



# Jefferson Lab Alignment Group

## Data Transmittal

**TO:** S. Covrig, L. Hannelius

**DATE :** Sep 10, 2003

**FROM:** Chris Gould

**Checked:**

**#** C894

**DETAILS:**

Attached are the results of the G0 target pre-alignment & actuator calibration performed September 5<sup>th</sup> and 8<sup>th</sup>, 2003. A right hand coordinate system was established using the upstream and downstream service module flanges to define the beam axis. Positive Z is downstream, positive X is to the beam left, and positive Y is up. Z = 0 is defined as the face of the entrance window flange. The pitch and yaw angles were determined by the position of the entrance window flange. After each actuator movement, measurements were taken at the downstream reference mark, the upstream reference mark, and the entrance window. All measurements are in millimeters and degrees.

**Friday, Sept 05**

Station	Z	X	Y	Angle
DS_REF	344.70	0.01	-0.11	
UP_REF	172.98	0.17	-0.08	
ENT_WINDOW	-0.00	-0.31	0.02	
<b>Pitch</b>				<b>0.19° Top US</b>
<b>Yaw</b>				<b>0.24° BL US</b>
BG_HALO	125.30	0.56	0.48	
SM_HALO	125.18	-0.12	-0.05	
C12_HOLE	125.16	-0.12	-0.11	
DS_REF_RPT1	342.62	0.15	0.00	
UP_REF_RPT1	172.82	0.37	0.01	
ENT_WINDOW_RPT1	0.00	-0.24	0.13	
SM_HALO_REL.TARG CELL	128.64	3.02	50.32	
US_ACT_+X_DS	339.91	43.90	-3.40	
US_ACT_+X_UP	171.25	39.89	-2.94	
US_ACT_+X_ENT	-0.72	35.05	-2.67	
US_ACT_+X_DS2	341.65	33.79	-2.19	
US_ACT_+X_UP2	172.43	30.78	-1.80	
US_ACT_+X_ENT2	-0.40	26.92	-1.72	
US_ACT_+X_DS3	345.27	22.45	-0.86	
US_ACT_+X_UP3	170.95	20.29	-0.57	
US_ACT_+X_ENT3	-0.17	17.59	-0.74	
US_ACT_+X_DS4	340.47	11.14	-0.08	
US_ACT_+X_UP4	171.45	10.17	-0.08	
US_ACT_+X_ENT4	-0.04	8.57	-0.12	

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**Friday, Sept 05 Cont.**

<b>Station</b>	<b>Z</b>	<b>X</b>	<b>Y</b>
US_ACT_+X_DS5	341.20	5.33	-0.16
US_ACT_+X_UP5	170.99	5.01	0.12
US_ACT_+X_ENT5	0.00	3.91	0.09
US_ACT_+X_DS6	343.17	2.93	-0.11
US_ACT_+X_UP6	170.86	2.91	0.31
US_ACT_+X_ENT6	0.00	2.00	0.12
DS_REF_REPT2	340.62	0.28	0.23
UP_REF_RPT2	172.62	0.33	0.02
ENT_WINDOW_RPT2	0.00	-0.14	0.07
US_ACT_-X_DS1	342.36	-2.41	0.09
US_ACT_-X_UP1	171.22	-1.97	0.24
US_ACT_-X_ENT1	0.00	-2.33	0.13
US_ACT_-X_DS2	343.42	-4.93	-0.09
US_ACT_-X_UP2	171.28	-4.25	0.21
US_ACT_-X_ENT2	-0.01	-4.28	0.18
US_ACT_-X_DS3	340.64	-10.41	0.17
US_ACT_-X_US3	172.94	-9.35	0.15
US_ACT_-X_ENT3	-0.06	-8.67	0.05
US_ACT_-X_DS4	341.93	-22.27	-0.43
US_ACT_-X_US4	170.16	-19.91	-0.18
US_ACT_-X_ENT4	-0.25	-18.31	-0.20
US_ACT_-X_DS5	340.70	-34.63	-1.07
US_ACT_-X_US5	171.21	-31.26	-1.02
US_ACT_-X_ENT5	-0.45	-28.36	-0.86
US_ACT_-Y_DS1	332.96	-0.41	-69.91
US_ACT_-Y_UP1	162.94	-0.04	-62.85
US_ACT_-Y_ENT1	-7.92	-0.69	-56.30
US_ACT_-Y_DS2	336.15	-1.39	-58.72
US_ACT_-Y_US2	164.38	-1.04	-52.57
US_ACT_-Y_ENT2	-6.48	-1.48	-47.11
US_ACT_-Y_DS3	334.97	-1.84	-48.31
US_ACT_-Y_US3	166.20	-1.48	-43.60
US_ACT_-Y_ENT3	-5.23	-1.88	-39.00
US_ACT_-Y_DS4	338.24	-1.95	-37.21
US_ACT_-Y_US4	168.04	-1.73	-33.75
US_ACT_-Y_ENT4	-3.94	-2.02	-29.92
US_ACT_-Y_DS5	339.35	-1.79	-25.83
US_ACT_-Y_UP5	169.84	-1.48	-23.43
US_ACT_-Y_ENT5	-2.67	-1.85	-20.76
US_ACT_-Y_DS6	339.98	-1.21	-14.66
US_ACT_-Y_US6	168.72	-0.84	-13.02
US_ACT_-Y_ENT6	-1.50	-1.32	-11.73
US_ACT_-Y_DS7	340.83	-0.40	-5.46
US_ACT_-Y_US7	172.59	-0.12	-4.77
US_ACT_-Y_ENT7	-0.54	-0.65	-4.33
US_ACT_-Y_DS8	342.82	0.01	-2.29
US_ACT_-Y_UP8	171.62	0.13	-1.75
US_ACT_-Y_ENT8	-0.22	-0.35	-1.66

