

2017-04-22 CSPAD MEC Alignment

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Optical measurements

Comments from Gabriel Blaj

```
From Blaj, Gabriel
Mon 6/26/2017 1:55 PM
To: Blaj, Gabriel; Brown, Shaughnessy; Johnson, Tyler; Hart, Philip Adam; Dubrovin, Mikhail; Browne, Michael C.;

Hi, Update on MEC CSPAD Quad metrology
I sent Mikhail the latest metrology files for quads Q1 and Q3 (valid after 04/22/2017).
Q2 is being repaired (no new metrology).
Q0 still has the latest released metrology.

Before
repairs, I also re-measured metrology data for Q1 and Q2 (valid before
04/19/2017); they should match the latest released metrology.
Thanks,
Gabriel
```

Metrology files

- [MEC-Q1-Before-20170419.txt](#), [MEC-Q1-Before-20170419.xlsx](#), [MEC-Q1-Before-20170419-corr.txt](#)
- [MEC-Q1-After-20170425.txt](#), [MEC-Q1-After-20170425.xlsx](#)
- [MEC-Q2-Before-20170419.txt](#), [MEC-Q2-Before-20170419.xlsx](#)
- [MEC-Q3-After-20170422.txt](#), [MEC-Q3-After-20170422.xlsx](#)

They were combined in two files for entire CSPAD

[2017-04-19-CSPAD-MEC-Before.txt](#), [2017-04-19-CSPAD-MEC-Before-corr.txt](#)

- Q0 - from previous ../calib-mec-2016-04-21/2016-04-21-CSPAD-MEC-Metrology-corr.txt
- Q1 - MEC-Q1-Before-20170419.txt
- Q2 - MEC-Q2-Before-20170419.txt
- Q3 - MEC-Q3-After-20170422.txt before is N/A

[2017-04-22-CSPAD-MEC-After.txt](#)

- Q0 - from previous ../calib-mec-2016-04-21/2016-04-21-CSPAD-MEC-Metrology-corr.txt
- Q1 - MEC-Q1-After-20170425.txt
- Q2 - MEC-Q2-Before-20170419.txt after is N/A
- Q3 - MEC-Q3-After-20170422.txt

SUMMARY OF DIFFERENCE between two files: Until Q2 is re-measured the difference between files is in Q1 ONLY!

Quality check in X-Y plane

File MEC-Q1-Before-20170419.txt - has 2 problematic segments:

```

2017-07-03 10:22:33 (info) CalibManager.GUIMetrology: Quality check in X-Y plane:
segm:      S1      S2      dS1      dS2      L1      L2      dL1      dL2      angle(deg)  D1      D2      dD      d
(dS)  d(dL)
Quad  1
segm: 4   20911   20514      85    -312   -43542  -43561      41     22    0.14932  48148  48303
-155   397     19
segm: 5   20904   20902      38     36   -43272  -43554     289     7   -0.04883  48066  48300
-234     2     282

```

with deviations of 397 and 282 um for two points, respectively.

Applied correction for two of measured points:

```

CORRECTION:
18c18
<    17  47134  66546      8
>    17  47134  66943      8
24c24
<    23  90435  69337    -74
>    23  90717  69337    -74

```

Corrected files

- [MEC-Q1-Before-20170419-corr.txt](#) for quad and
- [2017-04-19-CSPAD-MEC-Before-corr.txt](#) for entire CSPAD

```

/reg/g/psdm/detector/alignment/cspad/calib-mec-2017-04-22/2017-04-19-CSPAD-MEC-Before-corr.txt
2017-07-03 11:01:07 (info) CalibManager.GUIMetrology: Quality check in X-Y plane:

