Web services workshop report

Lana Abadie

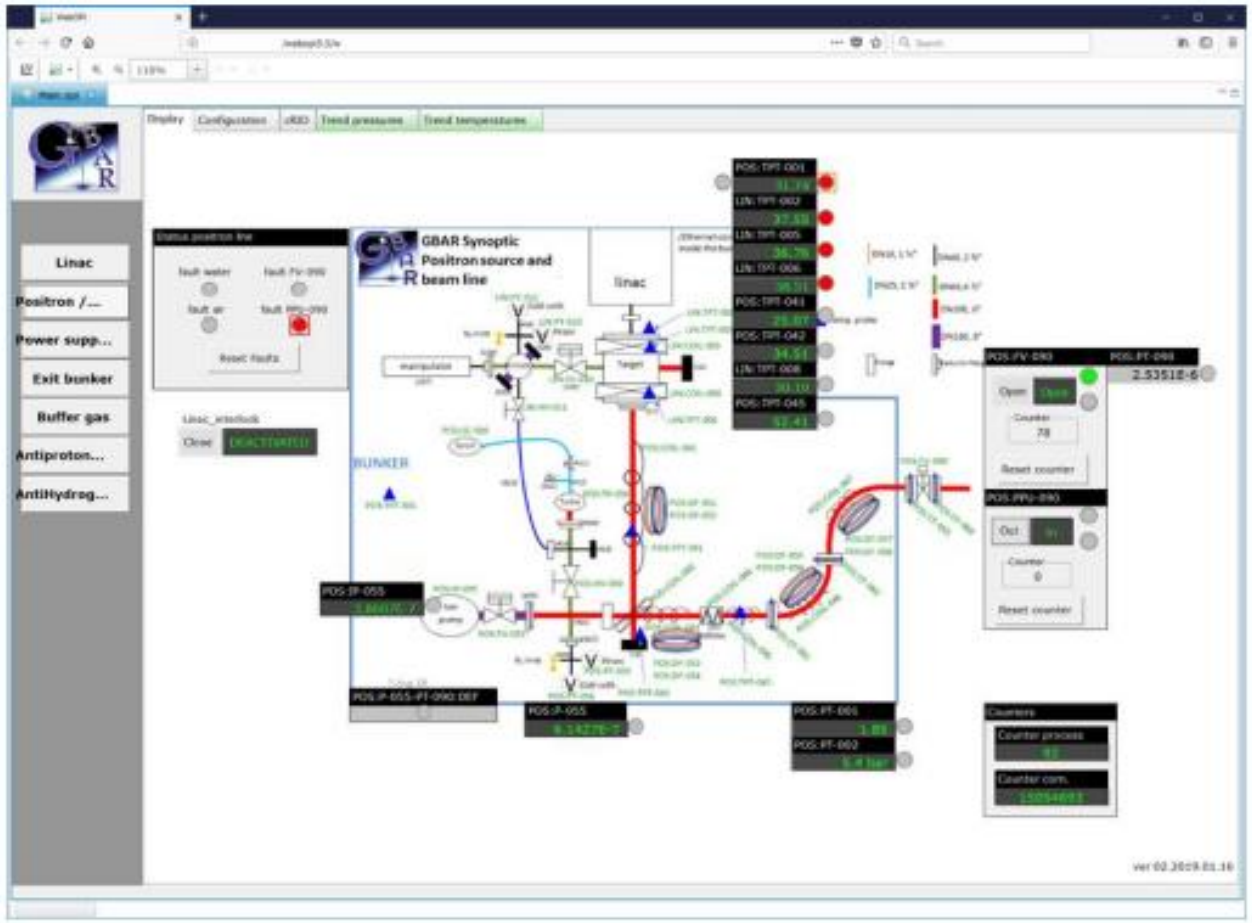
Some figures & objectives

- First of kind
- ~ 50 participants
- 10 presentations
- Current status of web applications in EPICS community
- Various types of web applications, various technologies
- A clear need to have information available from tablets, mobile phones

