LARES-2
303 uncoated 1.0 inch cubes
Final configuration

Contents:

1. Array Geometry

The cubes are not arranged in rings. There are a total of 303 cubes.

2. Centroid for circular polarization

Measured dihedral angles for 10 test cubes are used to randomize the dihedral angles. The orientation of each cube in incremented by 26 degrees from the previous cube.

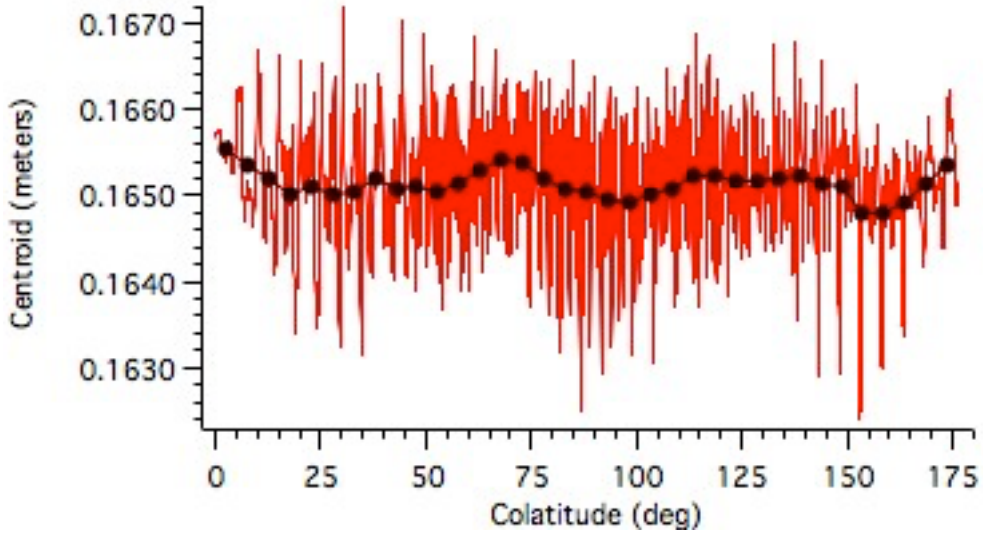

Figure 2.1 Centroid range correction (m) vs Colatitude (deg)

The data plotted in Figure 2.1 is for 2520 incidence angles that spiral around the satellite from 0 to 176.4 degrees colatitude. The Longitude increases by 5 deg between points. This is one revolution in 72 points. The Colatitude increased by .07 deg between points. This is 5 deg in colatitude on each revolution. There are 35 revolutions.

Red curve (all points)

Minimum	Maximum	Max - Min	Average	Rms
0.1624	0.1672	0.0048	0.1651	0.0007

Black curve (average over 72 points)

	Phi	minimum	Phi	maximum	max-min
Centroid	158.7250	0.1648	2.4850	0.1655	0.0007
Crossec	168.8050	3.7534	52.8850	4.1069	0.3535

Black curve (average over 72 points)

Longitude(deg)	Colatitude(deg)	Centroid(m)	Cross section
177.500	2.485	0.165538	3.823840
537.500	7.525	0.165353	3.831683
897.500	12.565	0.165196	3.898715
1257.500	17.605	0.165025	3.913206
1617.500	22.645	0.165107	3.938371
1977.500	27.685	0.165027	3.925265
2337.500	32.725	0.165058	3.882003
2697.500	37.765	0.165196	3.835324
3057.500	42.805	0.165067	3.956718
3417.500	47.845	0.165103	4.006304
3777.500	52.885	0.165058	4.106858
4137.500	57.925	0.165137	4.106691
4497.500	62.965	0.165296	4.002042
4857.500	68.005	0.165430	3.919495
5217.500	73.045	0.165388	3.848723
5577.500	78.085	0.165191	3.892470
5937.500	83.125	0.165073	3.936729
6297.500	88.165	0.165049	3.957846
6657.500	93.205	0.164954	3.921132
7017.500	98.245	0.164931	3.887420
7377.500	103.285	0.165005	3.848377
7737.500	108.325	0.165090	3.888036
8097.500	113.365	0.165234	3.979408
8457.500	118.405	0.165238	4.007156
8817.500	123.445	0.165160	4.037737
9177.500	128.485	0.165182	3.964257
9537.500	133.525	0.165210	3.888515
9897.500	138.565	0.165241	3.838690
10257.500	143.605	0.165154	3.871029
10617.500	148.645	0.165106	3.899348
10977.500	153.685	0.164811	3.900448
11337.500	158.725	0.164796	3.897006
11697.500	163.765	0.164915	3.885175
12057.500	168.805	0.165133	3.753373
12417.500	173.845	0.165359	3.892168

Table 2.1. Data for the black curve in Figures 2.1 and 3.1. Centroid is in meters. The peak to peak difference in the centroid averaged over 72 points is .7 mm. This is within the design goal of 1 mm. Since there is no ring structure there is no physical pole.

