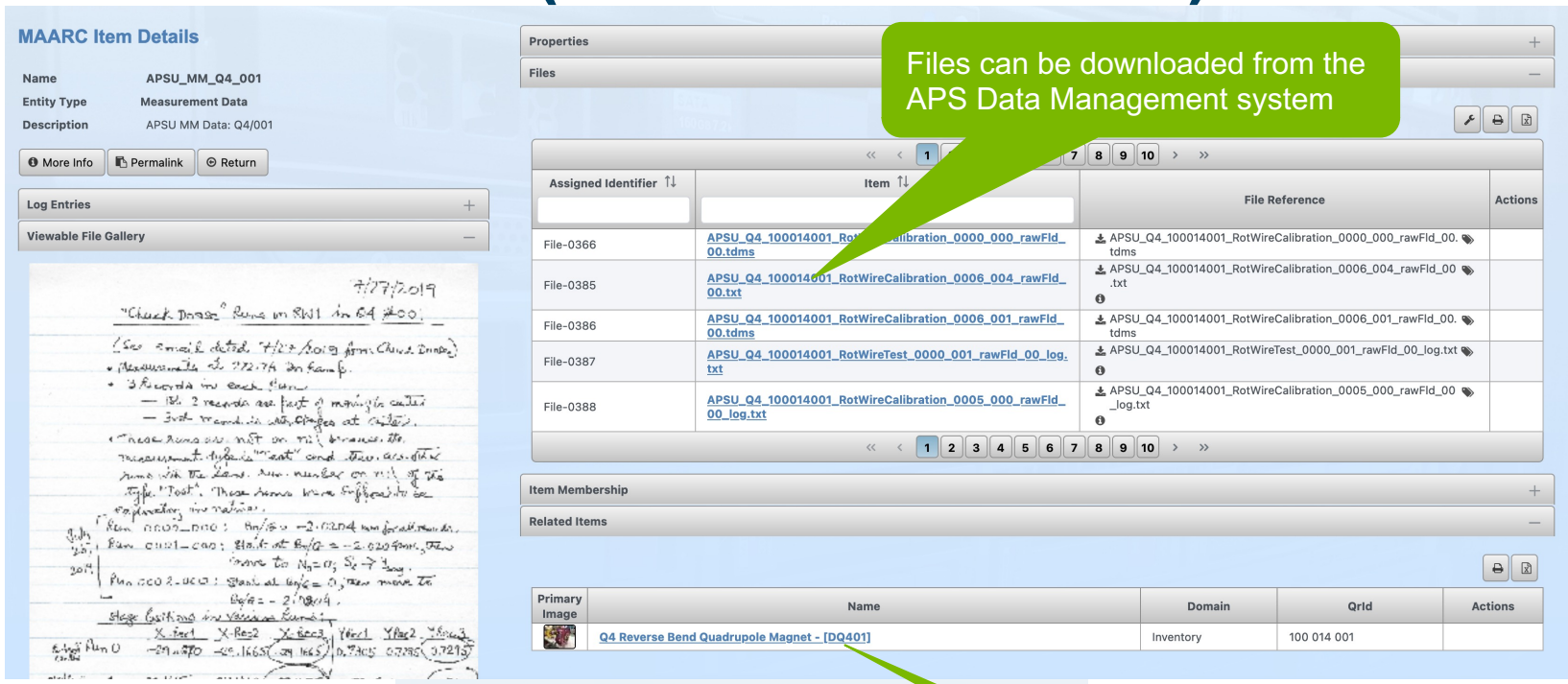
Cable ID is hyperlink to CDB PS-601128 (i.e. power system prefix followed by unique ID 601128)
End1 | End2 indicates this cable connects DC-to-DC converter S01A:Q1:PS to sector 01 magnet “A:Q1” thermal switch terminals labeled TS1.
Type/Laying indicates this “#18/2c (klixon)” cable type can be multi-layered in a raceway
Cable Info indicates additional information that is stored in the CDB.
Route indicates this cable’s first waypoint as being sleeve “01-C01” and final waypoint as being drop location A:Q1 (directly above magnet A:Q1) in power systems tunnel cable tray
End1 Length (ft) indicates to leave 10.0 feet of cable from mezzanine floor
End2 Length (ft) indicates to leave 2.0 feet of cable at in-tunnel drop location

Captures Control Flow Between Machine Elements

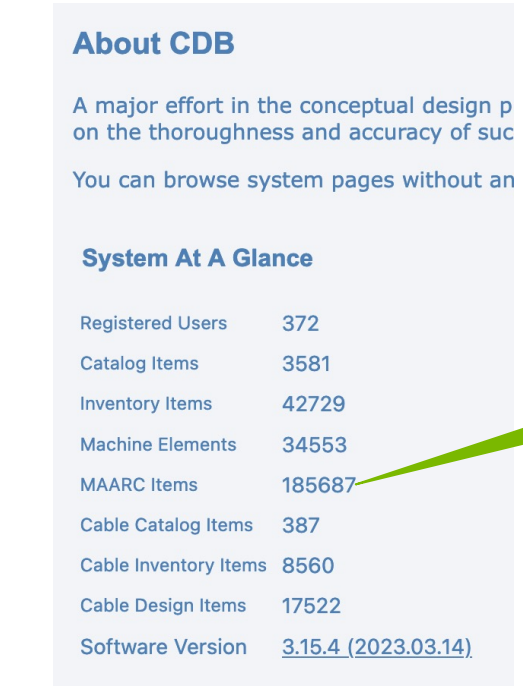


Tracking Measurements (MAARC Domain)