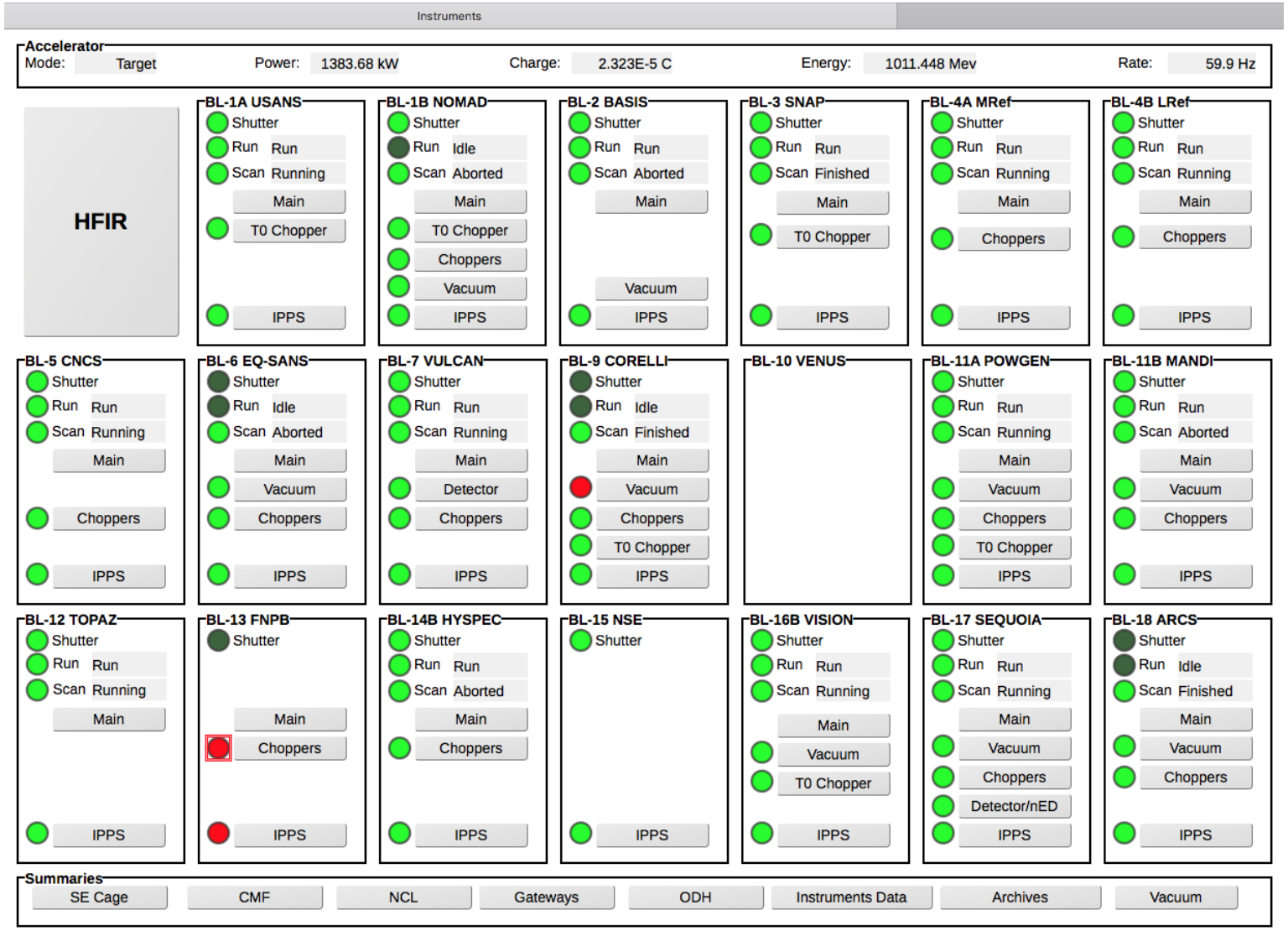
Web applications : display mimics

- Web OPI
  - used initially by CEA at GBAR but poor performance and not .BOB compatible
  - Used by ITER : but questioning scalability and maintenance
- Display Builder Web Runtime (successor of WebOPI) - ORNL
  - Try to fix the limitations of Web OPI
  - Idea is conversion of OPI/BOB/EDM.. to some static web pages and use PV web socket to update EPICS information
- WICA – PSI
  - Similar approach : static web pages (HTML,CSS) + REST server to update dynamic information
  - Use of HTML5 to allow user attributes definition and SSE for event update
- ESS – POS/WebPV
  - Not exactly a conversion of mimics
  - Use of framework like freeboard and JS/HTML to represent graphics, plotly.ly for plots
  - Websocket between client and server
- J-PARC
  - Strong security network rules
  - Takes a snapshot of OPIs (png) but suggested to move to svg and publish images at regular interval