```

	S1	S2	dS1	dS2	L1	L2	dL1	dL2	angle(deg)	D1	D2	dD	d
segm: 0													
Quad 0													
segm: 1	-20908	-20905	-87	-84	43544	43555	-46	-35	-0.11249	48308	48307		
6	-3	-11											
segm: 2	-20905	-20905	-43	-43	43550	43549	-17	-18	-0.05657	48310	48304		
27	0	1											
segm: 3	-20906	-20908	-18	-20	-43536	-43568	10	-22	-0.02500	48323	48296		
6	2	32											
segm: 4	-20907	-20918	39	28	-43540	-43546	-16	-22	0.04408	48307	48301		
45	11	6											
segm: 5	20917	20903	140	126	-43572	-43577	41	36	-0.17488	48354	48309		
segm: 6	20905	20910	-172	-167	-43547	-43549	-79	-81	0.22301	48305	48308		
-3	-5	2											
segm: 7	-20927	-20903	-10	14	-43540	-43569	17	-12	0.00263	48312	48319		
-7	-24	29											
segm: 8	-20914	-20915	80	79	-43544	-43543	-39	-38	0.10461	48306	48305		
1	1	-1											
Quad 1													
segm: 0	-20895	-20914	-63	-82	43527	43541	-48	-34	-0.09542	48287	48298		
-11	19	-14											
segm: 1	-20894	-20892	-11	-9	43534	43542	-9	-1	-0.01316	48291	48291		
0	-2	-8											
segm: 2	-20898	-20897	-152	-151	-43538	-43537	70	71	-0.19937	48295	48291		
4	-1	-1											
segm: 3	-20900	-20897	46	49	-43537	-43532	-28	-23	0.06251	48293	48288		
5	-3	-5											
segm: 4	20911	20911	85	85	-43542	-43561	41	22	-0.11182	48320	48303		
17	0	19											
segm: 5	20904	20902	38	36	-43554	-43554	7	7	-0.04867	48320	48300		
20	2	0											
segm: 6	-20923	-20939	35	19	-43583	-43574	-3	6	0.03550	48331	48357		
-26	16	-9											
segm: 7	-20892	-20888	72	76	-43530	-43505	-51	-26	0.09743	48274	48269		
5	-4	-25											
Quad 2													
segm: 0	-20901	-20892	65	74	43531	43534	23	26	0.09147	48280	48296		
-16	-9	-3											
segm: 1	-20899	-20900	-1	-2	43542	43544	-7	-5	-0.00197	48294	48303		
-9	1	-2											
segm: 2	-20894	-20902	294	286	-43537	-43555	-133	-151	0.38156	48304	48299		
5	8	18											
segm: 3	-20901	-20894	148	155	-43535	-43536	-71	-72	0.19938	48290	48292		
-2	-7	1											
segm: 4	20897	20900	-251	-248	-43541	-43538	-122	-119	0.32833	48296	48295		
1	-3	-3											
segm: 5	20907	20903	-432	-436	-43545	-43549	-208	-212	0.57100	48308	48305		
3	4	4											
segm: 6	-20890	-20906	209	193	-43533	-43547	-84	-98	0.26450	48291	48300		
-9	16	14											
segm: 7	-20897	-20903	198	192	-43532	-43524	-104	-96	0.25668	48291	48280		
11	6	-8											
Quad 3													
segm: 0	-20905	-20907	-228	-230	43542	43543	-113	-112	-0.30133	48299	48304		
-5	2	-1											
segm: 1	-20909	-20906	-106	-103	43545	43543	-50	-52	-0.13750	48302	48304		
-2	-3	2											
segm: 2	-20902	-20911	-180	-189	-43540	-43547	94	87	-0.24277	48301	48304		
-3	9	7											
segm: 3	-20913	-20912	-139	-138	-43542	-43550	71	63	-0.18223	48307	48307		
0	-1	8											
segm: 4	20915	20911	14	10	-43544	-43547	10	7	-0.01579	48304	48309		
-5	4	3											
segm: 5	20907	20917	21	31	-43542	-43574	36	4	-0.03420	48311	48324		
-13	-10	32											
segm: 6	-20900	-20912	-43	-55	-43543	-43546	26	23	-0.06447	48302	48303		
-1	12	3											
segm: 7	-20908	-20910	11	9	-43542	-43542	-4	-4	0.01316	48301	48302		
-1	2	0											

