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Accelerator Division
Technical Note

No. 236

Booster Coordinates Update

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ABSTRACT

THIS NOTE UPDATES THE AGS-BOOSTER COORDINATES, WHICH HAVE BEEN MODIFIED DUE TO AN ARCHITECTUAL RELOCATION OF THE CENTER OF THE BOOSTER. IT DESCRIBES THE COORDINATES OF THE AGS - BOOSTER IN THE BOOSTER CENTERED FRAME OF REFERENCE WITH AXES IN THE NORTH (X) AND EAST (Y) DIRECTIONS. TRANSFORMATION FROM THE BOOSTER CENTERED FRAME TO THE AGS AND BNL GRIDS ARE DISCUSSED, AND THE COORDINATES OF THE MACHINE WITH RESPECT TO THESE FRAMES ARE GIVEN.

I. INTRODUCTION

This note updates the AGS - Booster coordinates, which have been changed due to an architectual [1] relocation of the center of the Booster.

Previously [2], we generated and described the Booster coordinates in the AGS, BNL and Booster centered frames, using the modified parameters [3] (Circumference = 201.78 m and Quadrupole length = 0.050375 m). These modifications have resulted an architectual change in the center coordinates of the Booster [given in section III] and hence a need to readjust the Booster coordinates.

In section II we describe the Booster centered reference frame with axes in the North (X) and East (Y) directions, with the unit of length expressed in meters.

In section III, the transformation from the Booster centered reference frame to the AGS and BNL grids are discussed, and the coordinates of the Booster with respect to these frames are tabulated.

Layout of the Booster lattice [4] showing relative position of magnets and the labling convention of the lattice and its superperiods are also included (see Figures 1-3).

II. BOOSTER CENTERED COORDINATE SYSTEM

The coordinates of the Booster lattice in the Booster centered coordinate system (with East (X) and North (Y) axes where the length is measured in meters) using Tape 5 [5] of program SYNCH, were generated assuming that:

1. The magnets have sharp edges where the field becomes zero.

2. The values listed in Table I correspond to the coordinates of an on-axis point of the downstream end of that element when viewed in a clockwise direction.

We note that, the effect of the earth's curvature for the Booster is negligable.

III. TRANSFER OF COORDINATES TO AGS AND BNL GRID

We can use the following transformation from the Booster centered frame of reference to that of AGS and BNL grids asuuming that the axes of the Booster centered coordinate system are parallel to those of 1) AGS and 2) BNL grids. Here X_{BST} and Y_{BST} are the x and y distances expressed in the Booster coodinate system, with E and N as the East and North coordinates and EO and NO are the the coordinates of the Booster in the 1) AGS [E(inch),N(inch)] and 2) BNL [E(feet),N(feet)] grids respectively:

1. AGS GRID

$$E(\text{inch}) = EO_{AGS}(\text{inch}) + X_{BST}(\text{inch})$$

$$N(\text{inch}) = NO_{AGS}(\text{inch}) + Y_{BST}(\text{inch})$$

$$EO_{AGS}(\text{inch}) = 1{,}148.88$$

$$NO_{AGS}(\text{inch}) = 15{,}459.36$$

2. BNL GRID

$$E(\text{feet}) = EO_{BNL}(\text{feet}) + X_{BST}(\text{feet})$$

$$N(\text{feet}) = NO_{BNL}(\text{feet}) + Y_{BST}(\text{feet})$$

$$EO_{BNL}(\text{feet}) = 98{,}517.19 \text{ feet, and}$$

$$NO_{BNL}(\text{feet}) = 102{,}438.28 \text{ feet .}$$

where the values for EO and NO were obtained from [1], (using the conversion factor of 2.54 cm/inch).
Note that the origins of the two systems are different.

REFERENCES:

1. We received the changes for the Booster center coordinates (due to architectual relocation) from M. schaeffer, January 27, 1986.