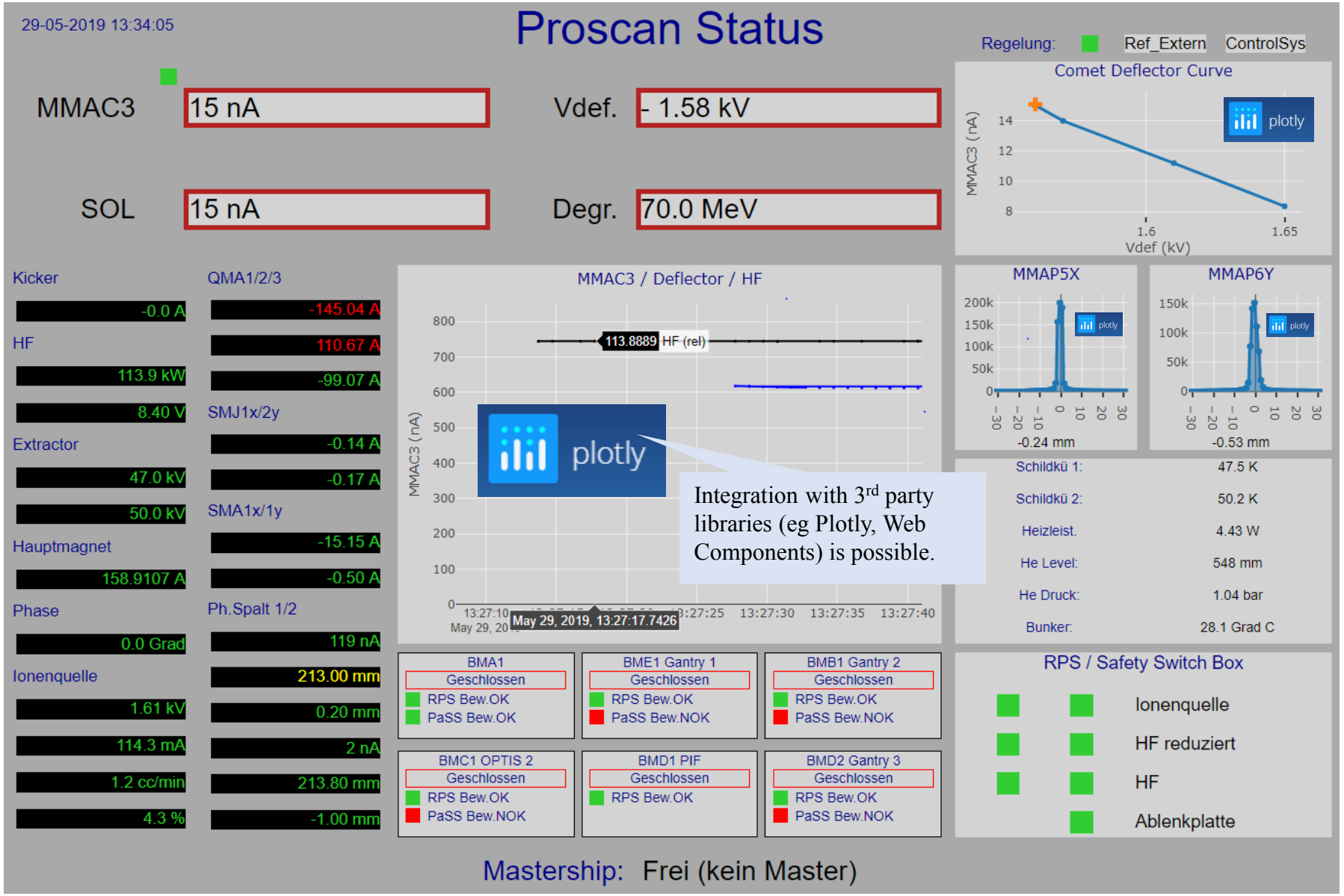
Example of web OPI at GBAR



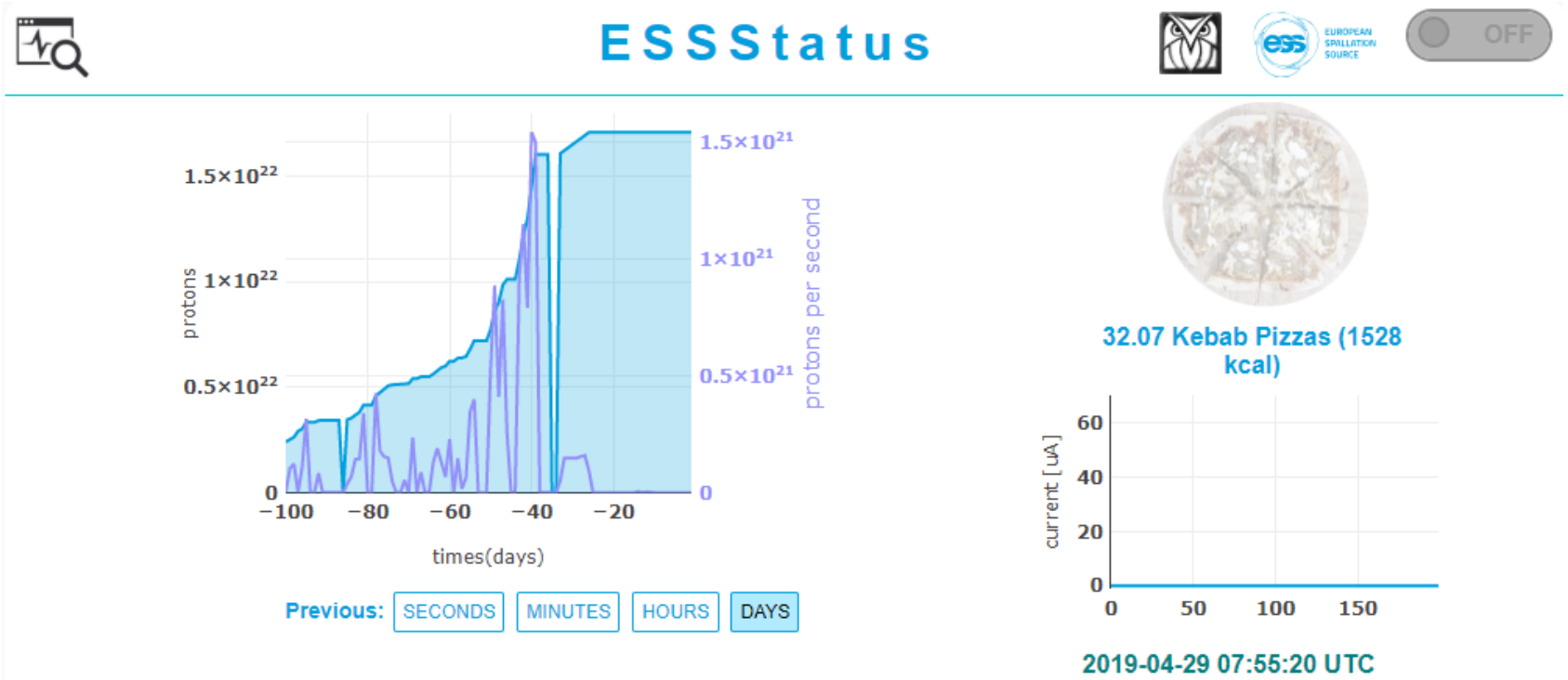
Display Builder Web Runtime



Example of WICA display

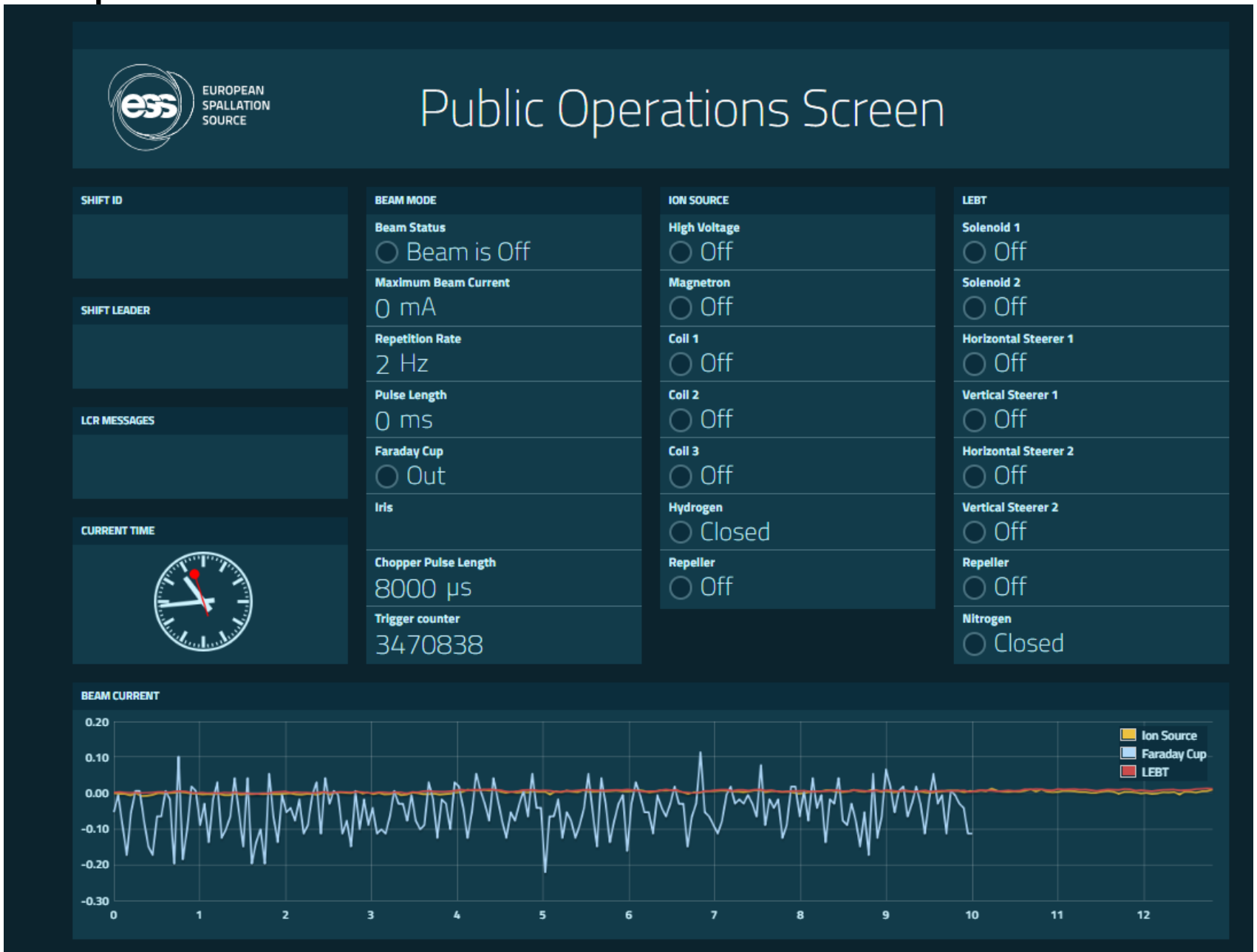


WEBPV example



Ion Source Current:	0.02	Magnetron Voltage:	0.00
Horizontal Steerer A:	0.00	Horizontal Steerer B:	0.00
Vertical Steerer A:	0.00	Vertical Steerer B:	0.00
Solenoid A:	0.00	Solenoid B:	0.00
Faraday Cup:	EXTRACTED	Repeller voltage:	-0.27 V

