



FRIBs diagnostics software development workflow and tools

Diego Omitto
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EPICS Collaboration meeting

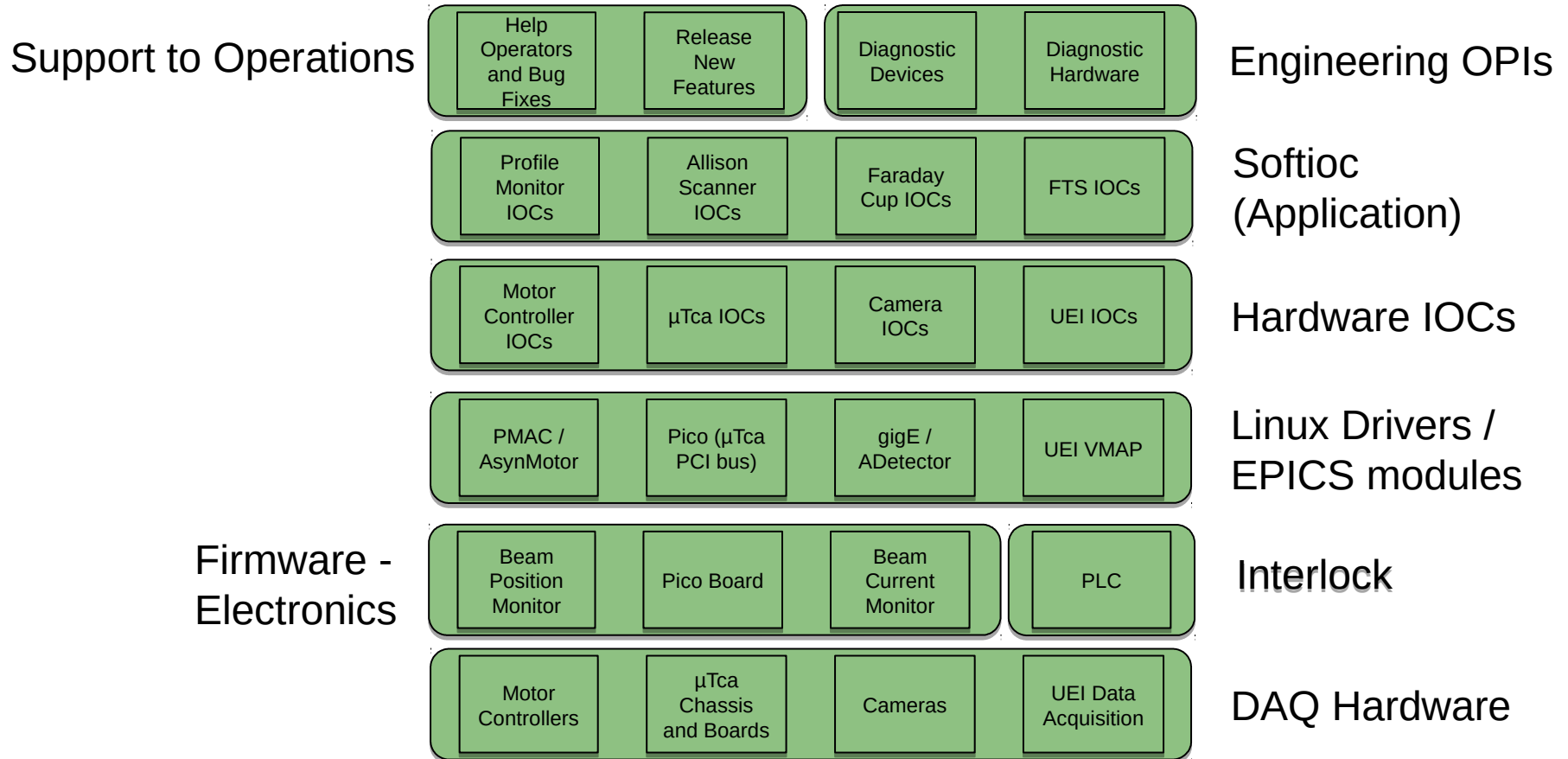
MICHIGAN STATE
UNIVERSITY