2. Booster Coordinates, Booster Tech Note No. 3, Z. Parsa, F. Dell, (January 17, 1986).

3. Booster Parameters, Booster Tech. Note No. 2, Z. Parsa, (January 16, 1986).

4. Booster Lattice, Booster Tech. Note No. 1, E. Courant and Z. Parsa, (January 15, 1986).

5. Using DUA0:[PARSA1.BOOSTER]SYNBOOST.DAT, a tape 5 [BSTR5, E. Courant] was generated.

	ELEMENT	X(M)	Y(M)	E-AGS(IN)	N-AGS(IN)	ANGLE	S(ORBIT)
0		31.86063	-5.55399	2408.03542	15234.13914	99.89	0.000
1	QD	31.82006	-5.80257	2406.43829	15224.35226	100.33	.252
2	S30	31.77174	-6.09866	2404.53601	15212.69543	100.87	.552
3	BEND	31.18098	-8.42167	2381.27751	15121.23823	105.11	2.952
4	S100	30.85098	-9.36565	2368.28561	15084.07355	106.89	3.952
5	QF	30.76787	-9.60342	2365.01327	15074.71270	107.33	4.204
6	QF	30.68475	-9.84118	2361.74094	15065.35184	107.78	4.456
7	S30	30.58575	-10.12438	2357.84336	15054.20244	108.32	4.756
8	BEND	29.60057	-12.30951	2319.05684	14968.17347	112.58	7.156
9	S100	29.11167	-13.18185	2299.80873	14933.82943	114.36	8.156
10	QD	28.98853	-13.40157	2294.96062	14925.17902	114.81	8.408
11	QD	28.86539	-13.62129	2290.11250	14916.52862	115.26	8.659
12	S370	27.05645	-16.84895	2218.89450	14789.45565	121.91	12.359
13	QF	26.93331	-17.06867	2214.04638	14780.80524	122.36	12.611
14	QF	26.81016	-17.28839	2209.19827	14772.15483	122.82	12.863
15	S30	26.66349	-17.55009	2203.42383	14761.85162	123.35	13.163
16	BEND	25.31384	-19.53095	2150.28779	14683.86484	127.65	15.563
17	S100	24.68088	-20.30514	2125.36832	14653.38496	129.44	16.563
18	QD	24.52146	-20.50014	2119.09173	14645.70783	129.90	16.815
19	QD	24.36203	-20.69514	2112.81514	14638.03071	130.35	17.067
20	S30	24.17215	-20.92740	2105.33930	14628.88675	130.88	17.367
21	BEND	22.49902	-22.64380	2039.46825	14561.31174	135.18	19.767
22	S100	21.74125	-23.29632	2009.63459	14535.62213	136.98	20.767
23	QF	21.55038	-23.46067	2002.12024	14529.15156	137.43	21.019
24	QF	21.35952	-23.62502	1994.60589	14522.68099	137.88	21.271
25	S370	18.55575	-26.03933	1884.22134	14427.62945	144.53	24.971
26	QD	18.36489	-26.20368	1876.70699	14421.15888	144.98	25.223
27	QD	18.17402	-26.36804	1869.19264	14414.68832	145.42	25.474
28	S30	17.94669	-26.56379	1860.24254	14406.98143	145.96	25.774
29	BEND	16.00093	-27.96359	1783.63794	14351.87143	150.22	28.174
30	S100	15.14136	-28.47460	1749.79657	14331.75266	152.00	29.174
31	QF	14.92486	-28.60331	1741.27277	14326.68525	152.45	29.426
32	QF	14.70835	-28.73203	1732.74898	14321.61784	152.89	29.678
33	S30	14.45048	-28.88533	1722.59657	14315.58221	153.42	29.978
34	BEND	12.29121	-29.92598	1637.58601	14274.61170	157.67	32.378
35	S100	11.35596	-30.27997	1600.76518	14260.67508	159.44	33.378
36	QD	11.12040	-30.36913	1591.49093	14257.16479	159.89	33.630

Table 1

	ELEMENT	X(M)	Y(M)	E-AGS(IN)	N-AGS(IN)	ANGLE	S(ORBIT)
37	QD	10.88483	-30.45830	1582.21668	14253.65450	160.33	33.882
38	S30	10.60426	-30.56449	1571.17043	14249.47352	160.87	34.162
39	BEND	8.29709	-31.21438	1480.33693	14223.88737	165.11	36.582
40	S100	7.31458	-31.40059	1441.65542	14216.55635	166.89	37.582
41	QF	7.06711	-31.44749	1431.91251	14214.70984	167.33	37.834
42	QF	6.81964	-31.49439	1422.16961	14212.86334	167.78	38.086
43	S30	6.52488	-31.55025	1410.56515	14210.66404	168.32	38.386
44	BEND	4.13991	-31.76963	1316.66862	14201.23967	172.58	40.786
45	S100	3.13999	-31.80240	1277.30175	14200.73700	174.36	41.786
46	QD	2.88814	-31.80562	1267.38622	14200.61039	174.81	42.037
47	QD	2.63628	-31.80883	1257.47069	14200.48378	175.26	42.289
48	S370	-1.06341	-31.85607	1111.81327	14198.62389	181.91	45.989
49	QF	-1.31527	-31.85929	1101.89774	14198.49728	182.36	46.241
50	QF	-1.56712	-31.86251	1091.98221	14198.37067	182.82	46.493
51	S30	-1.86710	-31.86634	1080.17215	14198.21987	183.35	46.793
52	BEND	-4.25741	-31.68793	986.06560	14205.24364	187.65	49.193
53	S100	-5.24435	-31.52687	947.20951	14211.58459	189.44	50.193
54	QD	-5.49294	-31.48630	937.42263	14213.18171	189.90	50.445
55	QD	-5.74152	-31.44574	927.63576	14214.77884	190.35	50.697
56	S30	-6.03761	-31.39742	915.97893	14216.68113	190.88	50.997
57	BEND	-8.36062	-30.80665	824.52173	14239.93962	195.18	53.397
58	S100	-9.30460	-30.47666	787.35705	14252.93153	196.98	54.397
59	QF	-9.54237	-30.39354	777.99619	14256.20386	197.43	54.649
60	QF	-9.78013	-30.31042	768.63534	14259.47620	197.88	54.901
61	S370	-13.27297	-29.08945	631.12602	14307.54625	204.53	58.601
62	QD	-13.51064	-29.00633	621.76517	14310.81858	204.98	58.852
63	QD	-13.74840	-28.92321	612.40431	14314.09092	205.42	59.104
64	S30	-14.03160	-28.82421	601.25491	14317.98649	205.96	59.404
65	BEND	-16.21673	-27.83903	515.22594	14356.77501	210.22	61.804
66	S100	-17.08907	-27.35013	480.88190	14376.02312	212.00	62.804
67	QF	-17.30879	-27.22699	472.23149	14380.87124	212.45	63.056
68	QF	-17.52851	-27.10385	463.58109	14385.71936	212.89	63.308
69	S30	-17.79021	-26.95716	453.27787	14391.49379	213.42	63.608
70	BEND	-19.77108	-25.60752	375.29109	14444.62983	217.67	66.008
71	S100	-20.54527	-24.97457	344.81121	14469.54930	219.44	67.008
72	QD	-20.74027	-24.81514	337.13409	14475.82589	219.89	67.260