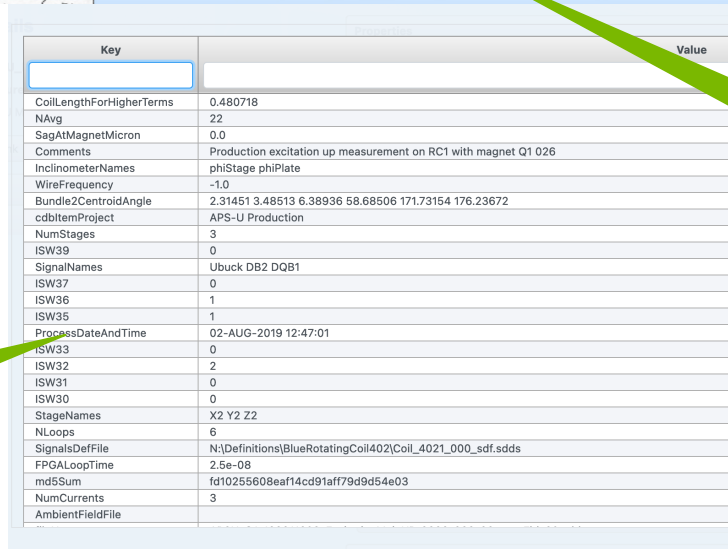
- MAARC Domain: used for archiving measurement and analysis results
- Entries are associated with items from other domains (e.g., component instances)
- MAARC is being populated automatically using the APS Data Management system:
  - Magnetic Measurements
  - Magnetic Module Assemblies



Files can be downloaded from the APS Data Management system



At the moment there are over 185K MAARC entries in production DB



Metadata from measurement files are automatically added to file entries

Parent CDB items are linked to MAARC entries

IOC Apps in a Searchable Index

Item App List

+ Add | Load Property Filters

More Info	Name	Primary Image	Type	Technical System	Description	Property: Personnel/Staff	Actions
			ioc	Select			
>	SR Vacuum		IOC Top App	Vacuum Controls/Instrumentation	All storage ring vacuum controls & gauges; 20 soft IOCs based on double sectors	Scott	
>	SR Magnet Power Supplies		IOC Top App	Power Systems Controls/Instrumentation	Includes both unipolar supplies & bipolar supplies, but not M1,M2,IS1 & kickers	Brendan	

Item App Details

Name SR Vacuum

Description All storage ring vacuum controls & gauges; 20 soft IOCs based on double sectors

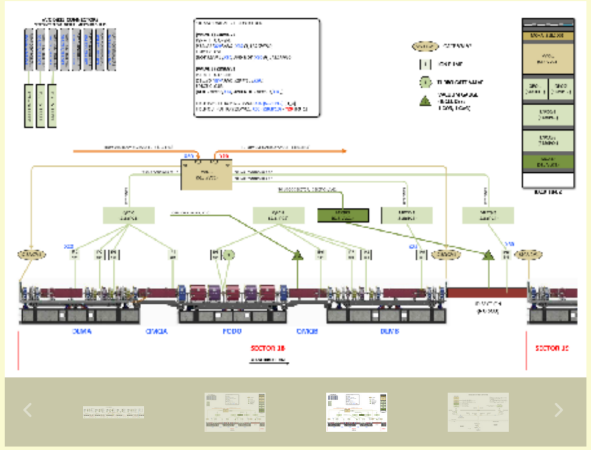
Technical System Vacuum | Controls/Instrumentation

Type IOC Top App

Edit | Delete | More Info | Permalink | Return

Gallery

+ Add



Log Entries

Properties

+ Add

Type	Tag	Value	Description	Actions
Personnel/Staff	Controls POC	Scott		
Document (Upload)	Zone F Vacuum Diagram			
Document (Upload)	Typical Odd Sector Vacuum Diagram			
Document (Upload)	Typical Even Sector Vacuum Diagram			
Document (Upload)	Vacuum Turbo Pump Control System			
Documentation (WEB)	Control Hierarchy	SR Vacuum IOCs		
Software/Firmware Code	Code Base - IOCs	git repo		
Software/Firmware Code	Code Base - PLCs			
Software/Firmware Code	Code Base - Touch Screens			
Software/Firmware Code	Top medm display		medm -x <path-to-top-display>	

App Listing

Deployments

Item Membership

SR Vacuum					
sioc2s01vac		10.54.0.0/23 [1600]	EPICS IOC	RR6M	SR_SOFTIOC
S01:SDS1		10.6.47.0/24 [1647]	Moxa 6650-32 - [Unit: 0002]	01-02	01-02
S01:VVC1		RS232	VVC210	01-02	01-02
S01:IPC1		RS232	Ion Pump Controller - QPC	01-02	01-02
S01:IP1		Direct Connection	Ion Pump- 45L w/ NEG Gamma	SR_Tunnel_01_DLMA	S01A:DLMA
S01:IP2		Direct Connection	Ion Pump- 45L w/ NEG Gamma	SR_Tunnel_01_DLMA	S01A:DLMA
S01:IP3		Direct Connection	Ion Pump- 45L w/ NEG Gamma	SR_Tunnel_01_DLMA	S01A:DLMA
S01:IP4		Direct Connection	Ion Pump- 45L w/ NEG Gamma	SR_Tunnel_01_QMQA	S01A:QMQA:VC:ASSY
S01:IPC2		RS232	Ion Pump Controller - QPC	01-02	01-02

High Level Apps in a Searchable Index

Item App List

+ Add | Load Property Filters

More Info	Name	Primary Image	Type	Technical System	Description	Property: Personnel/Staff	Actions
				Select			
>	C2 Deployment Intrastructure		Script	Controls/Instrumentation	Collection of tools and conventions to define IOC and HLA deployment infrastructure	Andrew	
>	Infrastructure Monitoring System (IMS)		Service - Continuous Web-based Application	Controls/Instrumentation	System for monitoring C2 health.	Dariusz	
	C2 Log Monitoring		Service - Continuous Web-based Application	Controls/Instrumentation			
>	Component Database		Web-based Application	Controls/Instrumentation	Tool designed to document, organize, track, and manage components over their life cycle. ...	Dariusz	
>	DAQ System Infrastructure		Service - Continuous	Controls/Instrumentation		Elaine/Sinisa	
>	DAQ tools		Service - On demand Service - Continuous Application - On Demand Script	Controls/Instrumentation	Tools for developing and debugging in the DAQ environment.	Elaine/Sinisa	
>	eTraveler		Web-based Application	Controls/Instrumentation		Dariusz	
>	GUI tools		Application - On Demand	Controls/Instrumentation	GUI tools deployed in C2 such as CS Studio and C2 Data Viewer	Elaine	
>	IOC tools		Script	Controls/Instrumentation	Command-line utilities that assist with IOC debugging and development.	Dariusz/Andrew	
>	IRMIS		Application - On Demand Web-based Application	Controls/Instrumentation	Integrated Relational Model of Installed Systems - component and IOC tracking	Dariusz	
>	Naming Portal		Web-based Application	Controls/Instrumentation	Tool to track abbreviations used in the naming convention	Dariusz	
>	Olog		Web-based Application				
>	PV Gateways/Nameservers		Service - Continuous				
>	SR Vacuum		IOC Top App				
>	SR Magnet Power Supplies		IOC Top App				

nda — nda@gaea:~ — ssh gaea — 166×45

```
(base) nda@gaea 13> cdbInfo --id 182824 --all
```