Positions of the handling cavities.

Cap	Row	Cube	X	Y	Z	θ	ϕ	α
2	1	1	-0.07205	0.06605	-0.17678	137.489	151.063	0.000
1	1	2	0.07205	-0.06605	0.17678	317.489	28.937	26.000
1	1	3	0.09726	0.17515	0.02580	60.956	82.663	52.000
2	1	4	-0.09726	-0.17515	-0.02580	240.956	97.337	78.000

Table 2.2. Position (m) and orientation (deg) of cube corners at the position of the handling cavities.

A simulation has been done to see the effect on the range of the missing cube at the position of the handling cavities. The third cavity above has been used. The Longitude is 60.956 deg. The CoLatitude is 82.773 deg. A simulation has been done going around the satellite ta 82.663 degrees with and without a cube corner in the cavity.

Range correction around the satellite at the Colatitude of a cavity.
Red = no cube in the cavity
Green = with a cube in the cavity

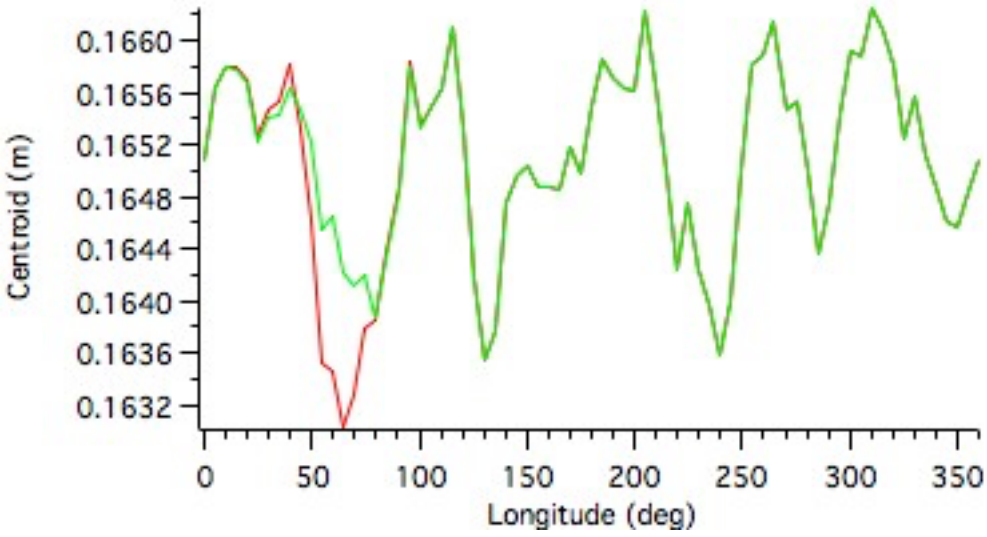

Figure 2.2. Range correction (m) around the satellite at CoLatitude 82.773 deg.

The effect of leaving out a cube is to make the range correction smaller (closer to the center of the satellite. The peak to peak difference in range is 3.2 mm with a cube missing and 2.7 mm with a cube in the cavity.