	ELEMENT	X(M)	Y(M)	E-AGS(IN)	N-AGS(IN)	ANGLE	S(ORBIT)
73	QD	-20.93527	-24.65572	329.45697	14482.10248	220.33	67.512
74	S30	-21.16752	-24.46583	320.31300	14489.57832	220.87	67.812
75	BEND	-22.88393	-22.79271	252.73799	14555.44937	225.11	70.212
76	S100	-23.53644	-22.03493	227.04838	14585.28303	226.89	71.212
77	QF	-23.70080	-21.84407	220.57781	14592.79738	227.33	71.464
78	QF	-23.86515	-21.65320	214.10724	14600.31174	227.78	71.716
79	S30	-24.06090	-21.42587	206.40036	14609.26183	228.32	72.016
80	BEND	-25.46070	-19.48011	151.29036	14685.86643	232.58	74.416
81	S100	-25.97171	-18.62054	131.17159	14719.70780	234.36	75.416
82	QD	-26.10043	-18.40404	126.10418	14728.23160	234.81	75.667
83	QD	-26.22914	-18.18753	121.03677	14736.75540	235.26	75.919
84	S370	-28.11990	-15.00712	46.59735	14861.96848	241.91	79.619
85	QF	-28.24861	-14.79062	41.52994	14870.49227	242.36	79.871
86	QF	-28.37732	-14.57411	36.46252	14879.01607	242.82	80.123
87	S30	-28.53063	-14.31624	30.42689	14889.16848	243.35	80.423
88	BEND	-29.57128	-12.15697	-10.54362	14974.17903	247.65	82.823
89	S100	-29.92527	-11.22172	-24.48024	15010.99987	249.44	83.823
90	QD	-30.01443	-10.98616	-27.99053	15020.27411	249.90	84.075
91	QD	-30.10359	-10.75059	-31.50081	15029.54836	250.35	84.327
92	S30	-30.20979	-10.47002	-35.68180	15040.59461	250.88	84.627
93	BEND	-30.85968	-8.16285	-61.26795	15131.42812	255.18	87.027
94	S100	-31.04589	-7.18034	-68.59897	15170.10963	256.98	88.027
95	QF	-31.09279	-6.93287	-70.44547	15179.85253	257.43	88.279
96	QF	-31.13969	-6.68540	-72.29197	15189.59544	257.88	88.531
97	S370	-31.82866	-3.05011	-99.41675	15332.71703	264.53	92.231
98	QD	-31.87556	-2.80264	-101.26325	15342.45993	264.98	92.482
99	QD	-31.92246	-2.55517	-103.10975	15352.20284	265.42	92.734
100	S30	-31.97832	-2.26041	-105.30906	15363.80729	265.96	93.034
101	BEND	-32.21770	.12456	-114.73342	15457.70382	270.22	95.434
102	S100	-32.23047	1.12448	-115.23610	15497.07069	272.00	96.434
103	QF	-32.23368	1.37633	-115.36271	15506.98622	272.44	96.686
104	QF	-32.23690	1.62818	-115.48932	15516.90175	272.89	96.938
105	S30	-32.24073	1.92816	-115.64012	15528.71181	273.42	97.238
106	BEND	-32.06233	4.31847	-108.61635	15622.81837	277.67	99.638
107	S100	-31.90127	5.30541	-102.27540	15661.67446	279.44	100.638
108	QD	-31.86070	5.55400	-100.67827	15671.46133	279.89	100.890