POS example


EUROPEAN SPALLATION SOURCE
Public Operations Screen
SHIFT ID
SHIFT LEADER
LCR MESSAGES
CURRENT TIME
BEAM MODE
Beam Status
Beam is Off
Maximum Beam Current
0 mA
Repetition Rate
2 Hz
Pulse Length
0 ms
Faraday Cup
Out
Iris
Chopper Pulse Length
8000 µs
Trigger counter
3470838
ION SOURCE
High Voltage
Off
Magnetron
Off
Coil 1
Off
Coil 2
Off
Coil 3
Off
Hydrogen
Closed
Repeller
Off
LEBT
Solenoid 1
Off
Solenoid 2
Off
Horizontal Steerer 1
Off
Vertical Steerer 1
Off
Horizontal Steerer 2
Off
Vertical Steerer 2
Off
Repeller
Off
Nitrogen
Closed
BEAM CURRENT
0.20
0.10
0.00
-0.10
-0.20
-0.30
0
1
2
3
4
5
6
7
8
9
10
11
12
Ion Source
Faraday Cup
LEBT

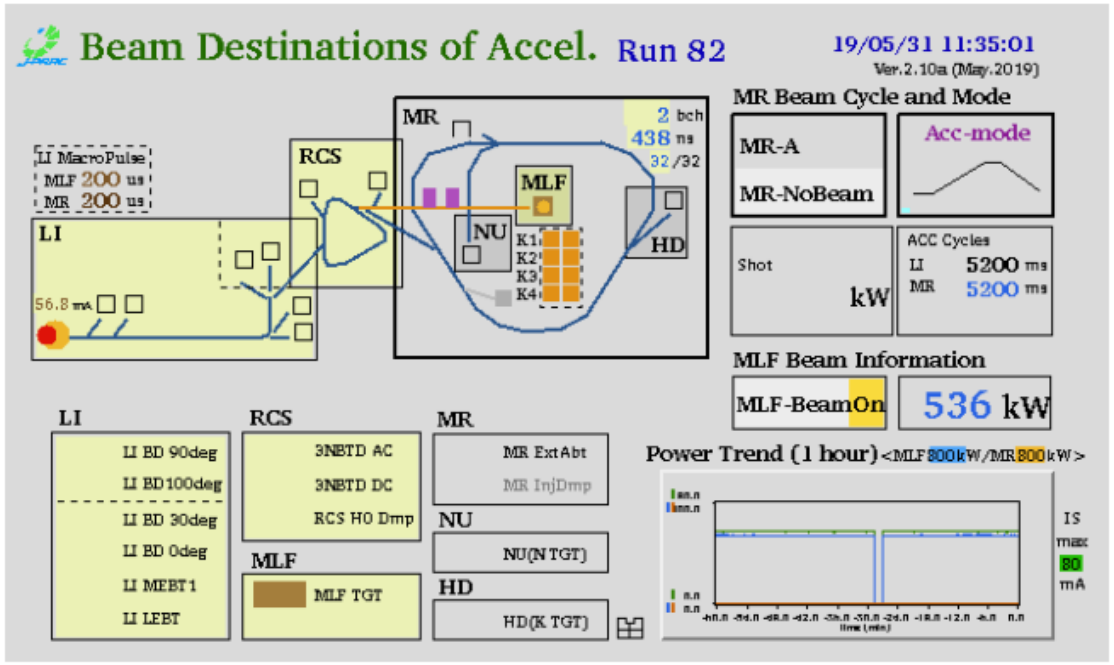
Accelerator Operation Status

www-cont.j-parc.jp/accutil/mr/BeamDestShot.html

Accelerator Operation Status

Fri May 31 2019 11:35:53 GMT+0900 (日本標準時)

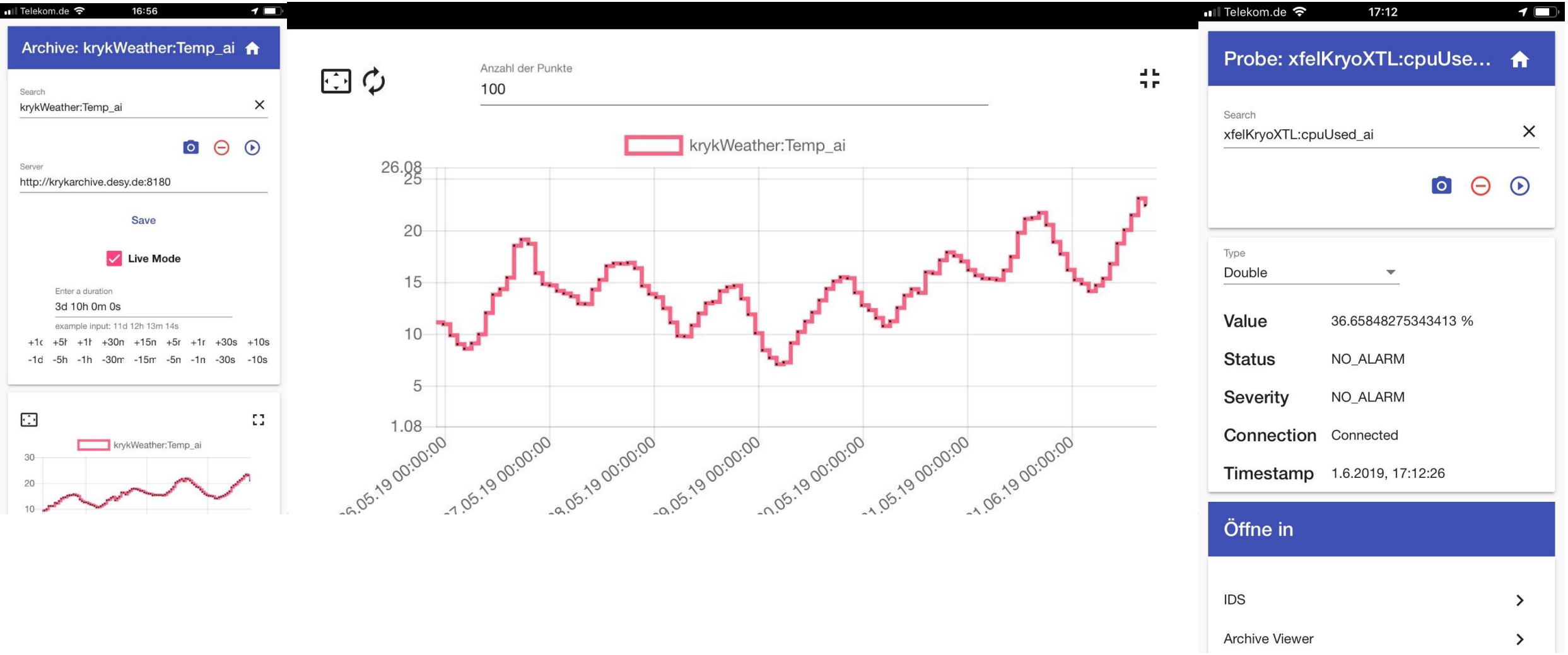
日付 Date & Time	最新の運転状況 Latest Operation Status	備考 notes
2019-05-29 17:44:59	Status(状況):In Operation for Experiments. ビーム供給中 Description(詳細):MLF：利用運転中	