/reg/g/psdm/detector/alignment/cspad/calib-mec-2017-04-22/2017-04-22-CSPAD-MEC-After.txt

2017-07-03 10:16:03 (info) CalibManager.GUIMetrology: Quality check in X-Y plane:



		S1	S2	dS1	dS2	L1	L2	dL1	dL2	angle(deg)	D1	D2	dD	d
segm: 0														
Quad 0														
segm: 0	-20908	-20905	-87	-84	43544	43555	-46	-35	-0.11249	48308	48307			
1	-3	-11												
segm: 1	-20905	-20905	-43	-43	43550	43549	-17	-18	-0.05657	48310	48304			
6	0	1												
segm: 2	-20906	-20908	-18	-20	-43536	-43568	10	-22	-0.02500	48323	48296			
27	2	32												
segm: 3	-20907	-20918	39	28	-43540	-43546	-16	-22	0.04408	48307	48301			
6	11	6												
segm: 4	20917	20903	140	126	-43572	-43577	41	36	-0.17488	48354	48309			
45	14	5												
segm: 5	20905	20910	-172	-167	-43547	-43549	-79	-81	0.22301	48305	48308			
-3	-5	2												
segm: 6	-20927	-20903	-10	14	-43540	-43569	17	-12	0.00263	48312	48319			
-7	-24	29												
segm: 7	-20914	-20915	80	79	-43544	-43543	-39	-38	0.10461	48306	48305			
1	1	-1												
Quad 1														
segm: 0	-20909	-20909	122	122	43542	43550	55	63	0.16052	48306	48305			
1	0	-8												
segm: 1	-20908	-20909	-22	-23	43544	43553	-12	-3	-0.02960	48310	48304			
6	1	-9												
segm: 2	-20906	-20916	-90	-100	-43541	-43545	53	49	-0.12500	48299	48308			
-9	10	4												
segm: 3	-20908	-20911	99	96	-43544	-43541	-53	-50	0.12830	48307	48298			
9	3	-3												
segm: 4	20909	20911	-103	-101	-43546	-43547	-48	-49	0.13421	48306	48307			
-1	-2	1												
segm: 5	20898	20909	-153	-142	-43545	-43547	-73	-75	0.19407	48306	48300			
6	-11	2												
segm: 6	-20906	-20909	7	4	-43569	-43547	6	28	0.00723	48298	48333			
-35	3	-22												
segm: 7	-20923	-20909	54	68	-43541	-43547	-22	-28	0.08026	48303	48310			
-7	-14	6												
Quad 2														
segm: 0	-20901	-20892	65	74	43531	43534	23	26	0.09147	48280	48296			
-16	-9	-3												
segm: 1	-20899	-20900	-1	-2	43542	43544	-7	-5	-0.00197	48294	48303			
-9	1	-2												
segm: 2	-20894	-20902	294	286	-43537	-43555	-133	-151	0.38156	48304	48299			
5	8	18												
segm: 3	-20901	-20894	148	155	-43535	-43536	-71	-72	0.19938	48290	48292			
-2	-7	1												
segm: 4	20897	20900	-251	-248	-43541	-43538	-122	-119	0.32833	48296	48295			
1	-3	-3												
segm: 5	20907	20903	-432	-436	-43545	-43549	-208	-212	0.57100	48308	48305			
3	4	4												
segm: 6	-20890	-20906	209	193	-43533	-43547	-84	-98	0.26450	48291	48300			
-9	16	14												
segm: 7	-20897	-20903	198	192	-43532	-43524	-104	-96	0.25668	48291	48280			
11	6	-8												
Quad 3														
segm: 0	-20905	-20907	-228	-230	43542	43543	-113	-112	-0.30133	48299	48304			
-5	2	-1												
segm: 1	-20909	-20906	-106	-103	43545	43543	-50	-52	-0.13750	48302	48304			
-2	-3	2												
segm: 2	-20902	-20911	-180	-189	-43540	-43547	94	87	-0.24277	48301	48304			
-3	9	7												
segm: 3	-20913	-20912	-139	-138	-43542	-43550	71	63	-0.18223	48307	48307			
0	-1	8												
segm: 4	20915	20911	14	10	-43544	-43547	10	7	-0.01579	48304	48309			
-5	4	3												
segm: 5	20907	20917	21	31	-43542	-43574	36	4	-0.03420	48311	48324			
-13	-10	32												
segm: 6	-20900	-20912	-43	-55	-43543	-43546	26	23	-0.06447	48302	48303			
-1	12	3												
segm: 7	-20908	-20910	11	9	-43542	-43542	-4	-4	0.01316	48301	48302			
-1	2	0												