Table 1

	ELEMENT	X(M)	Y(M)	E-AGS(IN)	N-AGS(IN)	ANGLE	S(ORBIT)
109	QD	-31.82013	5.80258	-99.08114	15681.24821	280.33	101.142
110	S30	-31.77182	6.09867	-97.17886	15692.90503	280.97	101.442
111	BEND	-31.18105	8.42168	-73.92036	15784.36224	285.11	103.842
112	S100	-30.85105	9.36566	-60.92846	15821.52692	286.89	104.842
113	QF	-30.76794	9.60343	-57.65612	15830.88777	287.33	105.094
114	QF	-30.68482	9.84120	-54.38379	15840.24862	287.78	105.346
115	S30	-30.58582	10.12439	-50.48621	15851.39803	288.32	105.646
116	BEND	-29.60064	12.30953	-11.69969	15937.42699	292.58	108.046
117	S100	-29.11174	13.18186	7.54842	15971.77104	294.36	109.046
118	QD	-28.98860	13.40158	12.39653	15980.42145	294.81	109.297
119	QD	-28.86546	13.62131	17.24465	15989.07185	295.26	109.549
120	S370	-27.05652	16.84896	88.46265	16116.14482	301.91	113.249
121	QF	-26.93338	17.06868	93.31077	16124.79523	302.36	113.501
122	QF	-26.81024	17.28840	98.15888	16133.44563	302.82	113.753
123	S30	-26.66357	17.55010	103.93332	16143.74885	303.35	114.053
124	BEND	-25.31391	19.53096	157.06936	16221.73563	307.65	116.453
125	S100	-24.68096	20.30515	181.98883	16252.21551	309.44	117.453
126	QD	-24.52153	20.50015	188.26542	16259.89263	309.90	117.705
127	QD	-24.36211	20.69515	194.54201	16267.56975	310.35	117.957
128	S30	-24.17222	20.92741	202.01785	16276.71372	310.88	118.257
129	BEND	-22.49909	22.64381	267.88890	16344.28873	315.18	120.657
130	S100	-21.74132	23.29633	297.72256	16369.97833	316.98	121.657
131	QF	-21.55045	23.46068	305.23691	16376.44890	317.43	121.909
132	QF	-21.35959	23.62503	312.75126	16382.91947	317.88	122.161
133	S370	-18.55582	26.03934	423.13581	16477.97101	324.53	125.861
134	QD	-18.36496	26.20370	430.65016	16484.44158	324.98	126.112
135	QD	-18.17409	26.36805	438.16451	16490.91215	325.42	126.364
136	S30	-17.94676	26.56380	447.11461	16498.61903	325.96	126.664
137	BEND	-16.00100	27.96360	523.71921	16553.72904	330.22	129.064
138	S100	-15.14143	28.47461	557.56058	16573.84780	332.00	130.064
139	QF	-14.92493	28.60333	566.08438	16578.91522	332.44	130.316
140	QF	-14.70842	28.73204	574.60817	16583.98263	332.89	130.568
141	S30	-14.45055	28.88534	584.76058	16590.01826	333.42	130.868
142	BEND	-12.29129	29.92599	669.77114	16630.98877	337.67	133.268
143	S100	-11.35604	30.27998	706.59197	16644.92539	339.44	134.268
144	QD	-11.12047	30.36915	715.86622	16648.43568	339.89	134.520