Web application : collect information for debugging

- DESY
  - Connection to various data sources (live/archived data and asset management)
  - Should work on tablets/mobile phone
  - Use of SpringBoot to deploy web server + websocket
- Canadian light Source
  - 2 components – web server and a server to get EPICS data
  - Based on REST
  - Everything from live network
  - Typical requests – list EPICS PVs/IOCs/clients
- LBNL
  - PVInfo based on MySQL/PHP
  - List of PVs/IOCs, metadata associated with a PV
  - Allow also monitoring of a PV (by values + plot)
  - Linked with LogBook server
- ISIS
  - Web dashboard which uses archive engines information, from instrument
  - Use of JSON Bourne as a cache

Example of data display at DESY



Example at Canadian Light Source

PVS IOCS SEARCH PVS DUPLICATE PVS INVALID NAMES LOST PVs HOSTS REQUESTS LINUXMONITOR

Displaying 1 - 25 of 659815 detected PVs

<< PREV NEXT >>

Index	PV Name	Requests (Tot.)	Requests (Non GW)	Last	Server	Port	Lost
1	SMTR1607-7-I21-03:veloBase	113220	84	NBK-W001627	IOC1607-008	43683	
2	IOP1302-03:ChannelInfo:cycle:upd2	9259	0		IOC2401-101	1039	
3	SYM1411-14:cAbsStep	32878	9	NBK-W001627	IOC2408-306	42765	
4	SMTR1607-5-I10-17:servo:pid:integrationSumLimit	151319	47	NBK-W001627	IOC1607-007	38528	
5	SMTR1607-8-I10-21:calibMove2	124533	13193	VMIOC2400-106	IOC1607-007	38528	
6	SMTR1601-1-R10-56:cosineOn	67336	13	NBK-W001627	IOC1601-103	34576	
7	CCG0004-01:vac:raw	72560	188	VM-ARCHIVER-02	VIOC2400-110	53477	
8	BID1411-03:A:osc	5377915	134560	OPI1021-101			
9	SMTR1604-3-I22-27:debugLevel	25970	46	WKS-W001434.	OPI1604-002	5064	** LOST **
10	IOP1302-03:reset	68666	15	WKS-W001434.	IOC2401-101	1027	** LOST **
11	SMTR1601-1-R10-63:debugLevel	50809	7	NBK-W001627	IOC1601-103	34576	
12	dxp1607-B21-13:dxp3:EnergyThreshold	59935	243	OPI1607-002	Unknown (10.52.27.242)	3184	** LOST **
13	SMTR1610-4-I22-09:preDBand	78463	617	OPI1610-204	IOC1610-025	34964	
14	07B2_YSL_U:ExtPVDL	60626	19	NBK-W001627	IOC1607-003	32805	
15	IOP1409-B20-02	90834	531	VM-ARCHIVER-02	VIOC2400-110	47686	
16	IOP1409-B20-03	96006	457	VM-ARCHIVER-02	VIOC2400-110	47686	
17	IOP1409-B20-04	94956	633	VM-ARCHIVER-02	VIOC2400-110	47686	
18	IOP1409-B20-05	94641	443	VM-ARCHIVER-02	VIOC2400-110	47686	
19	SMTR1607-8-I10-21:calibMove1	122489	13199	VMIOC2400-106	IOC1607-007	38528	
20	SMTR1607-7-I21-13:softLimit:configure	68811	13	WKS-W001434.	IOC1607-008	43683	
21	ENC1607-5-I10-21:atBoot	67541	5	NBK-W001627	IOC1607-007	48201	
22	DO4611	9498	7	WKS-W001434.	OPI2017-001	5064	** LOST **
23	MSD1606-5-07:intvl:fbk	56084	68	OPI1606-601	IOC1606-022	48014	
24	SMTR1608-4-B10-26:backlash	215154	37499	VMIOC2400-106	IOC1608-021	5064	
25	SMTR0000-E09-01:brakeBit	99590	43	NBK-W001627	IOC0000-E09-02	5064	** LOST **