Item Details

Id	182824
Name	S01A:GV1
Alternate Name	
UUID	06838804370c49fcb35fba1ff762d53d
Project	APS-U Production
Domain	Machine Design
Description	Gate Valve
URL	https://cdb.aps.anl.gov/cdb/views/item/view?id=182824
Control Hierarchy 1	SR Vacuum → (10.54.0.0/23 [1600]) → sioc2s01vac → (10.6.47.0/24 [1647]) → S01:SDS1 → (RS232) → S01:VVC1 → (Direct Connection) → S01A:GV1
Assigned Item	Gate Valve - 4.5" All Metal with RF-Liner
Assigned Item Id	20083

Cable Connections

Cable	Cable Id	Connected Machine(s)	Port Name
VA-011403	264462	S01:MPSL1 | S01A:GV1	
VA-011401	264270	S01:VVC1 | S01A:GV1	

Originally developed @ FRIB

Olog – NSLS II, FRIB, SNS

Managing Assemblies

Catalog Item Details

Name	DLMA Magnet Module
Model Number	A420-000001
Alternate Name	
Project	APS-U Production
Description	This DLMA Magnet Module has two build variants: "DLMA Magnet Modulde - S40" and "DLMA Magnet Module - S01,S37,S38,S39"
Technical System	Supports
Function	Magnet Module Assembly
Created from template	N/A

Edit | Delete | More Info | Permalink | Return

Gallery

+ Add

Log Entries

Ports

Properties

eTraveler Templates

Assembly Listing

A catalog item can be an “assembly” of other catalog items

+ Add

	Assembly			Assigned Item	
	Part Name	Part Description	Required	Name	Model Number
	A:DLMA:SUPP	DLM-A Support Assembly	Yes	DLMA Support Assembly	A241-100000
	A:Q1	Quadrupole	Yes	Q1 Production Magnet	U2330101-100000
	A:FC1	Fast Corrector	Yes	8-Pole Fast Corrector Production Magnet	APS-MG-CRR-3000
	A:Q2	Quadrupole	Yes	Q2 Production Magnet	U2330101-200000
	A:M1	Dipole Magnet	Yes	M1 Production Magnet	A174-100000
	A:Q3	Quadrupole	Yes	Q3 Production Magnet	U2330101-300000
	A:S1	Sextupole magnet	Yes	S1/S3 Production Magnet	A172-100000
	A:Q4	Quadrupole	Yes	Q4 Reverse Bend Quadrupole Magnet	U2330101-400000
	A:S2	Sextupole magnet	Yes	S2 Sextupole Magnet	A173-200000
	A:Q5	Quadrupole	Yes	Q5 Production Magnet	U2330101-500000
	A:FC2	Fast Corrector	Yes	8-Pole Fast Corrector Production Magnet	APS-MG-CRR-3000
	A:S3	Sextupole magnet	Yes	S1/S3 Production Magnet	A172-100000
	A:VC1	A:VC1	Yes	A:VC1 NEG-Coated Aluminum Vacuum Chamber	A043-010000
	A:P1:BCS	Set of 4 BPM cables	Yes	BPM PEEK Kit cables	X12J105319-00
	A:M1:STND_US	M1 L-bend US support	Yes	A:M1 L-bend Chamber US End Support Stand	A048-174000
	A:M1:STND_MS	M1 L-bend mid support	Yes	M1 L-bend Chamber Mid Support Stand	A048-180000
	A:M1:STND_DS	M1 L-bend DS support	Yes	A:M1 L-bend Chamber DS End Support Stand	A048-170000
	A:VC3	Vacuum Chamber - A:VC3 L-bend	Yes	A:VC3 (A:M1) L-bend Vacuum Chamber	A044-100000
	A:IP1	Ion Pump	Yes	Ion Pump- 45L w/ NEG Gamma	45SDI4DSC1N2
	A:P2	A:VC4 / A:P2 / A:VC5 / A:P2 keyhole support	Yes	A:P2 Keyhole Beam Position Monitor without RF Liners	A046-310000
	A:P2:BPP	BPM SMA Patch Panel	Yes	BPM SMA Patch Panel for DLMA/DLMB	A241-109010
	A:P1:BPP	BPM SMA Patch Panel	Yes	BPM SMA Patch Panel for DLMA/DLMB	A241-109010
	A:P2:BCS	Set of 4 BPM cables	Yes	BPM PEEK Kit cables	X12J105319-00
	A:IP2	Ion Pump	Yes	Ion Pump- 45L w/ NEG Gamma	45SDI4DSC1N2
	A:VC7	Vacuum Chamber - A:VC7 NEG-coated Aluminum	Yes	A:VC7 NEG-Coated Aluminum Vacuum Chamber	A043-060000

Managing Assemblies

Tag	DLMA-1170
QR Id	000 031 908
Catalog Item	DLMA Magnet Module
Serial Number	
Project	APS-U Production
Description	
Location	981-S6-D-101
Location Details	
Housing	
Status	Acceptance In Progress