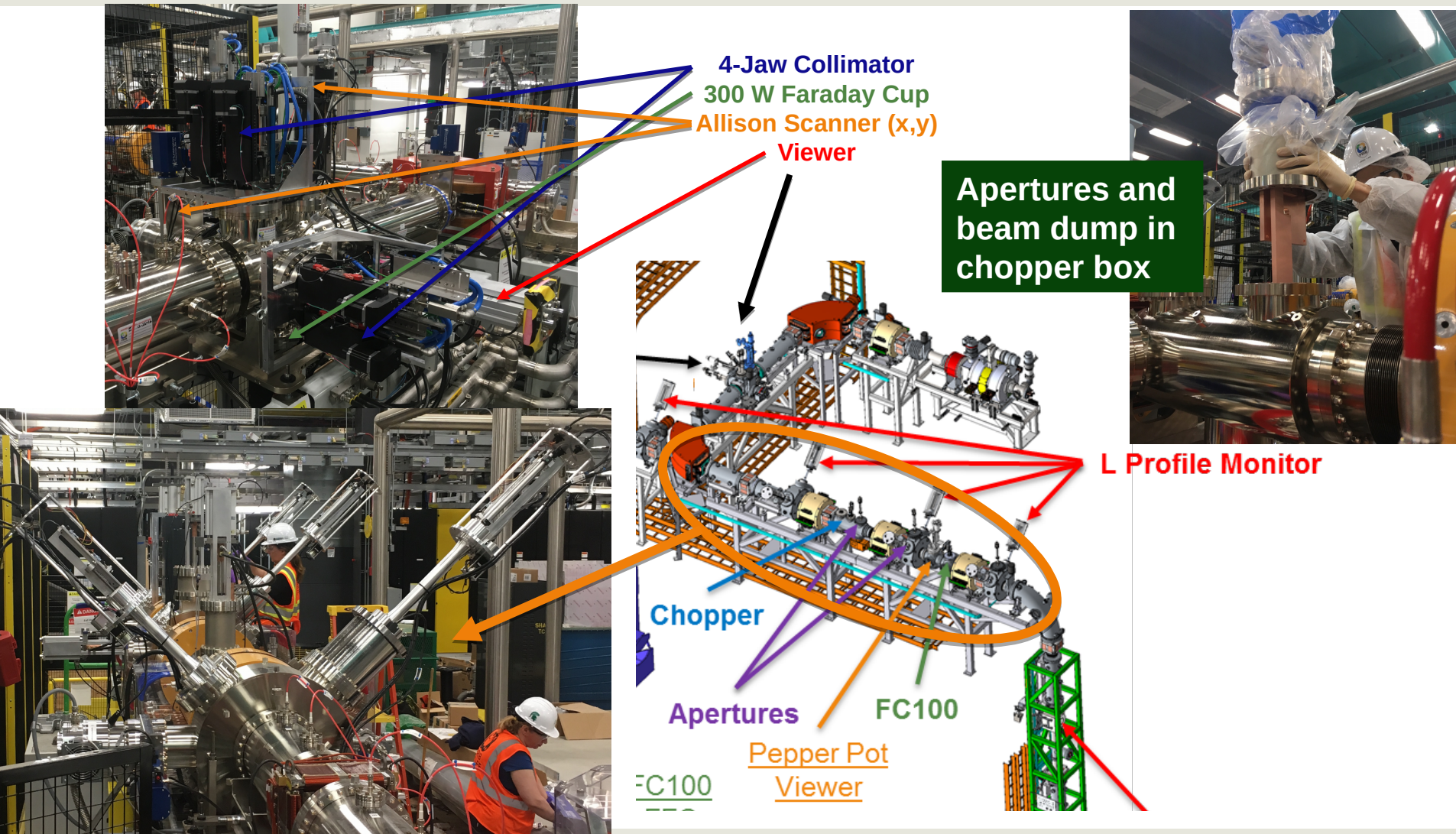
U.S. DEPARTMENT OF
ENERGY

Office of
Science

Diagnostics Controls Scope



Upper LEBT Devices Installed



Diagnostic Hardwares and IOC flavors



μ Tca



BPM - EVR



picoammeter



BCM



Delta Tau MC



DMK 33GX174