Quality check in Z

/reg/g/psdm/detector/alignment/cspad/calib-mec-2017-04-22/2017-04-19-CSPAD-MEC-Before-corr.txt

2017-07-03 11:01:07 (info) CalibManager.GUIMetrology: Quality check in Z:

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segm:	SA	LA	XSize	YSize	dZS1	dZS2	dZL1	dZL2	dZSA	dZLA	ddZS	ddZL	dZX	dZY
angXZ(deg)	angYZ(deg)	dz3(um)												
Quad 0														
segm: 0	-20906	43549	43549	20906	24	25	36	37	24	36	-1	-1	36	24
0.04736	0.06578	0.994												
segm: 1	-20905	43549	43549	20905	71	72	-10	-9	71	-9	-1	-1	-9	71
-0.01184	0.19459	1.000												
segm: 2	-20907	-43552	20907	43552	29	29	19	19	29	19	0	0	29	19
0.07947	0.02500	0.017												
segm: 3	-20912	-43543	20912	43543	27	-5	67	35	11	51	32	32	11	51
0.03014	0.06711	32.002												
segm: 4	20910	-43574	43574	20910	2	-18	2	-18	-8	-8	20	20	-8	-8
-0.01052	-0.02192	-20.012												
segm: 5	20907	-43548	43548	20907	60	-3	54	-9	28	22	63	63	22	28
0.02895	0.07673	-63.002												
segm: 6	-20915	-43554	20915	43554	5	9	30	34	7	32	-4	-4	7	32
0.01918	0.04210	-3.988												
segm: 7	-20914	-43543	20914	43543	-65	-63	24	26	-64	25	-2	-2	-64	25
-0.17533	0.03290	-2.004												
Quad 1														
segm: 0	-20904	43534	43534	20904	0	4	-77	-73	2	-75	-4	-4	-75	2
-0.09871	0.00548	4.024												
segm: 1	-20893	43538	43538	20893	-8	-21	-57	-70	-14	-63	13	13	-63	-14
-0.08291	-0.03839	-12.988												
segm: 2	-20897	-43537	20897	43537	9	51	-15	27	30	6	-42	-42	30	6
0.08225	0.00790	-42.003												
segm: 3	-20898	-43534	20898	43534	27	9	-2	-20	18	-11	18	18	18	-11
0.04935	-0.01448	18.001												
segm: 4	20911	-43551	43551	20911	21	13	102	94	17	98	8	8	98	17
0.12893	0.04658	-8.044												
segm: 5	20903	-43554	43554	20903	19	-49	84	16	-15	50	68	68	50	-15
0.06578	-0.04112	-68.004												
segm: 6	-20931	-43578	20931	43578	-78	6	-101	-17	-36	-59	-84	-84	-36	-59
-0.09855	-0.07757	-83.992												
segm: 7	-20890	-43517	20890	43517	38	16	-3	-25	27	-14	22	22	27	-14
0.07405	-0.01843	22.011												
Quad 2														
segm: 0	-20896	43532	43532	20896	-35	-13	2	24	-24	13	-22	-22	13	-24
0.01711	-0.06581	21.983												
segm: 1	-20899	43543	43543	20899	-45	-38	22	29	-41	25	-7	-7	25	-41
0.03290	-0.11240	7.001												
segm: 2	-20898	-43546	20898	43546	9	16	-35	-28	12	-31	-7	-7	12	-31
0.03290	-0.04079	-7.005												
segm: 3	-20897	-43535	20897	43535	-29	-11	-42	-24	-20	-33	-18	-18	-20	-33
-0.05484	-0.04343	-17.997												
segm: 4	20898	-43539	43539	20898	21	11	-25	-35	16	-30	10	10	-30	16
-0.03948	0.04387	-10.003												
segm: 5	20905	-43547	43547	20905	-46	-5	-31	10	-25	-10	-41	-41	-10	-25
-0.01316	-0.06852	41.002												
segm: 6	-20898	-43540	20898	43540	10	-26	15	-21	-8	-3	36	36	-8	-3
-0.02193	-0.00395	35.973												
segm: 7	-20900	-43528	20900	43528	-32	-48	2	-14	-40	-6	16	16	-40	-6
-0.10966	-0.00790	15.989												
Quad 3														
segm: 0	-20906	43542	43542	20906	0	5	-6	-1	2	-3	-5	-5	-3	2
-0.00395	0.00548	5.000												
segm: 1	-20907	43544	43544	20907	1	25	-33	-9	13	-21	-24	-24	-21	13
-0.02763	0.03563	24.000												
segm: 2	-20906	-43543	20906	43543	6	1	36	31	3	33	5	5	3	33
0.00822	0.04342	5.005												
segm: 3	-20912	-43546	20912	43546	6	-21	39	12	-7	25	27	27	-7	25
-0.01918	0.03289	27.003												
segm: 4	20913	-43545	43545	20913	20	-38	41	-17	-9	12	58	58	12	-9
0.01579	-0.02466	-58.010												
segm: 5	20912	-43558	43558	20912	-11	-22	-1	-12	-16	-6	11	11	-6	-16
-0.00789	-0.04384	-10.989												
segm: 6	-20906	-43544	20906	43544	14	15	-22	-21	14	-21	-1	-1	14	-21
0.03837	-0.02763	-0.993												
segm: 7	-20909	-43542	20909	43542	-11	-3	-38	-30	-7	-34	-8	-8	-7	-34
-0.01918	-0.04474	-8.000												