<< PREV NEXT >>

Example at Canadian Light Source

PVS IOCS GROUPS BEACONS HEARTBEATS HOSTS LINUXMONITOR

All IOCs 519 IOCS (with 1162 EPICS server apps) All IOCs

ACQ1001-322 (1)	ACQ1001-340 (1)	ACQ1001-341 (1)	ACQ1001-342 (1)	acq1001_343 (1)	acq1001_344 (1)	acq1001_345 (1)	acq1001_346 (1)	ADC2017-001 (1)	ADC2404-101 (1)
BPML2401-101 (1)	BPML2401-102 (1)	BPML2401-103 (1)	BPML2401-104 (1)	BPML2401-105 (1)	BPML2403-102 (1)	BPML2403-103 (1)	BPML2403-105 (1)	BPML2403-107 (1)	BPML2405-201 (1)
BPML2406-303 (1)	BPML2408-101 (1)	BPML2408-102 (1)	BPML2408-102a (1)	CCDC1608-004 (1)	CLS-00-90-e8-0c-10-07 (1)	CLS-00-90-e8-29-43-7d (1)	CLS-00-d0-50-31-11-75 (1)	CLS-f8-b1-56-de-42-50 (1)	DMS1606-601 (1)
IOC0000-003 (1)	IOC0000-015 (2)	IOC0000-031 (1)	IOC0000-046 (1)	IOC0000-051 (3)	IOC0000-07 (3)	IOC0000-E01-01 (2)	IOC0000-E03-01 (3)	IOC0000-E09-01 (2)	IOC0000-E11-401 (1)
IOC0004-007 (4)	IOC0004-008 (3)	IOC0004-104 (1)	IOC0006-102b (1)	IOC0006-105 (2)	IOC0009-001 (1)	IOC0009-201 (1)	IOC0009-202 (2)	IOC0013-001 (2)	IOC0102-102 (4)
IOC0102-404 (4)	IOC0102-405 (3)	IOC0105-602 (2)	IOC1009-109 (1)	IOC1009-109 (1)	IOC1021-201 (3)	IOC1021-504 (3)	IOC1022-101 (1)	IOC1022-102 (1)	IOC1022-103 (1)
IOC1029-001 (2)	IOC1032-001 (5)	IOC1032-002 (5)	IOC1066-003 (1)	IOC1104-101 (2)	IOC1104-102 (8)	IOC1104-104 (2)	IOC1126-002 (3)	IOC1126-004 (1)	IOC1126-004 (1)
IOC1126-007 (9)	IOC1126-008 (2)	IOC1126-011 (1)	IOC1406-001 (2)	IOC1406-002 (2)	IOC1408-001 (2)	IOC1408-002 (2)	IOC1500-101 (3)	IOC1503-001 (2)	IOC1503-002 (2)
IOC1601-101 (5)	IOC1601-103 (6)	IOC1602-101 (7)	IOC1602-102 (2)	IOC1602-104 (4)	IOC1604-001 (3)	IOC1604-002 (2)	IOC1606-001 (2)	IOC1606-004 (5)	IOC1606-010 (1)
IOC1606-013 (1)	IOC1606-014 (14)	IOC1606-015 (3)	IOC1606-018 (2)	IOC1606-019 (1)	IOC1606-022 (8)	IOC1606-025 (2)	IOC1606-201 (4)	IOC1606-207 (4)	IOC1606-208 (2)
IOC1606-401 (2)	IOC1606-501 (2)	IOC1606-503 (1)	IOC1606-504 (1)	IOC1606-505 (2)	IOC1606-506 (2)	IOC1606-507 (1)	IOC1606-601 (2)	IOC1606-602 (2)	IOC1607-001 (2)
IOC1607-005 (1)	IOC1607-007 (14)	IOC1607-008 (12)	IOC1607-009 (9)	IOC1607-010 (2)	IOC1607-011 (1)	IOC1607-012 (1)	IOC1607-102 (4)	IOC1607-203 (6)	IOC1607-501 (2)
IOC1607-702 (4)	IOC1607-801 (4)	IOC1607-803 (1)	IOC1607-804 (1)	IOC1608-001 (4)	IOC1608-004 (3)	IOC1608-008 (13)	IOC1608-009 (1)	IOC1608-010 (1)	IOC1608-011 (1)
IOC1608-021 (11)	IOC1608-022 (2)	IOC1608-023 (1)	IOC1608-025 (2)	IOC1608-026 (1)	IOC1608-027 (1)	IOC1608-1001 (3)	IOC1608-301 (8)	IOC1608-302 (7)	IOC1608-304 (1)
IOC1608-504 (1)	IOC1608-901 (4)	IOC1609-002 (2)	IOC1609-003 (3)	IOC1609-004 (2)	IOC1609-005 (3)	IOC1609-101 (4)	IOC1610-001 (4)	IOC1610-002 (3)	IOC1610-003 (2)
IOC1610-021 (1)	IOC1610-022 (2)	IOC1610-025 (1)	IOC1610-101 (3)	IOC1610-105 (4)	IOC1610-108 (2)	IOC1610-201 (3)	IOC1610-201b (1)	IOC1610-301 (1)	IOC1610-302 (1)
IOC1610-403 (1)	IOC1610-404 (1)	IOC1611-002 (3)	IOC1611-101 (6)	IOC1611-103 (2)	IOC1611-401 (1)	IOC1611-403 (1)	IOC1611-404 (1)	IOC1611-405 (1)	IOC1611-407 (1)
IOC1611-413 (3)	IOC1611-423 (1)	IOC1611-424 (1)	IOC1611-425 (1)	IOC1611-426 (1)	IOC1611-427 (8)	IOC1611-428 (8)	IOC1611-433 (2)	IOC1611-435 (1)	IOC1611-436 (2)
IOC1611-439 (4)	IOC1611-441 (2)	IOC1611-442 (2)	IOC1611-443 (2)	IOC1611-444 (7)	IOC1611-445 (2)	IOC2001-002 (2)	IOC2015-001 (3)	IOC2022-001 (1)	IOC2023-003 (1)
IOC2031-001 (3)	IOC2031-102 (1)	IOC2031-103 (1)	IOC2049-001 (1)	IOC2400-002 (2)	IOC2400-104 (1)	IOC2400-112 (2)	IOC2401-101 (5)	IOC2402-101 (3)	IOC2402-104 (2)
IOC2403-101 (3)	IOC2403-102 (4)	IOC2403-104 (1)	IOC2403-109 (2)	IOC2403-110 (2)	IOC2403-111 (2)	IOC2403-112 (3)	IOC2403-201 (2)	IOC2403-204 (3)	IOC2403-301 (4)

PVInfo at LBNL

PV Info

Showing **1-100** of **314** items.

Search | All | Export

PV Name	Description	IOC	Host	IRM	Alias of
Partial name, or wildcard		iocmaster			Partial name, or wildcarc
SRRF:MASTER1:Audio:bAmpHiFltIntrlk	Audio Amp Voltage High Limit	iocmaster	llrf		
SRRF:MASTER1:Audio:bAmpHiFltSt	Audio Amp Voltage High Limit	iocmaster	llrf		
SRRF:MASTER1:Audio:bAmpLoFltIntrlk	Audio Amp Voltage Low Limit	iocmaster	llrf		
SRRF:MASTER1:Audio:bAmpLoFltSt	Audio Amp Voltage Low Limit	iocmaster	llrf		
SRRF:MASTER1:Audio:bAmpOnCmd	Audio Amp On cmd	iocmaster	llrf		
SRRF:MASTER1:Audio:bAmpOperIntrlk	Audio Amp Operate/Test Intrl	iocmaster	llrf		
SRRF:MASTER1:Audio:bAmpOperSt	Audio Amp Operate/Test	iocmaster	llrf		