Iseg EHS 8620n



Cryocon 18c



DNA PPC5



AI 207



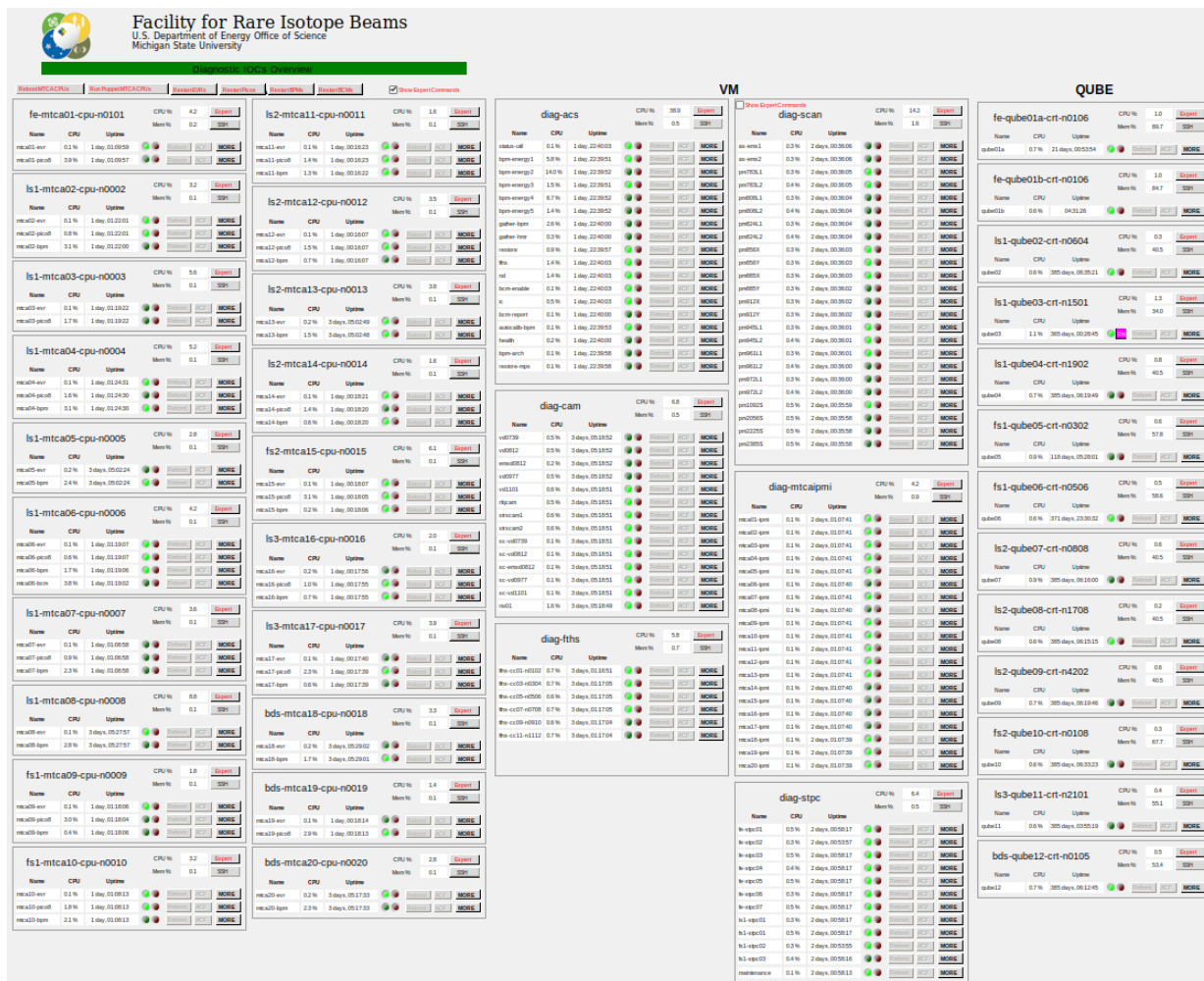
AO 308-020



AO 308-350

Diagnostics Controls Scope

Device Types	15
Total Instances	~400
IOC types	36
IOC Instances	~250
Number of PVs	> 200k