/reg/g/psdm/detector/alignment/cspad/calib-mec-2017-04-22/2017-04-22-CSPAD-MEC-After.txt

2017-07-03 10:16:03 (info) CalibManager.GUIMetrology: Quality check in Z:



	SA	LA	XSize	YSize	dZS1	dZS2	dZL1	dZL2	dZSA	dZLA	ddZS	ddZL	dZX	dZY
angXZ(deg)	angYZ(deg)	dz3(um)												
Quad 0														
segm: 0	-20906	43549	43549	20906	24	25	36	37	24	36	-1	-1	36	24
0.04736	0.06578	0.994												
segm: 1	-20905	43549	43549	20905	71	72	-10	-9	71	-9	-1	-1	-9	71
-0.01184	0.19459	1.000												
segm: 2	-20907	-43552	20907	43552	29	29	19	19	29	19	0	0	29	19
0.07947	0.02500	0.017												
segm: 3	-20912	-43543	20912	43543	27	-5	67	35	11	51	32	32	11	51
0.03014	0.06711	32.002												
segm: 4	20910	-43574	43574	20910	2	-18	2	-18	-8	-8	20	20	-8	-8
-0.01052	-0.02192	-20.012												
segm: 5	20907	-43548	43548	20907	60	-3	54	-9	28	22	63	63	22	28
0.02895	0.07673	-63.002												
segm: 6	-20915	-43554	20915	43554	5	9	30	34	7	32	-4	-4	7	32
0.01918	0.04210	-3.988												
segm: 7	-20914	-43543	20914	43543	-65	-63	24	26	-64	25	-2	-2	-64	25
-0.17533	0.03290	-2.004												
Quad 1														
segm: 0	-20909	43546	43546	20909	-22	-7	-43	-28	-14	-35	-15	-15	-35	-14
-0.04605	-0.03836	15.005												
segm: 1	-20908	43548	43548	20908	6	2	-22	-26	4	-24	4	4	-24	4
-0.03158	0.01096	-3.995												
segm: 2	-20911	-43543	20911	43543	15	35	-1	19	25	9	-20	-20	25	9
0.06850	0.01184	-19.981												
segm: 3	-20909	-43542	20909	43542	-28	-6	23	45	-17	34	-22	-22	-17	34
-0.04658	0.04474	-22.004												
segm: 4	20910	-43546	43546	20910	33	-40	67	-6	-3	30	73	73	30	-3
0.03947	-0.00822	-72.997												
segm: 5	20903	-43546	43546	20903	-29	-13	32	48	-21	40	-16	-16	40	-21
0.05263	-0.05756	16.005												
segm: 6	-20907	-43558	20907	43558	35	34	-22	-23	34	-22	1	1	34	-22
0.09318	-0.02894	1.016												
segm: 7	-20916	-43544	20916	43544	-9	-1	-18	-10	-5	-14	-8	-8	-5	-14
-0.01370	-0.01842	-8.001												
Quad 2														
segm: 0	-20896	43532	43532	20896	-35	-13	2	24	-24	13	-22	-22	13	-24