Difference in range due to missing cube at the cavity

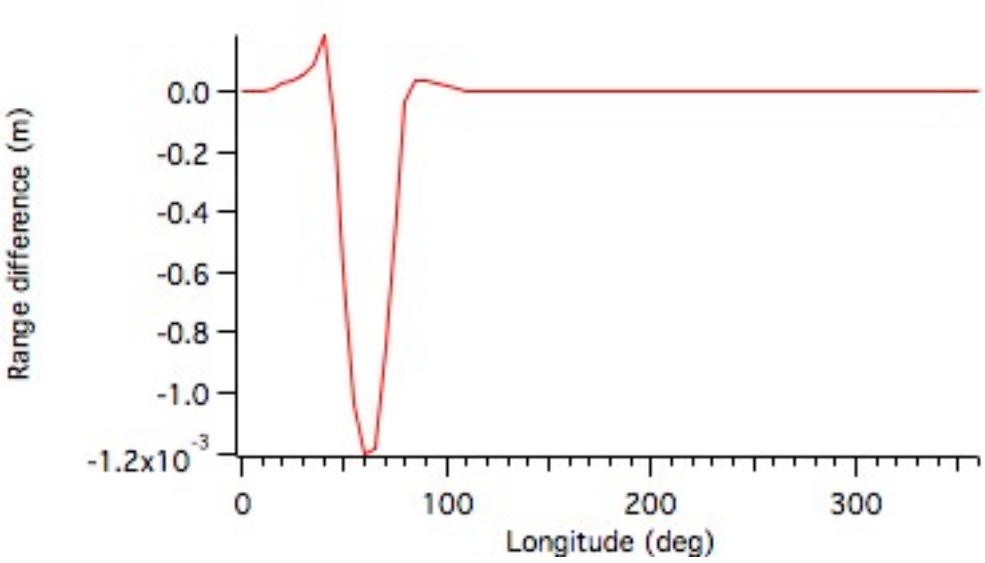

Figure 2.3. Difference between the red (with no cube) and green (with cube) centroid in figure 2.2.

The difference in range at the position of the cavity is 1.2 millimeters. The average range at the Colatitude of the cavity is 0.165109 with a cube and 0.165042 with no cube. The difference in average range is .067 mm. This is well within the design goal of one millimeter.

3. Cross section with circular polarization

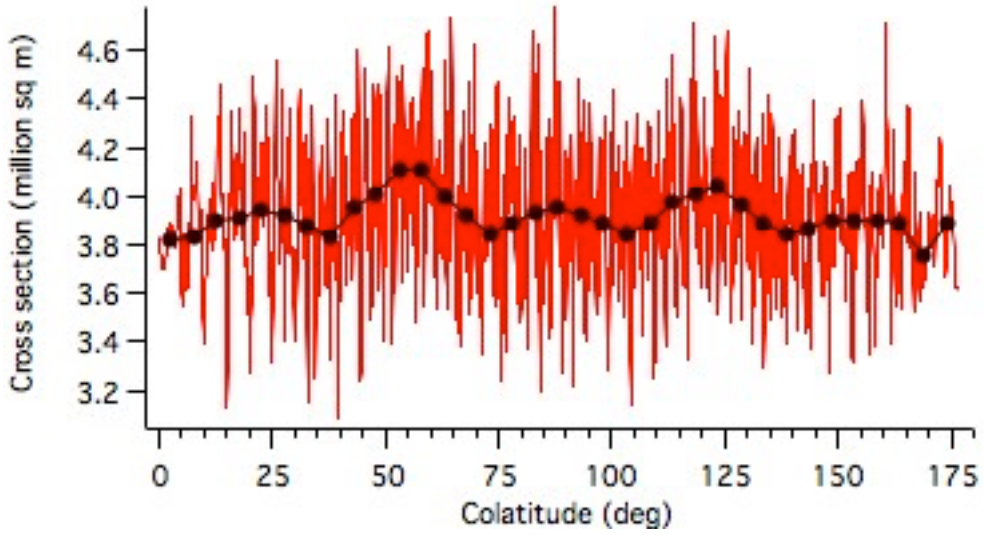

Figure 3.1. Cross section (million sq m) vs Colatitude (deg)

Table 3.1. Statistics for Figure 3.1. Cross section is in million sq m.

Red curve (all points)

Minimum	Maximum	Max - Min	Average	Rms
3.0859	4.7778	1.6919	3.9183	0.2666

4. Appendix: Position and orientation of the cubes

X,Y,Z position of each cube (m), θ=Longitude, ϕ=Colatitude, α=orientation (deg).