PVInfo at LBNL

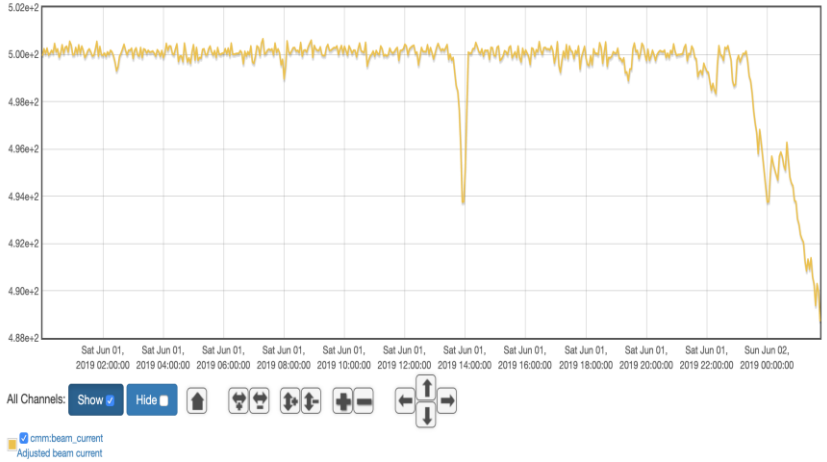
cmm:beam_current

Monitor live values | Plot this pv

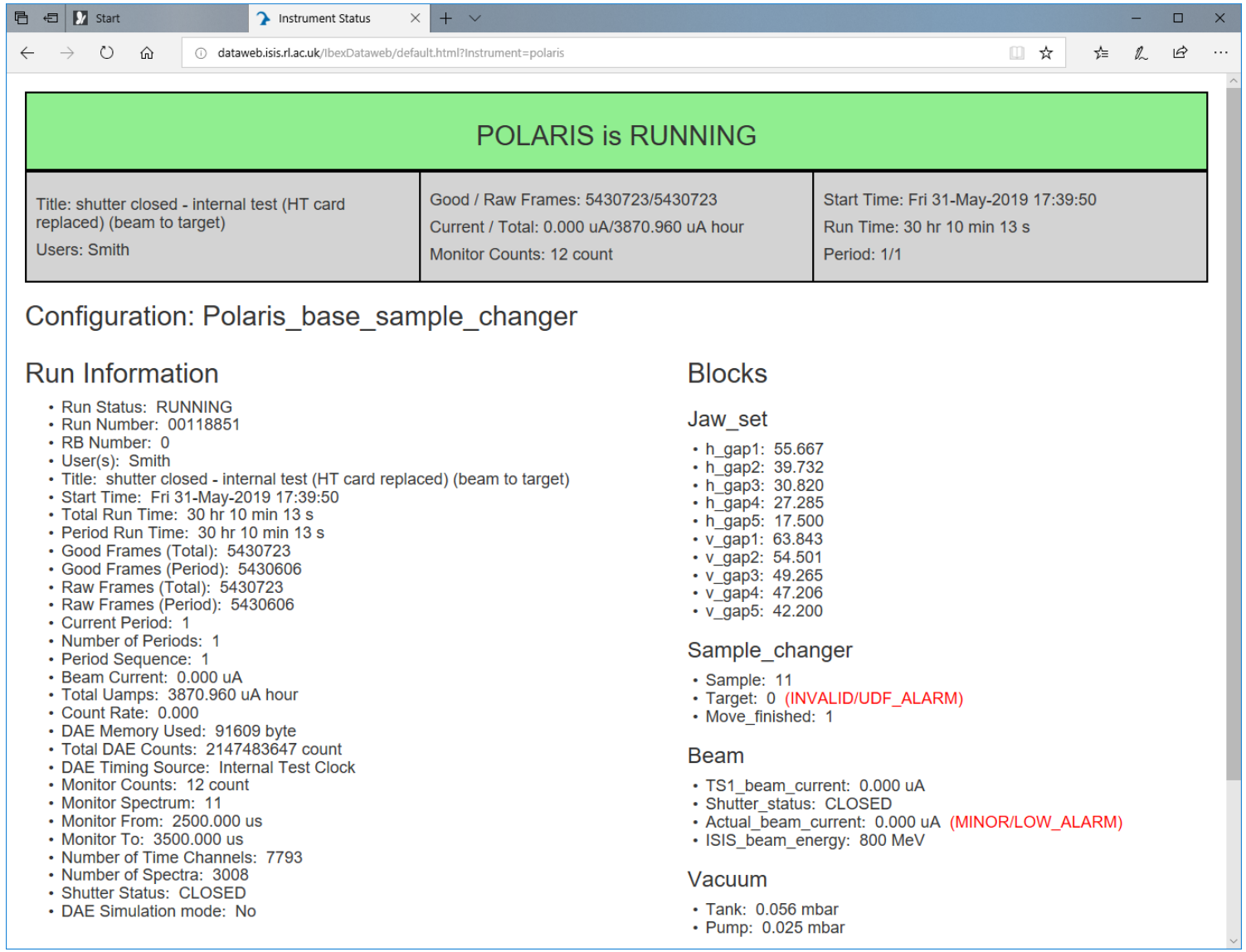
Name	cmm:beam_current
Descr	Adjusted beam current
Aliasof	
Host	sioc02
IOC	beam
Rec Type	calc
Dtyp	
VAL	493.83623046875
STAT	NO_ALARM
SEVR	NO_ALARM
CALC	(A-F)*C

ALS OnLine Log

DateTime	Category	Level	Subject	From
2019-Mar-27 15:22	Accelerator Controls, Operations	Info	**Adjusted SR08 PCT pot to zero beam current channel.** With production lattice loaded and no beam in the machine, adjusted pot screw on SR08 PCT chassis to zero cmm:beam_current. The other PV which is displayed as "New DCCT" on Hiroshi's apps says ~8.5 mA (I think this is SR05W___DCCT2__AM01, but why that is mapped to the SR08 DCCT system I have no idea). I also have no idea where the 8.5mA offset comes from. We would all like to understand this very confusing DCCT situation.	tom_scarvie
2019-Mar-20 12:00	Accelerator Controls, Accelerator Physics,	Info	**Recompiled srcontrol** Took the opportunity to recompile srcontrol.m. This incorporates setting cmm:beam_current.F to 0.0 in hwinit.m as well as recent changes Greg made to setoperationalmode.m (uncommented setlabcadefaults).	SCLeemann