	ELEMENT	X(M)	Y(M)	E-AGS(IN)	N-AGS(IN)	ANGLE	S(ORBIT)
145	QD	-10.88490	30.45831	725.14047	16651.94596	340.33	134.772
146	S30	-10.60433	30.56450	736.18671	16656.12695	340.87	135.072
147	BEND	-8.29716	31.21439	827.02022	16681.71310	345.11	137.472
148	S100	-7.31465	31.40060	865.70173	16689.04412	346.89	138.472
149	QF	-7.06718	31.44750	875.44464	16690.89062	347.33	138.724
150	QF	-6.81971	31.49440	885.18754	16692.73712	347.78	138.976
151	S30	-6.52496	31.55027	896.79200	16694.93643	348.32	139.276
152	BEND	-4.13998	31.78964	990.68853	16704.36080	352.58	141.676
153	S100	-3.14006	31.80241	1030.05540	16704.86347	354.36	142.676
154	QD	-2.88821	31.80563	1039.97093	16704.99008	354.81	142.927
155	QD	-2.63636	31.80884	1049.88646	16705.11669	355.26	143.179
156	S370	1.06334	31.85609	1195.54388	16706.97658	1.91	146.879
157	QF	1.31520	31.85930	1205.45941	16707.10319	2.36	147.131
158	QF	1.56705	31.86252	1215.37494	16707.22980	2.82	147.383
159	S30	1.86703	31.86635	1227.18500	16707.38060	3.35	147.683
160	BEND	4.25733	31.68794	1321.29155	16700.35683	7.65	150.083
161	S100	5.24428	31.52688	1360.14764	16694.01588	9.44	151.083
162	QD	5.49286	31.48632	1369.93452	16692.41875	9.90	151.335
163	QD	5.74145	31.44575	1379.72139	16690.82163	10.35	151.587
164	S30	6.03753	31.39743	1391.37822	16688.91934	10.88	151.887
165	BEND	8.36055	30.80667	1482.83542	16665.66085	15.18	154.287
166	S100	9.30453	30.47667	1520.00010	16652.66894	16.98	155.287
167	QF	9.54230	30.39355	1529.36095	16649.39660	17.43	155.539
168	QF	9.78006	30.31044	1538.72181	16646.12427	17.88	155.791
169	S370	13.27280	29.08946	1676.23113	16598.05422	24.53	159.491
170	QD	13.51056	29.00634	1685.59198	16594.78188	24.98	159.742
171	QD	13.74833	28.92322	1694.95284	16591.50955	25.42	159.994
172	S30	14.03152	28.82422	1706.10224	16587.61198	25.96	160.294
173	BEND	16.21666	27.83905	1792.13121	16548.82545	30.22	162.694
174	S100	17.08900	27.35014	1826.47525	16529.57734	32.00	163.694
175	QF	17.30872	27.22700	1835.12566	16524.72923	32.44	163.946
176	QF	17.52844	27.10386	1843.77606	16519.88111	32.89	164.198
177	S30	17.79014	26.95719	1854.07928	16514.10668	33.42	164.498
178	BEND	19.77101	25.60753	1932.06606	16460.97064	37.67	166.898
179	S100	20.54519	24.97458	1962.54594	16436.05117	39.44	167.898
180	QD	20.74019	24.81515	1970.22306	16429.77458	39.89	168.150

Table 1

	ELEMENT	X(M)	Y(M)	E-AGS(IN)	N-AGS(IN)	ANGLE	S(ORBIT)
181	QD	20.93519	24.65573	1977.90018	16423.49799	40.33	168.402
182	S30	21.16745	24.46584	1987.04415	16416.02215	40.87	168.702
183	BEND	22.88385	22.79272	2054.61916	16350.15110	45.11	171.102
184	S100	23.53637	22.03494	2080.30877	16320.31744	46.89	172.102
185	QF	23.70072	21.84408	2086.77934	16312.80309	47.33	172.354
186	QF	23.86508	21.65321	2093.24990	16305.28873	47.78	172.606
187	S30	24.06083	21.42588	2100.95679	16296.33863	48.32	172.906
188	BEND	25.46062	19.48012	2156.06679	16219.73404	52.58	175.306
189	S100	25.97164	18.62055	2176.18556	16185.89266	54.36	176.306
190	QD	26.10035	18.40405	2181.25297	16177.36887	54.81	176.557
191	QD	26.22907	18.18754	2186.32038	16168.84507	55.26	176.809
192	S370	28.11983	15.00713	2260.75980	16043.63199	61.91	180.509
193	QF	28.24854	14.79063	2265.82721	16035.10820	62.36	180.761
194	QF	28.37725	14.57412	2270.89463	16026.58440	62.82	181.013
195	S30	28.53056	14.31625	2276.93026	16016.43199	63.35	181.313
196	BEND	29.57121	12.15698	2317.90077	15931.42143	67.65	183.713
197	S100	29.92520	11.22174	2331.83739	15894.60060	69.44	184.713
198	QD	30.01436	10.98617	2335.34767	15885.32635	69.90	184.965
199	QD	30.10352	10.75060	2338.85796	15876.05211	70.35	185.217
200	S30	30.20972	10.47003	2343.03895	15865.00586	70.88	185.517
201	BEND	30.85961	8.16286	2368.62510	15774.17235	75.18	187.917
202	S100	31.04581	7.18035	2375.95612	15735.49084	76.98	188.917
203	QF	31.09271	6.93288	2377.80262	15725.74793	77.43	189.169
204	QF	31.13962	6.68541	2379.64912	15716.00503	77.88	189.421
205	S370	31.82859	3.05012	2406.77390	15572.88344	84.53	193.121
206	QD	31.87549	2.80265	2408.62040	15563.14054	84.98	193.372
207	QD	31.92239	2.55518	2410.46690	15553.39763	85.42	193.624
208	S30	31.97825	2.26043	2412.66621	15541.79318	85.96	193.924
209	BEND	32.21763	-.12455	2422.09057	15447.89665	90.22	196.324
210	S100	32.23040	-1.12446	2422.59325	15408.52978	92.00	197.324
211	QF	32.23361	-1.37632	2422.71986	15398.61425	92.44	197.576
212	QF	32.23683	-1.62817	2422.84647	15388.69872	92.89	197.828
213	S30	32.24066	-1.92815	2422.99727	15376.88865	93.42	198.128
214	BEND	32.06225	-4.31845	2415.97350	15282.78210	97.67	200.528
215	S100	31.90119	-5.30540	2409.63255	15243.92601	99.44	201.528
216	QD	31.86063	-5.55399	2408.03542	15234.13914	99.89	201.780