Cap	Row	Cube	X	Y	Z	θ	ϕ	α
2	1	1	0.05726	-0.01542	-0.19310	344.931	162.929	0.000
2	1	2	0.03536	-0.04933	-0.19267	305.631	162.514	26.000
2	1	3	0.06967	-0.06537	-0.17798	316.824	151.774	52.000
2	1	4	0.03634	-0.09131	-0.17648	291.701	150.887	78.000
2	1	5	0.06858	-0.10661	-0.15727	302.751	141.130	104.000
2	1	6	0.03664	-0.13036	-0.14989	285.699	137.905	10.000
2	1	7	0.00307	-0.11453	-0.16637	271.538	145.447	36.000
2	1	8	-0.03085	-0.09404	-0.17609	251.839	150.662	62.000
2	1	9	-0.04235	-0.12543	-0.15257	251.341	139.053	88.000
2	1	10	-0.06135	-0.14744	-0.12371	247.409	127.764	114.000
2	1	11	-0.09693	-0.14298	-0.10471	235.864	121.224	20.000
2	1	12	-0.09705	-0.16324	-0.06884	239.268	109.925	46.000
2	1	13	-0.06275	-0.16999	-0.08927	249.739	116.227	72.000
2	1	14	-0.05586	-0.18720	-0.05138	253.384	104.734	98.000
2	1	15	-0.03037	-0.19858	-0.02118	261.304	96.018	4.000
1	1	16	-0.06409	-0.19156	0.00015	251.502	89.957	30.000
1	1	17	-0.09571	-0.17642	0.02278	241.519	83.525	56.000

1	1	18	-0.12747	-0.15669	0.00182	230.870	89.485	82.000
1	1	19	-0.15250	-0.13069	0.02159	220.596	83.863	108.000
2	1	20	-0.15649	-0.12642	-0.01830	218.933	95.197	14.000
2	1	21	-0.15661	-0.11409	-0.05710	216.072	106.419	40.000
2	1	22	-0.12954	-0.13147	-0.08210	225.424	113.980	66.000
2	1	23	-0.13128	-0.14724	-0.04346	228.279	102.425	92.000
2	1	24	-0.15043	-0.09646	-0.09417	212.669	117.788	118.000
2	1	25	-0.16715	-0.05749	-0.09777	198.980	118.948	24.000
2	1	26	-0.17512	-0.01718	-0.09920	185.602	119.413	50.000
2	1	27	-0.17566	0.02386	-0.09684	172.265	118.646	76.000
2	1	28	-0.18165	0.05376	-0.07013	163.513	110.316	102.000
2	1	29	-0.17953	0.08276	-0.04154	155.252	101.867	8.000
2	1	30	-0.17032	0.10811	-0.01030	147.594	92.922	34.000
1	1	31	-0.17737	0.09246	0.02817	152.467	81.983	60.000
1	1	32	-0.17738	0.07178	0.06473	157.969	71.310	86.000
1	1	33	-0.19310	0.04769	0.03522	166.127	79.960	112.000
1	1	34	-0.20085	0.02109	0.00426	174.006	88.791	18.000
1	1	35	-0.20061	-0.02017	0.01238	185.741	86.487	44.000
2	1	36	-0.20005	-0.00864	-0.02665	182.473	97.581	70.000
2	1	37	-0.19181	0.00780	-0.06285	177.671	108.129	96.000
2	1	38	-0.19540	0.03860	-0.03369	168.826	99.600	2.000