Corrective Maintenance Tools

[<== Diagnostics Home](#)

Diagnostics MicroTCA Overview

FW Cyclic

MTCA01 -- FE Profile Monitors, FCs

FE_MTCA01-MCH_N0001	FE-001.00	V2.155 Real	78.91 days	Fans 2800 RPM	2130 RPM	Amb. 27.7 C	17.20 A	206.4 W	Detail	MPS	CBuf	Com
DIAG_MTCA01-EVR2	0xE11C	42434	MPS GTS EVR	396.0 uW	Rx Pwr	Thu Oct 03 2019 15:59:05 .390	PCIe	OK	Detail	OK		
DIAG_MTCA01-PIC03	0xBC04	9084572	-0.004012 -0.001909 0.000473 -0.001276 -0.000324 -0.000669 -0.001813 -0.002884	Detail	OK	Run						
DIAG_MTCA01-PIC04	0xBC04	9084572	-0.000898 -0.002125 -0.003597 -0.003610 -0.000515 -0.000679 -0.000332 0.000925	Detail	OK	Run						
DIAG_MTCA01-PIC05	0xBC04	9084572	0.000507 0.000268 -0.000247 -0.005483 0.000251 0.000547 0.001346 0.000929	Detail	OK	Run						
DIAG_MTCA01-PIC06	0xBC04	9084572	-0.000674 -0.000487 -0.001048 -0.004243 0.000178 0.000410 -0.000048 -0.003696	Detail	OK	Run						
DIAG_MTCA01-PIC07	0xBC04	9084572	0.001246 -0.000520 -0.000480 -0.002843 0.001208 0.000052 0.000341 -0.003921	Detail	OK	Run						
DIAG_MTCA01-PIC08	0xBC04	9084572	-0.000074 -0.002438 -0.003313 426.535926 0.000896 0.003493 -0.001182 513.489208	Detail	OK	Run						
DIAG_MTCA01-PIC09	0xBC04	9084572	-0.000952 0.002809 -0.000356 -0.001557 0.008274 0.003287 0.003949 0.000012	Detail	OK	Run						