Edit | Delete | More Info | Permalink | Return

Gallery

Log Entries

+ Add

Type	Tag	Value	Description	Actions
Document (Upload)	DLMA-1170_X_module_shim_change_00	document.125695594102398652.xlsx		
Document (Upload)	DLMA-1170_Y_module_shim_change_00	document.14179070794570592166.xlsx		
Document (Upload)	DA17 X SHIM CHANGE 01	document.15287097582387438094.xlsx		
Document (Upload)	DA17 Y SHIM CHANGE 01	document.12934298797760775345.xlsx		

eTraveler Instances

+ Add | + Create Binder

Title	Description	Created By	Updated By	Created From Template	Estimated Progress	Version	Action
DLMA-1170 Magnets Installation/Assembly		bechtold	dwilkin	DLMA Magnets Installation/Assembly	100%	13:0	
DLMA-1170 Magnet Alignment Verification		mmendez	dwilkin	DLMA Magnet Alignment Verification	100%	11:0	
DLMA-1170 Ground Bar Installation		mmendez	dwilkin	Ground Bar Installation	100%	8	
DLMA-1170 Cable Tray Installation		mmendez	dwilkin	Cable Tray Installation	100%	3:0	
DLMA-1170 Water Manifold Installation		mmendez	mmendez				

An assembly inventory item captures the exact parts used for this assembly

Assembly Listing

Edit

	Assembly		Assigned Item	
	Part Name	Part Description	Name	Serial Number
	A:DLMA:SUPP	DLM-A Support Assembly	DLMA Support Assembly - [017]	017
	A:Q1	Quadrupole	Q1 Production Magnet - [DQ143]	DQ143
	A:FC1	Fast Corrector	8-Pole Fast Corrector Production Magnet - [MFC118]	MFC118
	A:Q2	Quadrupole	Q2 Production Magnet - [SQ271]	SQ271
	A:M1	Dipole Magnet	M1 Production Magnet - [DM131]	DM131
	A:Q3	Quadrupole	Q3 Production Magnet - [SQ343]	
	A:S1	Sextupole magnet	S1/S3 Production Magnet - [DS1142]	
	A:Q4	Quadrupole	Q4 Reverse Bend Quadrupole Magnet - [DQ473]	DQ473
	A:S2	Sextupole magnet	S2 Sextupole Magnet - [ES2017]	ES2017
	A:Q5	Quadrupole	Q5 Production Magnet - [DQ523]	DQ523
	A:FC2	Fast Corrector	8-Pole Fast Corrector Production Magnet - [MFC116]	MFC116
	A:S3	Sextupole magnet	S1/S3 Production Magnet - [DS1141]	
	A:VC1	A:VC1	A:VC1 NEG-Coated Aluminum Vacuum Chamber- [ ]	
	A:P1:BCS	Set of 4 BPM cables	BPM PEEK Kit cables- [ ]	
	A:M1:STND_US	M1 L-bend US support	A:M1 L-bend Chamber US End Support Stand- [ ]	
	A:M1:STND_MS	M1 L-bend mid support	M1 L-bend Chamber Mid Support Stand- [ ]	

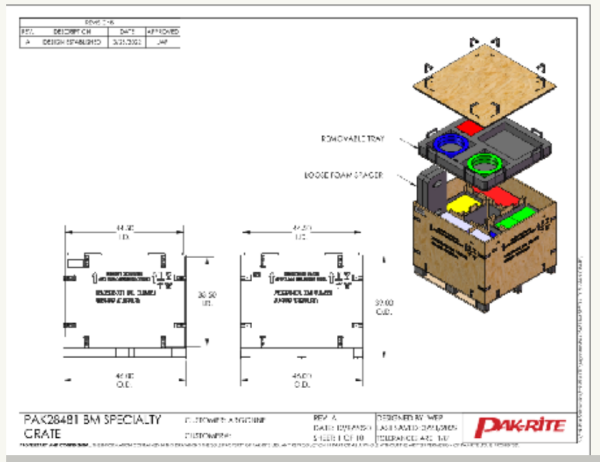
Defines & Captures “Installation Kit” Inventory

Catalog Item Details

Name	**Mezzanine Rack Kit BMFE (BM-AR-RR03/04)**
Model Number	NA
Alternate Name	APSU Bending Magnet Front End Mezzanine Box
Project	**APS-U Production**
Description	Crate used to store al cabinet hardware and cables need on the mezzanine for BMFE
Technical System	Controls/Instrumentation | Front Ends
Function	Controller - Generic | Kit
Created from template	**N/A**

More Info | Permalink | Return

Gallery



Log Entries

Ports

Properties

Type	Tag	Value	Description	Actions
Document (Upload)				

eTraveler Templates

Assembly Listing

« ‹ 1 2 › »

	Assembly			Assigned Item		
	Part Name	Part Description	Required	Name	Model Number	
›	IP Cable 7		No	SCPSC20SC (ion pump FE)	SCPSC20SC	
›	IP Cable 6		Yes	SCPSC20SC (ion pump FE)	SCPSC20SC	
›	IP Cable 5		Yes	SCPSC20SC (ion pump FE)	SCPSC20SC	
›	IP Cable 4		Yes	SCPSC20SC (ion pump FE)	SCPSC20SC	
›	IP Cable 3		Yes	SCPSC20SC (ion pump FE)	SCPSC20SC	
›	IP Cable 2		Yes	SCPSC20SC (ion pump FE)	SCPSC20SC	
›	IP Cable 1		Yes	SCPSC20SC (ion pump FE)	SCPSC20SC	
›	QPC shelf		Yes	KIT, SHELF, QPC, 19" RACK	310116	
›	Ion Pump Controller 2		Yes	Ion Pump Controller - QPC	QPC-4-P-S-1-US110-S-S-N	
›	Ion Pump Controller 1		Yes	Ion Pump Controller - QPC	QPC-4-P-S-1-US110-S-S-N	
›	Vacuum Gauge System		Yes	Vacuum Gauge Controller- Televac MX200	2-7900-034	
›	Picoammeter		Yes	Picoammeter - 4 channel; ±60µA range	WTETRAMMCAPS	
	FE Vacuum cat5 (1)		Yes	FE Vacuum cat5	cat5	
	FE Vacuum cat5 (2)		Yes	FE Vacuum cat5	cat5	
	FE Vacuum cat5 (3)		Yes	FE Vacuum cat5	cat5	
	DB9 to RJ45 Adaptor (1) Televac		Yes	DB9 to RJ45 Adaptor	PN 02947	
	DB9 to RJ45 Adaptor (2) QPC		Yes	DB9 to RJ45 Adaptor	PN 02947	
	DB9 to RJ45 Adaptor (3) QPC		Yes	DB9 to RJ45 Adaptor	PN 02947	
›	BM Patch Panel		Yes	FE XBPM Patch Panel	R1280/1UK/16	
	FE-BM motor/limit switch (long)		Yes	FE-BM motor/limit switch (long)		
	FE-BM motor/limit switch (short)		Yes	FE-BM motor/limit switch (short)		
	Pot (long)		Yes	FE-BM potentiometer (long)		
	Pot (short)		Yes	FE-BM potentiometer (short)		
	Diag BMFE Ethernet interface panel		Yes	Generic: Interface Adapter		
›	Moxa 6650-16		Yes	Moxa 6650-16	NPort 6650-16	