Table 2

	APEX	N(IN)	E(IN)	X(M)	Y(M)
1	A1	15172.50940	2392.10750	31.57798	-7.28601
2	A2	15016.05127	2337.41338	30.18875	-11.26004
3	A4	14727.09383	2175.46729	26.07532	-18.59956
4	A5	14598.77776	2070.55980	23.41067	-21.85879
5	A7	14382.63541	1819.55099	17.03504	-27.34880
6	A8	14297.93822	1677.08352	13.41637	-29.50011
7	B1	14239.26699	1522.07293	9.47910	-30.99036
8	B2	14208.40441	1359.22915	5.34287	-31.77427
9	B4	14204.17512	1028.01162	-3.07006	-31.88170
10	B5	14230.86964	864.43290	-7.22496	-31.20366
11	B7	14340.17847	551.74374	-15.16726	-28.42721
12	B8	14421.21033	407.16008	-18.83969	-26.36900
13	C1	14526.11782	278.84401	-22.09891	-23.70435
14	C2	14651.71338	170.69434	-24.84592	-20.51422
15	C4	14936.44153	1.42291	-29.14541	-13.28213
16	C5	15091.45212	-57.24832	-30.63566	-9.34486
17	C7	15416.90330	-118.92868	-32.20234	-1.07840
18	C8	15582.63234	-121.04486	-32.25609	3.13112
19	D1	15746.21107	-94.35034	-31.57805	7.28602
20	D2	15902.66920	-39.65623	-30.18882	11.26005
21	D4	16191.62664	122.28986	-26.07539	18.59957
22	D5	16319.94271	227.19735	-23.41074	21.85880
23	D7	16536.08505	478.20617	-17.03512	27.34882
24	D8	16620.78224	620.67364	-13.41644	29.50012
25	E1	16679.45347	775.68423	-9.47917	30.99037
26	E2	16710.31605	938.52801	-5.34294	31.77428
27	E4	16714.54534	1269.74553	3.06998	31.88171
28	E5	16687.85082	1433.32426	7.22488	31.20367
29	E7	16578.54199	1746.01342	15.16719	28.42722
30	E8	16497.51013	1890.59708	18.83961	26.36901
31	F1	16392.60264	2018.91315	22.09884	23.70436
32	F2	16267.00708	2127.06281	24.84584	20.51424
33	F4	15982.27893	2296.33425	29.14534	13.28214
34	F5	15827.26834	2355.00548	30.63559	9.34487
35	F7	15501.81716	2416.68583	32.20227	1.07841
36	F8	15336.08811	2418.80201	32.25602	-3.13111