POLAR @ISIS

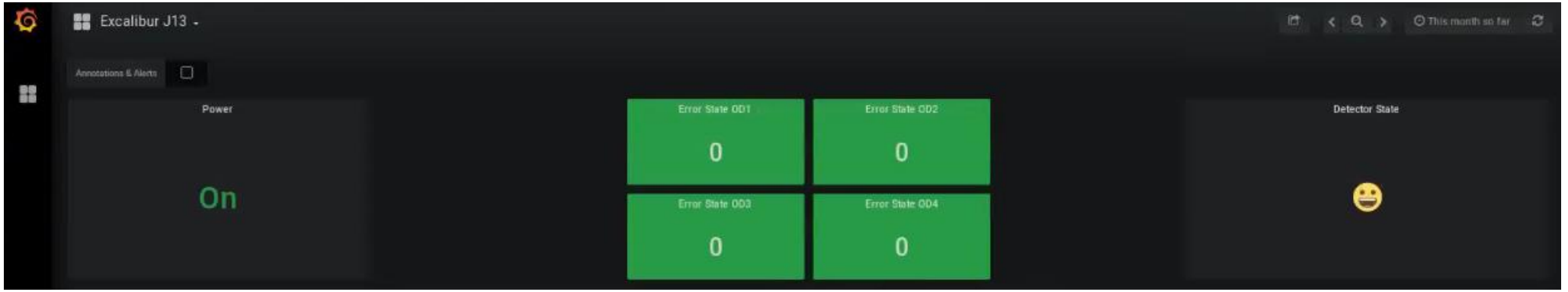

Start
Instrument Status
dataweb.isis.rl.ac.uk/IbexDataweb/default.html?Instrument=polaris
POLARIS is RUNNING
Title: shutter closed - internal test (HT card replaced) (beam to target)
Users: Smith
Good / Raw Frames: 5430723/5430723
Current / Total: 0.000 uA/3870.960 uA hour
Monitor Counts: 12 count
Start Time: Fri 31-May-2019 17:39:50
Run Time: 30 hr 10 min 13 s
Period: 1/1
Configuration: Polaris_base_sample_changer
Run Information
• Run Status: RUNNING
• Run Number: 00118851
• RB Number: 0
• User(s): Smith
• Title: shutter closed - internal test (HT card replaced) (beam to target)
• Start Time: Fri 31-May-2019 17:39:50
• Total Run Time: 30 hr 10 min 13 s
• Period Run Time: 30 hr 10 min 13 s
• Good Frames (Total): 5430723
• Good Frames (Period): 5430606
• Raw Frames (Total): 5430723
• Raw Frames (Period): 5430606
• Current Period: 1
• Number of Periods: 1
• Period Sequence: 1
• Beam Current: 0.000 uA
• Total Uamps: 3870.960 uA hour
• Count Rate: 0.000
• DAE Memory Used: 91609 byte
• Total DAE Counts: 2147483647 count
• DAE Timing Source: Internal Test Clock
• Monitor Counts: 12 count
• Monitor Spectrum: 11
• Monitor From: 2500.000 us
• Monitor To: 3500.000 us
• Number of Time Channels: 7793
• Number of Spectra: 3008
• Shutter Status: CLOSED
• DAE Simulation mode: No
Blocks
Jaw_set
• h_gap1: 55.667
• h_gap2: 39.732
• h_gap3: 30.820
• h_gap4: 27.285
• h_gap5: 17.500
• v_gap1: 63.843
• v_gap2: 54.501
• v_gap3: 49.265
• v_gap4: 47.206
• v_gap5: 42.200
Sample_changer
• Sample: 11
• Target: 0 (INVALID/UDF_ALARM)
• Move_finished: 1
Beam
• TS1_beam_current: 0.000 uA
• Shutter_status: CLOSED
• Actual_beam_current: 0.000 uA (MINOR/LOW_ALARM)
• ISIS_beam_energy: 800 MeV
Vacuum
• Tank: 0.056 mbar
• Pump: 0.025 mbar

Web application : dashboard-type

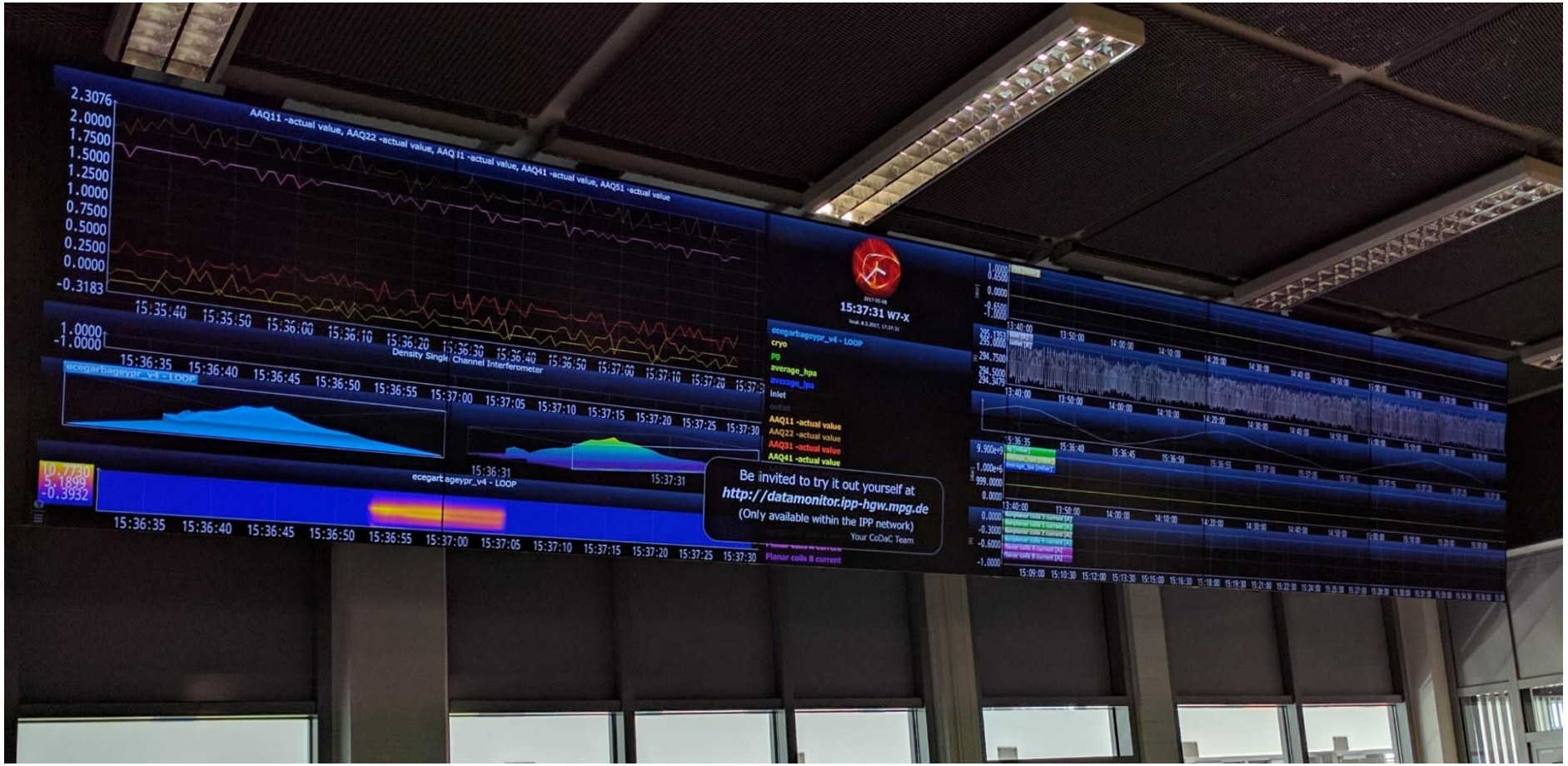
- DIAMOND
  - Use of grafana to display EPICS data (from live and archive)
- ITER

  - Currently under investigation DAVinci
  - Allows operators to compose its own dashboard

GRAFANA @ DIAMOND



Example of DAVINCI



Conclusions

- Good way to share expertise, lessons learned from various institutes
- Some new ideas popped-up
- Web application is becoming more popular
  - mobile phones and tablets support
  - Lightweight to support
- All slides are uploaded in indico (web services workshop)