CDB Update upon eTraveler Entry

eTraveler is an MQTT client that can publish all user entries to MQTT subscribers … one of which updates CDB via the API

Magnet Installation

2.1 Refer to DWG# A420-000004 DLM-A MAGNET MOUNTING and DWG# A420-000005 DLM-A MAGNET LUG POLARITY TAGS to install magnets onto girder.

2.2 Install lifting rings onto each magnet.

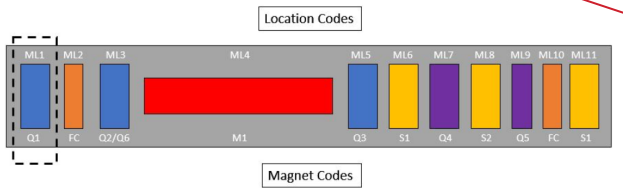
- Q1, Q2, Q3, Q4, Q5, S1/S3 and S2 magnets use M12 lifting hardware (installation torque 37 ft-lb).
- Q7, Q8, M3 and M4 magnets use M16 lifting hardware (installation torque 80 ft-lb).

2.3 Install Q1 magnet in location ML1

2.3.1 Scan Q1 magnet QR code: ps.anl.gov/cdb?qrId=100011043

history: changed to https://qr.aps.anl.gov/cdb?qrId=100011043 by mmendez Tuesday, November 23rd 2021, 2:15:37 pm;

notes: 0



Q1 magnet location ML1

2.4 Install FC magnet in location ML2

2.4.1 Scan FC magnet QR code: ps.anl.gov/cdb?qrId=100008118

history: changed to https://qr.aps.anl.gov/cdb?qrId=100008118 by mmendez Tuesday, November 23rd 2021, 2:15:48 pm;

notes: 0

DLMA-1170 Magnets Installation/Assembly

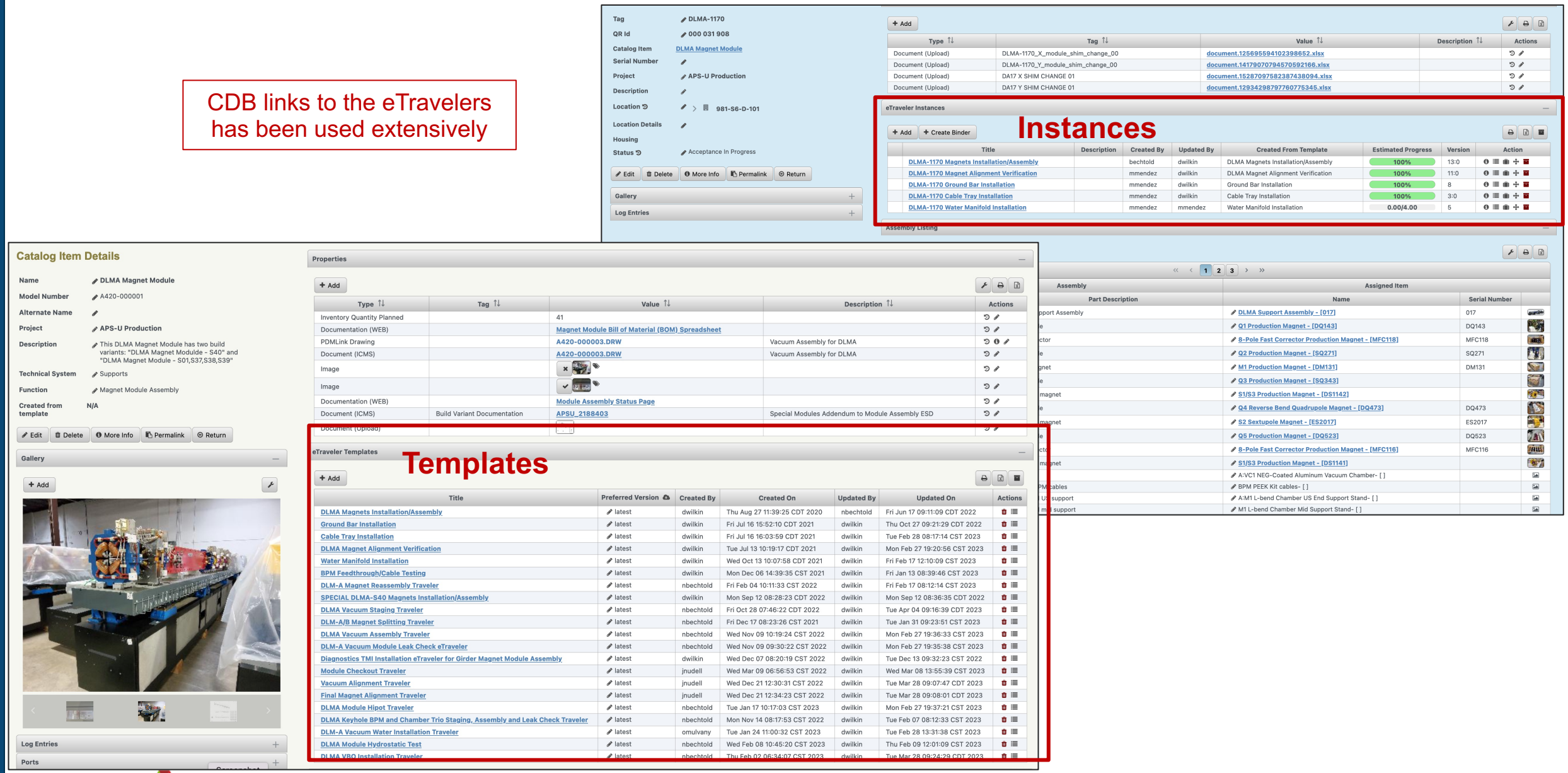
- Discrepancy log
- Traveler
- 1 General Safety Precautions
- 2 Magnet Installation