2	1	39	-0.19061	0.06680	-0.00287	160.688	90.813	28.000
1	1	40	-0.19686	0.00425	0.04509	178.765	77.102	54.000
1	1	41	-0.18458	0.03054	0.07618	170.605	67.845	80.000
1	1	42	-0.18335	-0.01228	0.08388	183.831	65.466	106.000
1	1	43	-0.16253	-0.02575	0.11716	189.001	54.550	12.000
1	1	44	-0.17212	-0.05536	0.09007	197.829	63.518	38.000
1	1	45	-0.17649	-0.08029	0.05665	204.463	73.713	64.000
1	1	46	-0.15543	-0.11476	0.05895	216.439	73.033	90.000
1	1	47	-0.15248	-0.09372	0.09365	211.577	62.379	116.000
1	1	48	-0.14398	-0.06789	0.12436	205.245	52.001	22.000
1	1	49	-0.11304	-0.08185	0.14604	215.909	43.700	48.000
1	1	50	-0.12094	-0.11088	0.11783	222.514	54.317	74.000
1	1	51	-0.12473	-0.13468	0.08431	227.195	65.331	100.000
1	1	52	-0.09007	-0.14740	0.10471	238.574	58.777	6.000
1	1	53	-0.08455	-0.12267	0.13641	235.422	47.524	32.000
1	1	54	-0.07604	-0.09283	0.16250	230.679	36.443	58.000
1	1	55	-0.06417	-0.05932	0.18212	222.753	25.634	84.000
1	1	56	-0.02974	-0.04120	0.19551	234.170	14.569	110.000
1	1	57	0.00371	-0.01815	0.20115	281.555	5.261	16.000
1	1	58	0.03602	-0.04181	0.19432	310.741	15.855	42.000
1	1	59	0.04037	-0.00042	0.19792	359.408	11.529	68.000
1	1	60	0.07490	0.02011	0.18652	15.031	22.576	94.000
1	1	61	0.10839	0.00395	0.17041	2.089	32.476	120.000
1	1	62	0.13988	-0.00734	0.14555	356.996	43.901	26.000
1	1	63	0.13532	0.03398	0.14607	14.095	43.686	52.000
1	1	64	0.16270	0.02531	0.11701	8.843	54.602	78.000
1	1	65	0.16611	-0.01526	0.11393	354.752	55.666	104.000
1	1	66	0.16575	-0.05484	0.10161	341.692	59.802	10.000
1	1	67	0.18568	-0.03442	0.07171	349.497	69.206	36.000
1	1	68	0.19686	-0.00425	0.04509	358.765	77.102	62.000
1	1	69	0.20029	0.02297	0.01267	6.541	86.403	88.000
2	1	70	0.20015	0.00946	-0.02556	2.706	97.269	114.000
2	1	71	0.19333	0.04992	-0.03056	14.479	98.701	20.000
2	1	72	0.17722	0.07605	-0.06012	23.225	107.316	46.000
2	1	73	0.18506	0.03768	-0.07166	11.508	110.779	72.000
2	1	74	0.19099	-0.00255	-0.06572	359.236	108.988	98.000
2	1	75	0.17359	-0.00663	-0.10308	357.813	120.684	4.000
2	1	76	0.17992	-0.04103	-0.08214	347.153	113.995	30.000
2	1	77	0.19355	-0.03763	-0.04387	348.998	102.544	56.000
2	1	78	0.17929	-0.07345	-0.05712	337.722	106.424	82.000