0.01711	-0.06581	21.983												
segm: 1	-20899	43543	43543	20899	-45	-38	22	29	-41	25	-7	-7	25	-41
0.03290	-0.11240	7.001												
segm: 2	-20898	-43546	20898	43546	9	16	-35	-28	12	-31	-7	-7	12	-31
0.03290	-0.04079	-7.005												
segm: 3	-20897	-43535	20897	43535	-29	-11	-42	-24	-20	-33	-18	-18	-20	-33
-0.05484	-0.04343	-17.997												
segm: 4	20898	-43539	43539	20898	21	11	-25	-35	16	-30	10	10	-30	16
-0.03948	0.04387	-10.003												
segm: 5	20905	-43547	43547	20905	-46	-5	-31	10	-25	-10	-41	-41	-10	-25
-0.01316	-0.06852	41.002												
segm: 6	-20898	-43540	20898	43540	10	-26	15	-21	-8	-3	36	36	-8	-3
-0.02193	-0.00395	35.973												
segm: 7	-20900	-43528	20900	43528	-32	-48	2	-14	-40	-6	16	16	-40	-6
-0.10966	-0.00790	15.989												
Quad 3														
segm: 0	-20906	43542	43542	20906	0	5	-6	-1	2	-3	-5	-5	-3	2
-0.00395	0.00548	5.000												
segm: 1	-20907	43544	43544	20907	1	25	-33	-9	13	-21	-24	-24	-21	13
-0.02763	0.03563	24.000												
segm: 2	-20906	-43543	20906	43543	6	1	36	31	3	33	5	5	3	33
0.00822	0.04342	5.005												
segm: 3	-20912	-43546	20912	43546	6	-21	39	12	-7	25	27	27	-7	25
-0.01918	0.03289	27.003												
segm: 4	20913	-43545	43545	20913	20	-38	41	-17	-9	12	58	58	12	-9
0.01579	-0.02466	-58.010												
segm: 5	20912	-43558	43558	20912	-11	-22	-1	-12	-16	-6	11	11	-6	-16
-0.00789	-0.04384	-10.989												
segm: 6	-20906	-43544	20906	43544	14	15	-22	-21	14	-21	-1	-1	14	-21
0.03837	-0.02763	-0.993												
segm: 7	-20909	-43542	20909	43542	-11	-3	-38	-30	-7	-34	-8	-8	-7	-34
-0.01918	-0.04474	-8.000												

Constants

✓ Archive: /reg/g/psdm/detector/alignment/cspad/

- /reg/g/psdm/detector/alignment/cspad/calib-mec-2017-04-22/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/geometry/0-end.data-2017-04-19-CSPAD-MEC-Before-corr
- /reg/g/psdm/detector/alignment/cspad/calib-mec-2017-04-22/calib/CsPad::CalibV1/MecTargetChamber.0:Cspad.0/geometry/1-end.data-2017-04-22-CSPAD-MEC-After

References

- [CSPAD Alignment](#)