By	Updated By	Created From Template	Estimated Progress	Version	Action
	dwilkin	DLMA Magnets Installation/Assembly	100%	13:0	
	dwilkin	DLMA Magnet Alignment Verification	100%	11:0	
	dwilkin	Ground Bar Installation	100%	8	
	dwilkin	Cable Tray Installation	100%	3:0	
	mmendez	Water Manifold Installation	0.00/4.00	5	

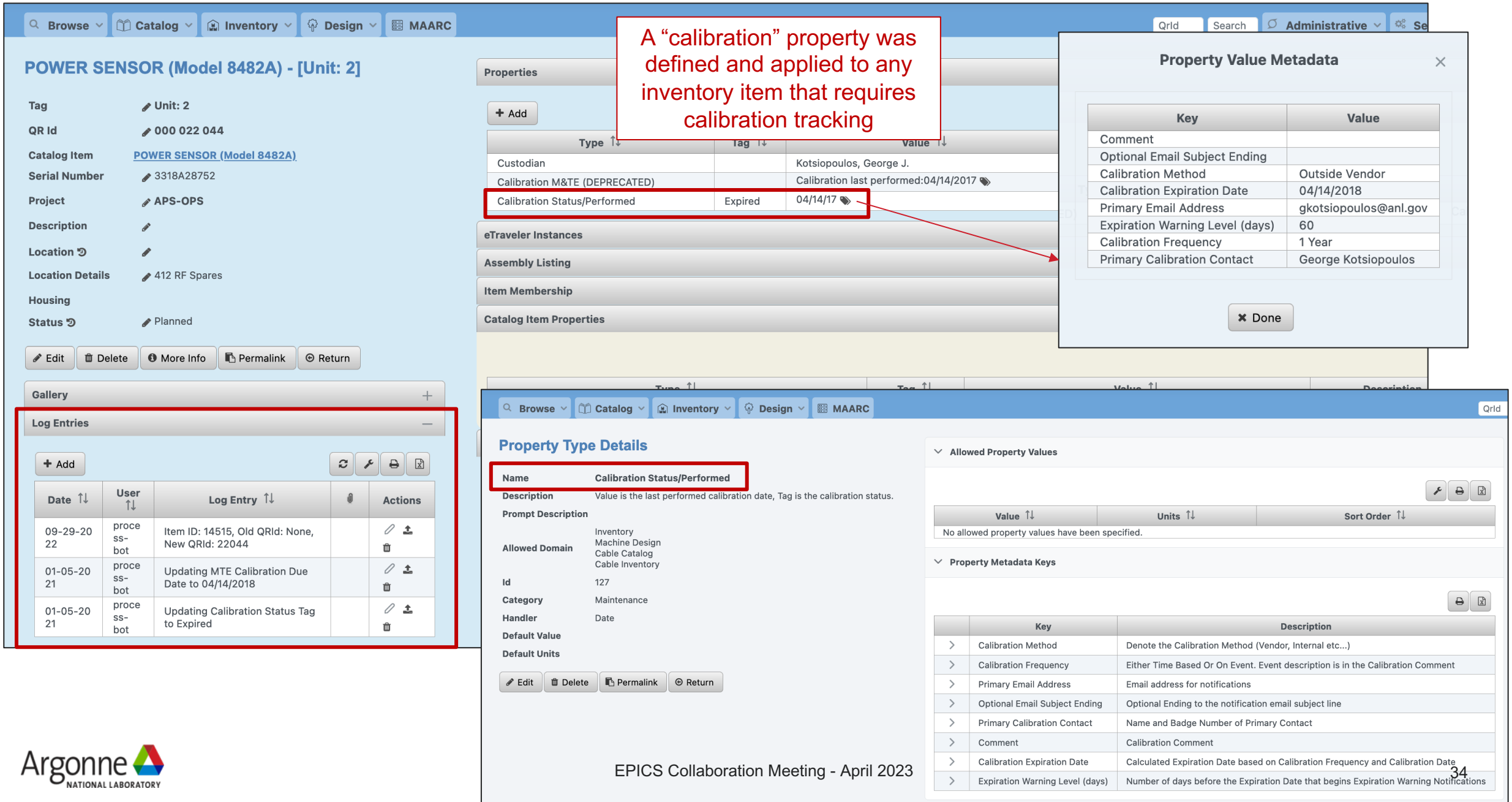
			Assigned Item	
			Name	Serial Number
			DLMA Support Assembly - [017]	017
			Q1 Production Magnet - [DQ143]	DQ143
			8-Pole Fast Corrector Production Magnet - [MFC118]	MFC118
			Q2 Production Magnet - [SQ271]	SQ271
			M1 Production Magnet - [DM131]	DM131
			Q3 Production Magnet - [SQ343]	
			S1/S3 Production Magnet - [DS1142]	
			Q4 Reverse Bend Quadrupole Magnet - [DQ473]	DQ473
			S2 Sextupole Magnet - [ES2017]	ES2017
>	A:Q5	Quadrupole	Q5 Production Magnet - [DQ523]	DQ523
>	A:FC2	Fast Corrector	8-Pole Fast Corrector Production Magnet - [MFC116]	MFC116
>	A:S3	Sextupole magnet	S1/S3 Production Magnet - [DS1141]	
	A:VC1	A:VC1	A:VC1 NEG-Coated Aluminum Vacuum Chamber- [ ]	
	A:P1:BCS	Set of 4 BPM cables	BPM PEEK Kit cables- [ ]	
	A:M1:STND_US	M1 L-bend US support	A:M1 L-bend Chamber US End Support Stand- [ ]	
	A:M1:STND_MS	M1 L-bend mid support	M1 L-bend Chamber Mid Support Stand- [ ]	