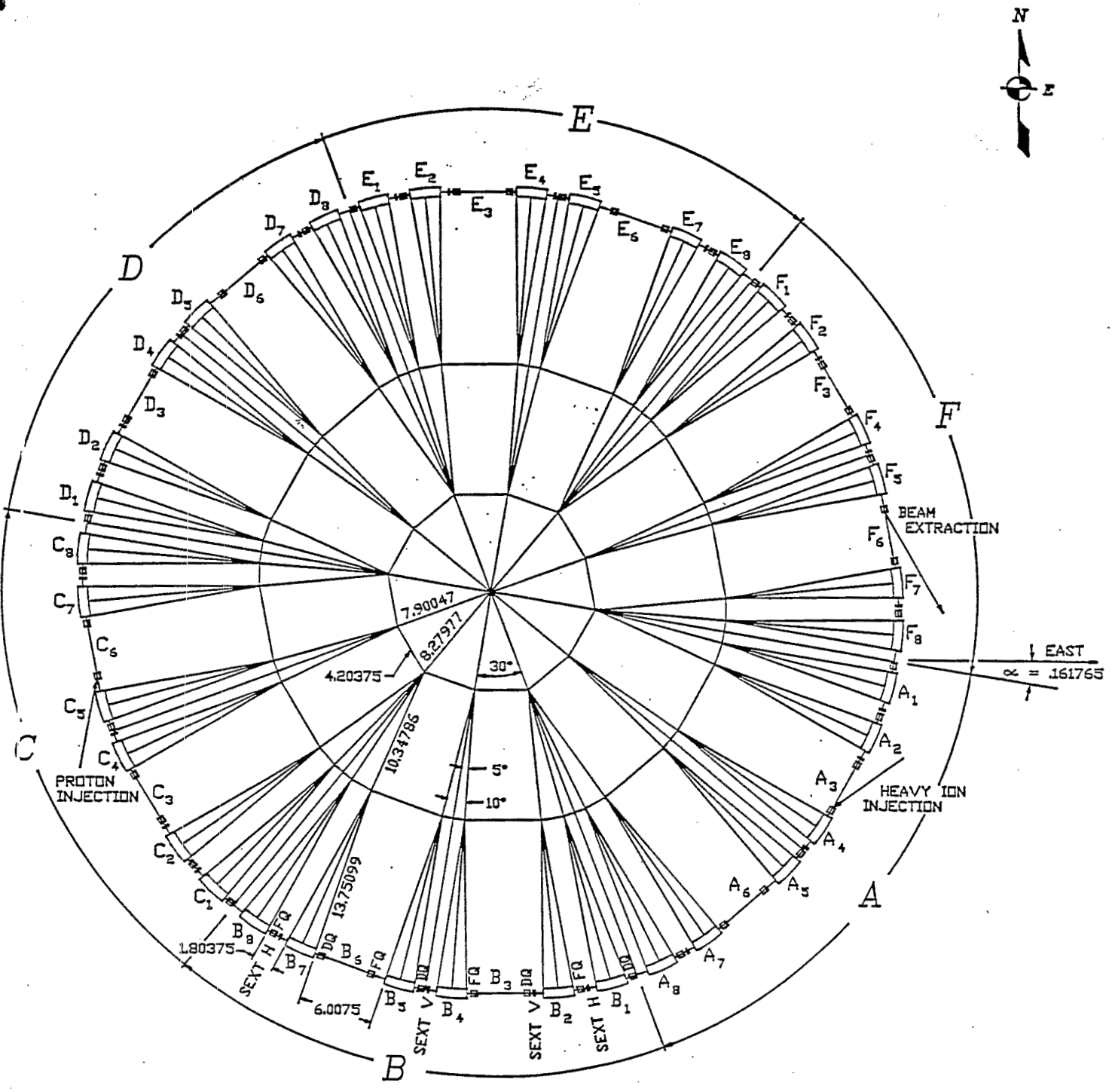

FIG. 1 Overall Layout of the AGS Booster

0 5
METERS
NOTE ALL DIMENSIONS ARE IN METERS

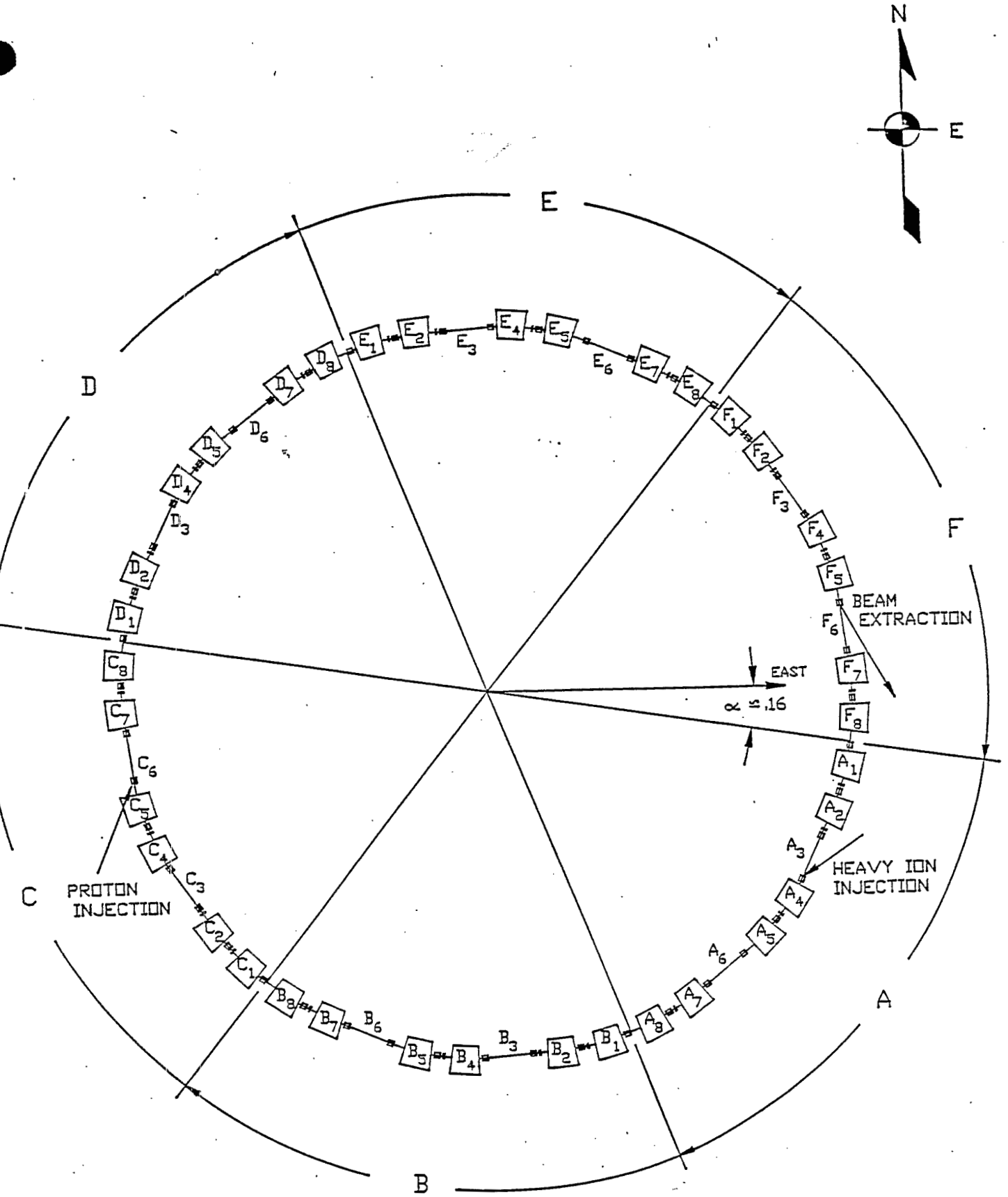

Fig.2 Layout of the AGS Booster showing the relative