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Station	Z	X	Y
DSREF_RPT3	341.97	0.29	0.16
USREF_RPT3	172.21	0.44	0.13
ENT_WINDOW_RPT3	0.01	-0.12	0.18
US_ACT_+Y_DS1	343.99	0.55	2.27
US_ACT_+Y_US1	172.82	0.64	2.18
US_ACT_+Y_ENT1	0.20	0.03	1.91
US_ACT_+Y_DS2	342.36	0.95	4.93
US_ACT_+Y_US2	176.18	0.97	4.74
US_ACT_+Y_ENT2	0.43	0.40	3.99
US_ACT_+Y_DS3	341.00	2.73	16.37
US_ACT_+Y_US3	172.95	2.55	14.59
US_ACT_+Y_ENT3	1.46	1.73	12.88
US_ACT_+Y_DS4	345.19	3.67	21.65
US_ACT_+Y_UP4	172.84	3.50	19.89
US_ACT_+Y_ENT4	1.98	2.63	17.67
DSREF_RPT4	341.41	0.50	0.00
USREF_RPT4	171.15	0.66	0.38
ENT_WINDOW_RPT4	-0.03	0.05	0.15

**Monday, Sept 08**

Station	Z	X	Y	Angle
DSREF_RPT1	345.31	0.20	-0.18	
USREF_RPT1	173.15	0.31	0.07	
ENT_WIN_RPT1	-0.04	-0.16	-0.00	
<b>Pitch</b>				<b>0.12° Top US</b>
<b>Yaw</b>				<b>0.28° BL US</b>
C12_TARG RADIATOR (Unmodified)	125.22	-0.02 3.17	0.19 0.52	
DSREF_RPT2	345.05	0.18	0.04	
USREF_RPT2	174.11	0.30	0.18	
ENT_WIN_RPT2	-0.00	-0.16	0.07	
DS_ACT_-X_DS1	345.33	-35.26	0.78	
DS_ACT_-X_UP1	174.68	-33.09	0.80	
DS_ACT_-X_ENT1	-0.10	-31.53	0.62	
DS_ACT_-X_DS2	344.08	-23.32	0.38	
DS_ACT_-X_UP2	171.55	-21.73	0.64	
DS_ACT_-X_ENT2	-0.04	-20.92	0.46	
DS_ACT_-X_DS3	344.12	-10.34	0.15	

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**Monday, Sept 08 Cont.**

<b>Station</b>	<b>Z</b>	<b>X</b>	<b>Y</b>
DS_ACT_-X_US3	175.38	-9.56	0.44
DS_ACT_-X_ENT3	-0.00	-9.43	0.24
DS_ACT_-X_DS4	345.08	-3.17	0.16
DS_ACT_-X_US4	171.86	-2.76	0.33
DS_ACT_-X_ENT4	-0.01	-3.09	0.13
DS_ACT_-X_DS5	346.87	-0.95	0.15
DS_ACT_-X_US5	174.69	-0.69	0.25
DS_ACT_-X_ENT5	-0.00	-1.11	0.10
DSREF_RPT3	345.37	0.19	-0.04
USREF_RPT3	174.59	0.39	0.23
ENT_WIN_RPT3	0.01	-0.16	0.14
DS_ACT_+X_DS1	344.64	1.54	-0.03
DS_ACT_+X_UP1	175.77	1.68	0.27
DS_ACT_+X_ENT1	0.02	1.08	0.08
DS_ACT_+X_DS2	344.49	2.99	-0.24
DS_ACT_+X_UP2	174.69	3.12	0.22
DS_ACT_+X_ENT2	0.03	2.43	0.06
DS_ACT_+X_DS3	345.74	10.11	-0.16
DS_ACT_+X_UP3	174.03	9.60	0.04
DS_ACT_+X_ENT3	-0.00	8.54	-0.03
DS_ACT_+X_DS4	345.32	22.12	-0.39
DS_ACT_+X_US4	174.69	21.09	-0.13
DS_ACT_+X_ENT4	-0.04	19.24	-0.23
DS_ACT_+X_DS5	344.41	34.93	-0.58
DS_ACT_+X_UP5	174.83	33.13	-0.34
DS_ACT_+X_ENT5	-0.06	30.64	-0.40
DS_ACT_+X_DS6	345.44	61.02	-1.06
DS_ACT_+X_UP6	173.76	57.64	-0.87
DS_ACT_+X_ENT6	-0.28	53.59	-0.87
DSREF_RPT4	345.72	0.10	0.08
USREF_RPT4	174.23	0.28	0.18
ENT_WIN_RPT4	0.00	-0.15	0.16
DS_ACT_+Y_DS1	348.45	4.09	75.68
DS_ACT_+Y_US1	177.17	3.96	71.54
DS_ACT_+Y_ENT1	3.87	3.24	67.09
DS_ACT_+Y_DS2	347.99	3.68	63.27
DS_ACT_+Y_US2	178.36	3.70	59.96
DS_ACT_+Y_ENT2	3.27	2.96	56.03
DS_ACT_+Y_DS3	346.57	3.36	49.69
DS_ACT_+Y_US3	177.17	3.38	47.20
DS_ACT_+Y_ENT3	2.65	2.59	44.12
DS_ACT_+Y_DS4	346.27	2.67	37.50
DS_ACT_+Y_UP4	176.54	2.72	35.56
DS_ACT_+Y_ENT4	2.03	2.03	33.19
DS_ACT_+Y_DS5	345.90	2.11	24.30
DS_ACT_+Y_UP5	175.46	2.19	23.25