MTCA02 -- MEBT BPMs

LS1_MTCA02-MCH_N0002	LS1-002.06	V2.201 Real	105.93 days	Fans 2780 RPM	2180 RPM	Amb. 26.5 C	17.20 A	206.4 W	Detail	MPS	CBuf	Com
DIAG_MTCA02-EVR2	0xE11C	42429	MPS GTS EVR	394.8 uW	Rx Pwr	Thu Oct 03 2019 15:59:05 .445	PCIe	OK	Detail	OK		
FE_MEBT-BPM_D1006	0xB127	503777F	ready X,Y [mm] -3.02 1.88 2.9E-3 mag 52.03 deg 0.9 dBm REF	Detail	OK	Run						
FE_MEBT-BPM_D1072	0xB127	503777F	ready X,Y [mm] -0.42 0.83 2.2E-3 mag -33.10 deg 0.9 dBm REF	Detail	OK	Run						
FE_MEBT-BPM_D1094	0xB127	503777F	ready X,Y [mm] -1.95 1.25 2.3E-3 mag 70.54 deg 2.0 dBm REF	Detail	OK	Run						
FE_MEBT-BPM_D1111	0xB127	503777F	ready X,Y [mm] -0.63 0.48 2.3E-3 mag -39.59 deg 2.6 dBm REF	Detail	OK	Run						
LS1_CA01-BPM_D1129	0xB127	603777F	ready X,Y [mm] -2.01 3.13 3.3E-3 mag -77.19 deg 2.1 dBm REF	Detail	OK	Run						
LS1_CA01-BPM_D1144	0xB127	603777F	ready X,Y [mm] -1.51 0.24 2.6E-3 mag -51.97 deg 2.1 dBm REF	Detail	OK	Run						
LS1_WA01-BPM_D1155	0xB127	603777F	ready X,Y [mm] -3.04 2.46 2.5E-3 mag -20.30 deg 2.4 dBm REF	Detail	OK	Run						
LS1_CA02-BPM_D1163	0xB127	603777F	ready X,Y [mm] -0.69 0.10 2.4E-3 mag -22.76 deg 2.4 dBm REF	Detail	OK	Run						
LS1_CA02-BPM_D1177	0xB127	503777F	ready X,Y [mm] 1.44 1.89 2.4E-3 mag -58.34 deg 5.7 dBm REF	Detail	OK	Run						
LS1_WA02-BPM_D1188	0xB127	503777F	ready X,Y [mm] 1.13 -2.46 2.6E-3 mag -86.08 deg 5.7 dBm REF	Detail	OK	Run						
LS1_CA03-BPM_D1196	0xB127	503777F	ready X,Y [mm] 1.10 1.01 3.2E-3 mag 76.23 deg 2.9 dBm REF	Detail	OK	Run						
LS1_CA03-BPM_D1211	0xB127	503777F	ready X,Y [mm] 2.05 2.75 4.5E-3 mag 62.12 deg 2.9 dBm REF	Detail	OK	Run						
FS2_BMS-BPM_D4216	0xB127	1101183	boot X,Y [mm] 0.00 0.00 0.0E0 mag 0.00 deg -Infinity dREF	Detail	OK	Run						
FS2_BMS-BPM_D4283	0xB127	1101183	boot X,Y [mm] 0.00 0.00 0.0E0 mag 0.00 deg -Infinity dREF	Detail	OK	Run						
FS2_BMS-BPM_D4326	0xB127	1101183	boot X,Y [mm] 0.00 0.00 0.0E0 mag 0.00 deg -Infinity dREF	Detail	OK	Run						
LS3_WD01-BPM_D4389	0xB127	1101183	boot X,Y [mm] 0.00 0.00 0.0E0 mag 0.00 deg -Infinity dREF	Detail	OK	Run						
DIAG_MTCA02-PIC011	0xBC04	9156733	-0.000387 0.001929 0.000059 130.797901 0.000283 0.000922 -0.001289 130.823517	Detail	OK	Run						