2	1	79	0.17173	-0.10225	-0.02927	329.231	98.330	108.000
2	1	80	0.15773	-0.10676	-0.06728	325.907	109.457	14.000
2	1	81	0.12995	-0.13587	-0.07387	313.725	111.449	40.000
2	1	82	0.13679	-0.10765	-0.10248	321.799	120.487	66.000
2	1	83	0.10999	-0.10487	-0.13307	316.366	131.207	92.000
2	1	84	0.13742	-0.07523	-0.12751	331.303	129.142	118.000
2	1	85	0.13181	-0.04025	-0.14768	343.020	136.979	24.000
2	1	86	0.15899	-0.04192	-0.11734	345.229	125.514	50.000
2	1	87	0.16172	-0.07592	-0.09427	334.852	117.820	76.000
2	1	88	0.10448	-0.13616	-0.10652	307.500	121.825	102.000
2	1	89	0.07056	-0.13859	-0.12892	296.982	129.658	8.000
2	1	90	0.07092	-0.16351	-0.09507	293.448	118.076	34.000
2	1	91	0.09689	-0.16679	-0.05998	300.153	107.273	60.000
2	1	92	0.11786	-0.16256	-0.02210	305.944	96.280	86.000
2	1	93	0.14647	-0.13438	-0.03592	317.465	100.243	112.000
1	1	94	0.15049	-0.13458	0.00676	318.195	88.081	18.000
1	1	95	0.12112	-0.16039	0.02023	307.060	84.253	44.000
1	1	96	0.08595	-0.18169	0.02020	295.316	84.260	70.000
1	1	97	0.09185	-0.16973	0.05966	298.421	72.820	96.000
1	1	98	0.12620	-0.14614	0.05933	310.812	72.921	2.000
1	1	99	0.15533	-0.11916	0.04978	322.506	75.734	28.000
1	1	100	0.17588	-0.09720	0.02051	331.072	84.172	54.000
1	1	101	0.19226	-0.05638	0.02572	343.657	82.686	80.000
1	1	102	0.17772	-0.07487	0.06012	337.155	72.685	106.000
1	1	103	0.15486	-0.09499	0.08831	328.475	64.077	12.000
1	1	104	0.12747	-0.12418	0.09557	315.749	61.764	38.000
1	1	105	0.09536	-0.14957	0.09665	302.519	61.414	64.000
1	1	106	0.05825	-0.16857	0.09485	289.062	61.995	90.000
1	1	107	0.05321	-0.18615	0.05763	285.952	73.422	116.000
1	1	108	0.04666	-0.19566	0.01851	283.414	84.742	22.000
2	1	109	0.03758	-0.19731	-0.02144	280.783	96.092	48.000
2	1	110	0.00555	-0.19645	-0.04671	271.618	103.371	74.000
2	1	111	-0.02095	-0.18606	-0.07581	263.576	112.042	100.000
2	1	112	-0.02657	-0.16669	-0.11096	260.945	123.319	6.000
2	1	113	-0.00430	-0.14524	-0.14032	268.305	134.001	32.000
2	1	114	0.03129	-0.15931	-0.12019	281.112	126.513	58.000
2	1	115	0.02745	-0.18091	-0.08557	278.627	115.064	84.000
2	1	116	0.05700	-0.18519	-0.05708	287.107	106.415	110.000
2	1	117	0.07811	-0.18504	-0.02152	292.885	96.116	16.000
1	1	118	0.00390	-0.20196	0.00167	271.107	89.526	42.000
1	1	119	-0.02942	-0.19829	0.02485	261.560	82.934	68.000
1	1	120	-0.06169	-0.18647	0.04719	251.694	76.489	94.000
1	1	121	-0.09229	-0.16635	0.06793	240.978	70.348	120.000
1	1	122	-0.12372	-0.15295	0.04585	231.032	76.881	26.000
1	1	123	-0.17602	-0.09719	0.01935	208.904	84.502	52.000
1	1	124	-0.19221	-0.05998	0.01612	197.332	85.422	78.000
2	1	125	-0.19390	-0.05119	-0.02422	194.789	96.886	104.000
2	1	126	-0.18865	-0.03549	-0.06289	190.655	108.141	10.000
2	1	127	-0.17679	-0.07639	-0.06094	203.368	107.558	36.000
2	1	128	-0.17923	-0.09061	-0.02174	206.818	96.178	62.000
1	1	129	-0.19099	-0.03957	0.05255	191.705	74.921	88.000
1	1	130	-0.16610	0.01526	0.11393	174.752	55.666	114.000
1	1	131	-0.16321	0.05512	0.10549	161.340	58.517	20.000
1	1	132	-0.15420	0.09270	0.09183	148.988	62.959	46.000
1	1	133	-0.15571	0.11489	0.05797	143.578	73.323	72.000
1	1	134	-0.15158	0.13189	0.02077	138.973	84.098	98.000
2	1	135	-0.14341	0.14103	-0.01861	135.480	95.286	4.000
2	1	136	-0.15518	0.11906	-0.05048	142.504	104.471	30.000
2	1	137	-0.12510	0.14737	-0.05862	130.327	106.871	56.000
2	1	138	-0.13377	0.12225	-0.08923	137.577	116.216	82.000
2	1	139	-0.13470	0.09181	-0.11930	145.722	126.199	108.000