CDB Holds Links to eTravelers

CDB links to the eTravelers has been used extensively



Equipment Calibration Tracking



Equipment Calibration Tracking

Semi-Custom Web Page – Data From CDB

Index Status	
Data Current As Of	2023-04-17 04:23:43
Number of Log Entries	347
Download Report	Excel File

Display Status	
Last Updated	2023-04-17 13:57:17
Email Contact	Diane Wilkinson
CDB Engineering Display	Index

Calibration Status for MT&E

ITEM	STATUS	DUE DATE	CUSTODIAN	CUSTODIAN EMAIL	CALIBRATION FREQUENCY	CALIBRATION METHOD	CALIBRATION LAST PERFORMED	COMMENT
PCMM Arm (Model 87) - Unit: 1 - S/N: 8725-6-10153-UC	Expired	04/30/2022	Bill Jansma	jansma@anl.gov	1 Year	In House	4/30/2021	Certification document: https://anl.app.box.com/folder/125155345309
HIGH-VOLTAGE VOLTMETER (Model VMDP60E-GJYB-KV-ANB) - Unit: 1 - S/N: 171107-31	Expired	06/07/2022	George Kotsiopoulos	gkotsiopoulos@anl.gov	1 Year	Outside Vendor	6/7/2021	
ISOTROPIC PROBE (Model 8760D) - Unit: 1 - S/N: 01013	Expired	10/27/2022	George Kotsiopoulos	gkotsiopoulos@anl.gov	1 Year	Outside Vendor	10/27/2021	
POWER METER (Model N1914A) - Unit: 1 - S/N: MY50001045	Expired	05/08/2018	George Kotsiopoulos	gkotsiopoulos@anl.gov	1 Year	Outside Vendor	5/8/2017	
Pulse Generator (Model 81110A) - Unit: 1 - S/N: DE41B05278	Expiration Warning	04/19/2023	Pat Weghorn	pweghorn@anl.gov	1 Year	Outside Vendor	4/19/2022	
DLI vibration analyzer (Model TRIO CX10) - Unit: 1 - S/N: ** NONE **	Expiration Warning	06/11/2023	Rick Putnam	ccp@anl.gov	2 Years	Vendor	6/11/2021	
Laser Tracker (Model AT403) - Unit: 4 - S/N: 395034	Expiration Warning	04/22/2023	Thomas Parchem	tparchem@anl.gov	1 Year	Manufacturer	4/22/2022	
Transducer Electronics (Model 860R) - Unit: 3 - S/N: 9111107	Expiration Warning	05/09/2023	Tony Puttkammer	puttkamm@anl.gov	1 Year	Manufacturer	5/9/2022	
Transducer Electronics (Model 860R) - Unit: 4 - S/N: 9711219	Expiration Warning	05/09/2023	Tony Puttkammer	puttkamm@anl.gov	1 Year	PSG	5/9/2022	
HIGH-VOLTAGE VOLTMETER (Model VM50DE-BLD-6L-T) - Unit: 2 - S/N: 010226-46	Current	09/19/2025			3 Years		9/19/2022	
Laser Interferometer System Std. (Model 5508A display) - Unit: 1 - S/N: 3124A02811	Current	07/29/2024	Bill Jansma	jansma@anl.gov	5 Years	Outside Vendor (Agilent)	7/29/2019	
Laser Tracker (Model AT403) - Unit: 2 - S/N: 394890	Current	10/07/2023	Bill Jansma	jansma@anl.gov	1 Year	Manufacturer	10/7/2022	Certification document: https://anl.app.box.com/folder

A web page pulls all items that have a “calibration” property

Supports Customized Web Pages (API)

DLMB - Status	
Quantity Needed	41
Quantity Available	0

Display Status	
Last Updated	2023-04-17 14:30:19
Email Contact	Diane Wilkinson
CDB Engineering display	Index

Data fetched from CDB

DLMB - Bill of Materials

ITEM NUMBER	ITEM NA	M DESCRIPTION	CDB CATALOG NAME	CDB CATALOG ID	QUANTITY NEEDED PER UNIT	QUANTITY NEEDED FOR REMAINING UNITS	QUANTITY READY FOR USE	QUANTITY ON SITE BUT NOT READY	LOCATION
1		DLM-B SUPPORT ASSEMBLY	DLMB Plinth	8131	1 of 1	41	0	41	
2		Sextupole magnet	S1/S3 Production Magnet	8122	1 of 2	41	2	0	1 (2);
3	B:FC2	Fast Corrector	8-Pole Fast Corrector Production Magnet	8152	1 of 2	41	2	0	1 (2);
4	B:Q5	Quadrupole	Q5 Production Magnet	6711	1 of 1	41	1	0	1 (1);
5	B:S2	Sextupole magnet	S2 Sextupole Magnet	6132	1 of 1	41	0	1	
6	B:Q4	Quadrupole	Q4 Reverse Bend Quadrupole Magnet	6575	1 of 1	41	1	0	1 (1);
7	B:S1	Sextupole magnet	S1/S3 Production Magnet	8122	1 of 2	41	2	0	1 (2);
8	B:Q3	Quadrupole	Q3 Production Magnet	17194	1 of 1	41	1	0	1 (1);
9	B:M1	Dipole Magnet	M1 Production Magnet	18334	1 of 1	41	1	0	40] (1);
10	B:Q2	Quadrupole	Q2 Production Magnet	2108	1 of 1	41	0	0	
11	B:FC1	Fast Corrector	8-Pole Fast Corrector Production Magnet	8152	1 of 2	41	2	0	1 (2);
12	B:Q1	Quadrupole	Q1 Production Magnet	2090	1 of 1	41	1	0	1 (1);
13	B:DLMB:TRAY	Cable tray	DLM B BPM CABLE TRAY ASSEMBLY	42289	1 of 1	41	0	0	
14	B:DLMB:BUSBAR	Busbar assembly	DLM B BUS BAR ASSEMBLY	42294	1 of 1	41	6	0	981-S1-A-05-B1 (6);
15	B:P4:STND	Standard BPM-B Support	STANDARD BPM-B SUPPORT	224865	1 of 2	41	72	0	981-S4-D-07-B1 (48); 981-S4-D-07-B2 (24);
16	B:VC7	Vacuum Chamber - B:VC7 NEG-coated Inconel	B:VC7 NEG-Coated Inconel Vacuum Chamber	6958	1 of 1	41	23	10	Pallet-00636 (10); Pallet-00469 (7); Pallet-00479 (6);
17		Copper Gasket - DN40 RF Gasket #1	DN40 RF-sealing Copper Gasket	41574	1 of 10	41	32	0	Pallet-00706 (16); Cart (5); Cart (5);
18		QCF Chain Clamp #1	DN40 QCF Chain Clamp	41573	1 of 10	41	41	0	Cart (14); Cart (8); Cart (6);
19	B:VC6	Vacuum Chamber - B:VC6 NEG-coated Aluminum	B:VC6 NEG-Coated Aluminum Vacuum Cross Chamber	7156	1 of 1	41	21	0	Pallet-00701 (13); Pallet-00565 (8);
20	B:VC6:STND	Vacuum Support Stand	B:VC6 Cross Support Stand	81872	1 of 1	41	43	0	981-S4-D-05-B1 (23); 981-S4-D-05-B2 (20);