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Station	Z	X	Y
DS_ACT_+Y_ENT5	1.36	1.54	21.66
DS_ACT_+Y_DS6	345.58	1.79	11.64
DS_ACT_+Y_UP6	175.75	1.83	11.33
DS_ACT_+Y_ENT6	0.66	1.24	10.44
DS_ACT_+Y_DS7	344.89	1.70	2.74
DS_ACT_+Y_US7	174.58	1.74	2.75
DS_ACT_+Y_ENT7	0.21	1.20	2.44
DS_ACT_+Y_DS8	346.90	1.73	0.79
DS_ACT_+Y_US8	173.86	1.69	0.96
DS_ACT_+Y_ENT8	0.06	1.11	0.70
DS_ACT_+Y_DS9	345.41	1.60	0.01
DS_ACT_+Y_US9	174.56	1.66	0.05
DS_ACT_+Y_ENT9	0.03	1.09	0.00
DS_ACT_-Y_DS1	345.41	1.56	-1.84
DS_ACT_-Y_US1	174.71	1.69	-1.59
DS_ACT_-Y_ENT1	-0.07	1.04	-1.68
DS_ACT_-Y_DS2	344.78	1.52	-5.12
DS_ACT_-Y_US2	172.74	1.48	-4.76
DS_ACT_-Y_ENT2	-0.25	1.04	-4.47
DS_ACT_-Y_DS3	344.34	1.40	-11.96
DS_ACT_-Y_US3	174.21	1.49	-11.01
DS_ACT_-Y_ENT3	-0.66	0.99	-10.47
DS_ACT_-Y_DS4	343.24	1.38	-24.94
DS_ACT_-Y_US4	172.87	1.49	-23.27
DS_ACT_-Y_ENT4	-1.40	0.93	-21.92
DS_ACT_-Y_DS5	342.26	2.66	-45.36
DS_ACT_-Y_US5	172.09	2.83	-42.38
DS_ACT_-Y_ENT5	-2.70	2.09	-40.02
DSREF_RPT5	345.54	0.23	-0.05
USREF_RPT5	172.21	0.37	0.15
ENT_WIN_RPT5	0.03	-0.13	0.07
FLYSWAT_US_SIDE_Z	371.26		
C12_RPT2	125.25	0.07	0.13
RADIATOR (1 <sup>st</sup> modification)	-229.55	3.27	0.55
SM_HALO_RPT2	125.26	-0.03	-0.12
SM_HALO_RPT3	125.26	-0.16	0.07
C12_RPT3	125.26	0.05	0.16
RADIATOR (Final Modification)	-226.40	-0.53	-1.32
BOTBR_LIMIT	-2.61	-109.93	-243.53
BOTBRSIDE_LIMIT	-18.67	-179.48	-193.90
BOTBL_LIMIT	-16.56	122.68	-237.40
BG_HALO_CHK	125.43	0.13	0.05
BGHALO_RPT1	125.43	-0.23	0.09

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**Monday, Sept 08 Cont.**

<b>Station</b>	<b>Z</b>	<b>X</b>	<b>Y</b>
TOPBRSIDE_LIMIT		-201.51	95.05
TOPBL_LIMIT		151.41	174.98
TOPBLSIDE_LIMIT		205.56	96.91
DSREF_OFFSET	343.98	-1.39	7.35
USREF_OFFSET	174.62	-1.14	7.54
ENT_WINDOW_OFFSET	0.02	-1.57	7.46