Machine Status

EPICs Write: Open to all

Duty Factor % 0.000 % Single

0 20 40 60 80 100

MPS State: MPS Fault

Artemis Src: Source Off

Chopper: Chopper Off

RFQ: RFQ Off

GTS Status

GTS	GTS
GTS	GTS
GTS	GTS
GTS	GTS
GTS	GTS
GTS	GTS
GTS	GTS
GTS	GTS

Diagnostics Configuration

Config Status: Approved

Non-Approved Settings List

None

Restore Approved Config

Clear All NOKs

Clear NOK & CBF

Re-Init BPMs

Write TOF Config

Overview Pages

MPS Overview

Chopper Overview

Data Browser Plots

Preventive Maintenance Tools

Diag Engineering PM Check

	IN UEI	IN Motor	OUT UEI	OUT Motor		Last Check	Status			
D0783 L1	1.12 V	-69.41 mm	5.34 V	85.17 mm	RUN	04/0un/2019 11:14:20 AM	Ready	Out In	Enable ILK	Reset
D0783 L2	0.04 V	-208.03 mm	4.95 V	81.93 mm	RUN	04/0un/2019 11:17:03 AM	Ready	Out In	Enable ILK	Reset
D0808 L1	1.06 V	-67.65 mm	4.82 V	85.28 mm	RUN	04/0un/2019 11:20:57 AM	Ready	Out In	Enable ILK	Reset
D0808 L2	0.04 V	-207.80 mm	4.73 V	81.32 mm	RUN	04/0un/2019 11:22:50 AM	Ready	Out In	Enable ILK	Reset
D0824 L1	1.10 V	-68.00 mm	5.15 V	85.72 mm	RUN	04/0un/2019 11:24:46 AM	Ready	Out In	Enable ILK	Reset
D0824 L2	0.03 V	-210.79 mm	4.66 V	80.24 mm	RUN	04/0un/2019 11:26:04 AM	Ready	Out In	Enable ILK	Reset
D0945 L1	1.12 V	-64.47 mm	4.96 V	86.83 mm	RUN	04/0un/2019 11:27:26 AM	Ready	Out In	Enable ILK	Reset
D0945 L2	0.04 V	-210.73 mm	4.94 V	80.48 mm	RUN	04/0un/2019 11:28:53 AM	Ready	Out In	Enable ILK	Reset
D0961 L1	1.14 V	-64.59 mm	5.21 V	87.31 mm	RUN	04/0un/2019 11:29:53 AM	Ready	Out In	Enable ILK	Reset
D0961 L2	0.02 V	-209.11 mm	4.85 V	81.26 mm	RUN	04/0un/2019 11:31:35 AM	Ready	Out In	Enable ILK	Reset
D0972 L1	1.07 V	-68.09 mm	5.10 V	86.53 mm	RUN	04/0un/2019 11:32:55 AM	Ready	Out In	Enable ILK	Reset

Plot PM In
Plot PM Out
Plot Rappers

Device Maintenance							Update Distances
Motor Devices							
Automatically updated once per day. Distance and uses are since last maintenance date.							
Status	Update complete.						
D0783_PM-L1	Total Distance	234.67372 m	Use Count	807	Last Maintenance	07/25/2018	Reset
D0783_PM-L2	Total Distance	502.95524 m	Use Count	895	Last Maintenance	07/25/2018	Reset
D0808_PM-L1	Total Distance	129.49843 m	Use Count	449	Last Maintenance	07/25/2018	Reset
D0808_PM-L2	Total Distance	248.35038 m	Use Count	464	Last Maintenance	07/25/2018	Reset
D0824_PM-L1	Total Distance	79.08824 m	Use Count	227	Last Maintenance	07/25/2018	Reset
D0824_PM-L2	Total Distance	158.06464 m	Use Count	256	Last Maintenance	07/25/2018	Reset
D0856_PM-FX	Total Distance	227.30732 m	Use Count	581	Last Maintenance	11/02/2017	Reset
D0856_PM-FY	Total Distance	631.23522 m	Use Count	543	Last Maintenance	11/02/2017	Reset
D0884_PM-FX	Total Distance	232.62606 m	Use Count	338	Last Maintenance	11/02/2017	Reset
D0884_PM-FY	Total Distance	1115.03514 m	Use Count	568	Last Maintenance	11/02/2017	Reset
D0912_PM-FX	Total Distance	121.59634 m	Use Count	284	Last Maintenance	11/02/2017	Reset
D0912_PM-FY	Total Distance	327.12885 m	Use Count	276	Last Maintenance	11/02/2017	Reset
D0945_PM-L1	Total Distance	14.82614 m	Use Count	104	Last Maintenance	07/11/2018	Reset
D0945_PM-L2	Total Distance	56.62898 m	Use Count	153	Last Maintenance	07/11/2018	Reset
D0961_PM-L1	Total Distance	25.11241 m	Use Count	150	Last Maintenance	07/11/2018	Reset
D0961_PM-L2	Total Distance	71.31525 m	Use Count	197	Last Maintenance	07/11/2018	Reset
D0972_PM-L1	Total Distance	19.91023 m	Use Count	120	Last Maintenance	07/11/2018	Reset
D0972_PM-L2	Total Distance	68.49061 m	Use Count	169	Last Maintenance	07/11/2018	Reset
D1092_PM-S	Total Distance	190.66674 m	Use Count	1611	Last Maintenance	11/02/2017	Reset
D0738_FC	Total Distance	7228.37963 m	Use Count	114	Last Maintenance	04/29/2019	Reset



Facility for Rare Isotope Beams
U.S. Department of Energy Office of Science
Michigan State University