2	1	140	-0.10405	0.11751	-0.12716	131.525	129.014	14.000
2	1	141	-0.07296	0.10994	-0.15295	123.570	139.218	40.000
2	1	142	-0.03996	0.09602	-0.17317	112.593	149.012	66.000
2	1	143	-0.03664	0.13036	-0.14989	105.700	137.905	92.000
2	1	144	-0.00308	0.11453	-0.16637	91.538	145.447	118.000
2	1	145	0.03085	0.09404	-0.17609	71.840	150.663	24.000
2	1	146	0.05030	0.05987	-0.18625	49.964	157.227	50.000
2	1	147	0.01815	0.03753	-0.19765	64.187	168.090	76.000
2	1	148	-0.00191	0.07263	-0.18848	91.509	158.920	102.000
2	1	149	-0.03257	0.04509	-0.19419	125.844	164.015	8.000
2	1	150	-0.06610	0.02292	-0.18950	160.876	159.737	34.000
2	1	151	-0.10222	0.03281	-0.17111	162.204	147.894	60.000
2	1	152	-0.12671	0.00256	-0.15730	178.844	141.142	86.000
2	1	153	-0.15414	0.01363	-0.12985	174.946	130.001	112.000
2	1	154	-0.15047	-0.02921	-0.13156	190.986	130.639	18.000
2	1	155	-0.11981	-0.04073	-0.15745	198.775	141.209	44.000
2	1	156	-0.08394	-0.05051	-0.17665	211.037	150.988	70.000
2	1	157	-0.04358	-0.05731	-0.18873	232.752	159.119	96.000
2	1	158	-0.05468	-0.01812	-0.19361	198.331	163.432	2.000
2	1	159	-0.02245	0.00596	-0.20066	165.136	173.397	28.000
2	1	160	-0.01029	-0.03291	-0.19903	252.630	170.172	54.000
2	1	161	0.00191	-0.07263	-0.18848	271.508	158.920	80.000
2	1	162	-0.07058	-0.09000	-0.16650	231.898	145.514	106.000
2	1	163	-0.08403	-0.11821	-0.14060	234.590	134.112	12.000
2	1	164	-0.11938	-0.11064	-0.11963	222.823	126.314	38.000
2	1	165	-0.10712	-0.08196	-0.15037	217.420	138.110	64.000
2	1	166	-0.13962	-0.07052	-0.12782	206.798	129.255	90.000
2	1	167	-0.09373	-0.00880	-0.17872	185.363	152.222	116.000
2	1	168	-0.13259	0.04786	-0.14469	160.152	135.748	22.000
2	1	169	-0.10853	0.08174	-0.14948	143.015	137.733	48.000
2	1	170	-0.15790	0.05777	-0.11196	159.904	123.659	74.000
2	1	171	-0.16287	0.08884	-0.07991	151.388	113.304	100.000
2	1	172	-0.09951	0.14774	-0.09526	123.962	118.138	6.000
2	1	173	-0.08965	0.17080	-0.05996	117.695	107.268	32.000
2	1	174	-0.04980	0.18647	-0.05962	104.952	107.168	58.000
2	1	175	-0.06047	0.16777	-0.09487	109.823	118.013	84.000
2	1	176	-0.06908	0.14145	-0.12658	116.030	128.804	110.000
2	1	177	-0.02684	0.16002	-0.12031	99.522	126.557	16.000
2	1	178	0.00758	0.14584	-0.13956	87.023	133.699	42.000
2	1	179	0.01816	0.17022	-0.10723	83.910	122.064	68.000
2	1	180	-0.01646	0.18205	-0.08597	95.165	115.187	94.000
2	1	181	-0.00555	0.19645	-0.04672	91.618	103.372	120.000
2	1	182	-0.03714	0.19741	-0.02128	100.656	96.048	26.000
1	1	183	-0.00390	0.20196	0.00167	91.107	89.526	52.000
1	1	184	0.02942	0.19829	0.02485	81.560	82.935	78.000
1	1	185	0.05835	0.18622	0.05219	72.603	75.028	104.000
1	1	186	0.02108	0.18855	0.06934	83.621	69.923	10.000
1	1	187	-0.01154	0.19675	0.04430	93.356	77.333	36.000
1	1	188	-0.01798	0.18253	0.08464	95.626	65.227	62.000
1	1	189	0.01574	0.16994	0.10806	84.709	57.661	88.000
1	1	190	0.05479	0.17173	0.09115	72.304	63.175	114.000
1	1	191	0.05041	0.14992	0.12565	71.414	51.536	20.000
1	1	192	0.04300	0.12131	0.15569	70.484	39.579	46.000
1	1	193	0.03354	0.08676	0.17931	68.865	27.419	72.000
1	1	194	0.00084	0.11023	0.16927	89.565	33.074	98.000
1	1	195	-0.03249	0.12877	0.15220	104.160	41.107	4.000
1	1	196	-0.06522	0.14170	0.12834	114.713	50.554	30.000
1	1	197	-0.10075	0.11813	0.12922	130.458	50.230	56.000
1	1	198	-0.06981	0.10685	0.15656	123.159	39.189	82.000
1	1	199	-0.03643	0.09019	0.17704	111.996	28.786	108.000
1	1	200	-0.00259	0.06804	0.19018	92.183	19.700	14.000