CDB + eTraveler + External Tools

Work Processes/Flow with Real-time Update

- CDB Auto-update
- Cue sheets
- Trello

Real-time Inventory Status Displays

- In work areas for inventory mgmnt

QA Consistency

- CDB entry
- Hazard Property
- Consistent ACL
- Consistent Discrepancy Forms/Reports

Calibration Info

Installation Coordination <planned>

- Work Process/Flow
- Inventory
- Progress/Status

Progress/Status Reports

- Dump to spreadsheet
- Tableau

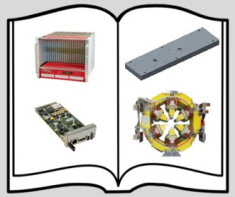
User Support

- Training
- Assistance
- Bug reports/fixes
- New features

Application Programming Interface (API)

Catalog

Each unique *type of component* or *component design or COTS item* + properties /drawings/specification/..

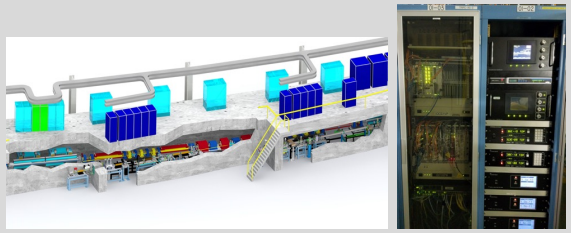


Inventory

Each unique *instance of component* procured or fabricated) + properties/serial # QR code/travelers/pictures/…

Machine Design

A simple hierarchical model of the components to be installed. "What & Where" for installation + Properties/pictures/locations/…

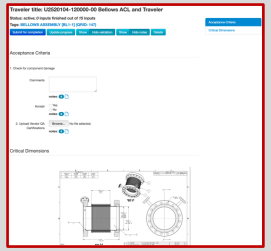


Cables

Cables are defined by Cable Type + 2 endpoints. Endpoints are referenced to the Machine Design components

eTravelers

(Electronic forms to capture inspection, measurement, test results of components. Accessed through CDB)



Component Database (CDB)

CDB + eTraveler + External Tools

Work Processes/Flow with Real-time Update

- CDB Auto-update
- Cue sheets
- Trello

Real-ti… Inventory Displa…

- In work are… inventory n…

Item	Quantity
Registered Users	372
CDB Catalog Items	3,581
CDB Inventory Items	42,739
CDB Cable Types	387
CDB Cable Inventory	8,560
CDB Machine Elements	34,553
CDB Cable Design Elements	17,582
MAARC Items	185,615
eTraveler Forms	1,370
eTraveler Instances	42,414
Semi-custom Web Pages	34+
Custom scripts to manipulate data	numerous

…tion Coordination <planned>

…Process/Flow …ory …ss/Status

User Support

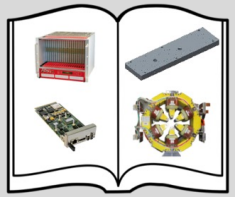
- Training
- Assistance
- Bug reports/fixes
- New features

… Reports

…et

Catalog

Each unique *type of component* or *component design or COTS item* + properties /drawings/specification/..

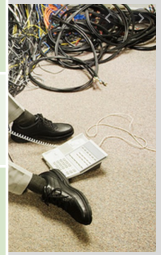


Inve…

Each uniqu… *componen…* fabric… properties… code/travele…

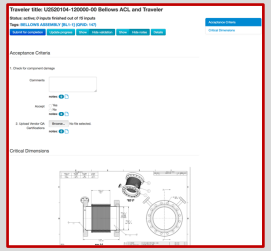
…s

…Cable Type …points are …hine Design …s



eTravelers

(Electronic forms to capture inspection, measurement, test results of components. Accessed through CDB)



Lessons Learned

- Get management & QA backing (the fact that it benefits ”Controls” is not sufficient motivation for other groups)
- It is a lot of work to track tens of thousands of components
  - Decide what the general staff will do vs. what the “CDB Team” will do
- Critical Step: Mapping “site domain knowledge” into CDB domains
- Have the database ready *early* … if it is not available staff will use other options
- Train the staff on how to use it
- Set up conventions of how to do standard things
  - eTraveler format, properties, naming of machine elements, …
- Be prepared for entering / editing / deleting *large quantities* of items …
- It is hard to beat Excel for mass changes & entries
  - export -> modify -> import
- Don’t do “customized views” for users in CDB … have them use an external tool

Acknowledgements

- Sinisa Veseli - original developer/code architecture
- Dariusz Jarosz - prime developer
- John Quintana - developed *numerous* use cases and tools to make them happen
- Craig McChesney (Osprey DCS) – CDB Cable domains + external cable tools
- Dong Liu - original developer of eTraveler (while at FRIB)
- Diane Wilkinson – eTraveler Coordinator / CDB ”Help Desk”
- Guobao Shen – CAM (interface to Project), supported ongoing development