position of magnets (e.g. Dipole Apex locations) and labling convention of the Booster Superperiods. (A to F, with the Beam in the Clockwise direction).

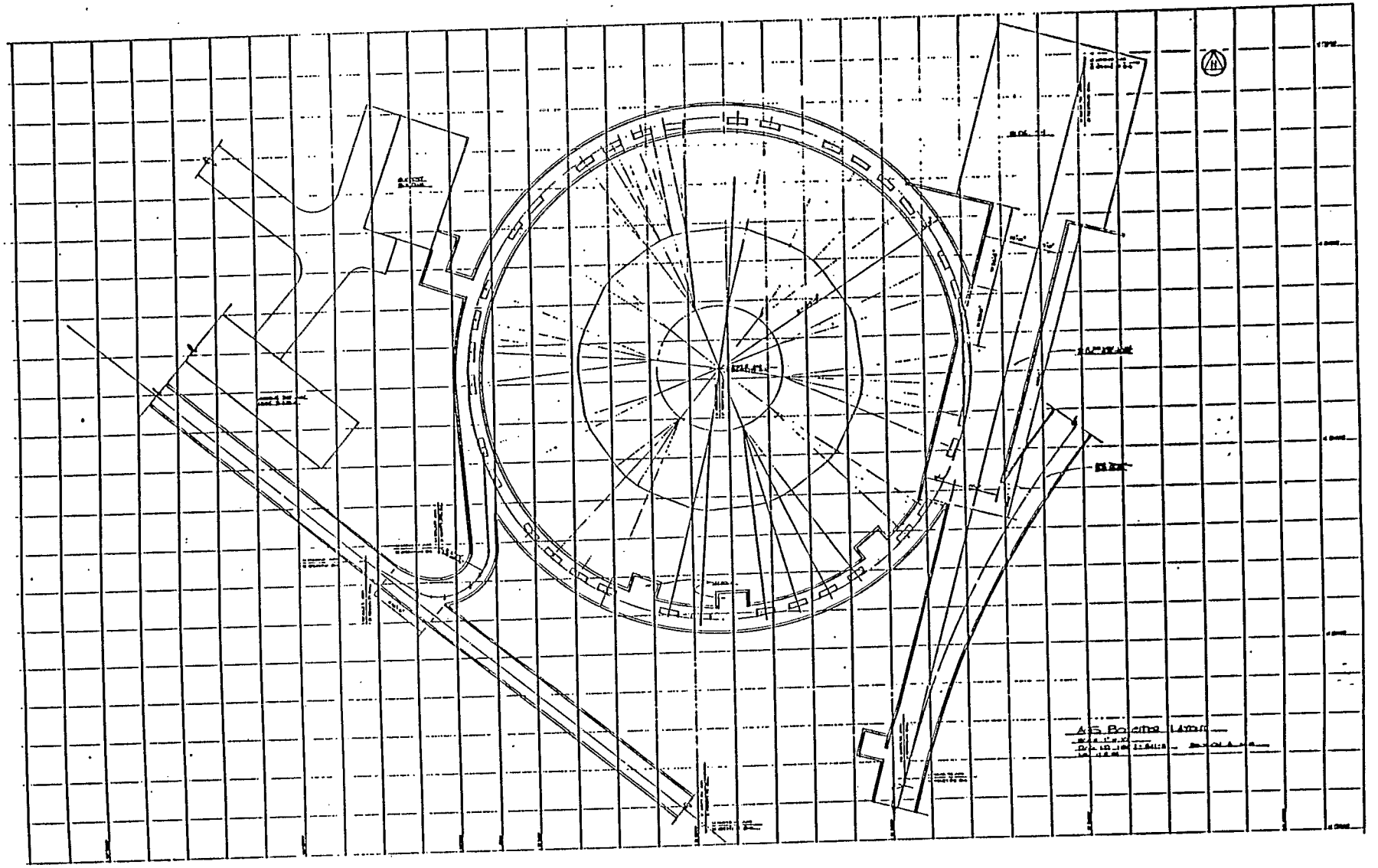

Fig. 3 Construction map of AGS Booster