1	1	201	-0.03967	0.04619	0.19261	130.653	17.543	40.000
1	1	202	-0.00569	0.02454	0.20042	103.053	7.163	66.000
1	1	203	-0.03909	0.00032	0.19818	179.526	11.157	92.000
1	1	204	-0.07377	-0.01774	0.18721	193.522	22.063	118.000
1	1	205	-0.10839	-0.00395	0.17041	182.089	32.476	24.000
1	1	206	-0.13988	0.00734	0.14555	176.995	43.901	50.000
1	1	207	-0.13858	0.04860	0.13870	160.674	46.637	76.000
1	1	208	-0.10878	0.03855	0.16579	160.484	34.843	102.000
1	1	209	-0.07483	0.02407	0.18608	162.169	22.900	8.000
1	1	210	-0.07228	0.06622	0.17662	137.506	29.033	34.000
1	1	211	-0.10404	0.07947	0.15384	142.627	40.398	60.000
1	1	212	-0.13164	0.08813	0.12533	146.199	51.652	86.000
1	1	213	-0.12747	0.12418	0.09557	135.748	61.764	112.000
1	1	214	-0.09535	0.14957	0.09665	122.519	61.415	18.000
1	1	215	-0.05825	0.16857	0.09485	109.062	61.995	44.000
1	1	216	-0.05321	0.18615	0.05763	105.952	73.422	70.000
1	1	217	-0.04666	0.19566	0.01851	103.414	84.743	96.000
1	1	218	-0.08595	0.18168	0.02020	115.316	84.261	2.000
1	1	219	-0.12112	0.16039	0.02023	127.060	84.254	28.000
1	1	220	-0.12620	0.14614	0.05933	130.812	72.921	54.000
1	1	221	-0.09185	0.16973	0.05966	118.421	72.820	80.000
2	1	222	-0.11204	0.16683	-0.02045	123.884	95.811	106.000
2	1	223	-0.07622	0.18593	-0.02058	112.289	95.847	12.000
2	1	224	0.03008	0.19838	-0.02333	81.377	96.631	38.000
1	1	225	0.06409	0.19156	0.00015	71.502	89.958	64.000
2	1	226	0.09661	0.17574	-0.02420	61.201	96.882	90.000
2	1	227	0.12806	0.15608	-0.00666	50.633	91.891	116.000
2	1	228	0.13201	0.14551	-0.04696	47.786	103.443	22.000
2	1	229	0.13001	0.12957	-0.08433	44.903	114.677	48.000
2	1	230	0.15661	0.11409	-0.05710	36.072	106.420	74.000
2	1	231	0.15649	0.12642	-0.01830	38.933	95.198	100.000
1	1	232	0.14987	0.13373	0.02142	41.743	83.914	6.000
1	1	233	0.17398	0.10086	0.01907	30.102	84.583	32.000
1	1	234	0.19098	0.06377	0.01631	18.464	85.368	58.000
1	1	235	0.19099	0.03957	0.05255	11.705	74.922	84.000
1	1	236	0.18335	0.01228	0.08388	3.831	65.466	110.000
1	1	237	0.17212	0.05536	0.09007	17.829	63.519	16.000
1	1	238	0.17649	0.08029	0.05665	24.463	73.713	42.000
1	1	239	0.15375	0.11708	0.05880	37.289	73.078	68.000
1	1	240	0.15199	0.09517	0.09299	32.052	62.592	94.000
1	1	241	0.12247	0.10955	0.11749	41.812	54.433	120.000
1	1	242	0.12584	0.13329	0.08487	46.646	65.156	26.000
1	1	243	0.12453	0.15161	0.04809	50.601	76.227	52.000
1	1	244	0.09229	0.16635	0.06793	60.978	70.349	78.000
1	1	245	0.08999	0.14784	0.10416	58.670	58.961	104.000
1	1	246	0.08446	0.12326	0.13593	55.580	47.708	10.000
1	1	247	0.07715	0.09312	0.16181	50.358	36.772	36.000
1	1	248	0.06588	0.05952	0.18144	42.098	26.073	62.000
1	1	249	0.03198	0.04201	0.19498	52.719	15.153	88.000
1	1	250	0.10271	0.04786	0.16723	24.985	34.121	114.000
1	1	251	0.11304	0.08185	0.14604	35.909	43.701	20.000
1	1	252	0.14494	0.06818	0.12308	25.194	52.461	46.000
1	1	253	0.13858	-0.04860	0.13870	340.675	46.637	72.000
1	1	254	0.10878	-0.03855	0.16579	340.485	34.843	98.000
1	1	255	0.07473	-0.02127	0.18646	344.113	22.621	4.000
1	1	256	0.10466	-0.08230	0.15191	321.818	41.232	30.000
1	1	257	0.13333	-0.08959	0.12248	326.100	52.674	56.000
1	1	258	0.10180	-0.11897	0.12762	310.554	50.817	82.000
1	1	259	0.07068	-0.10914	0.15458	302.927	40.070	108.000
1	1	260	0.06522	-0.14170	0.12834	294.714	50.554	14.000
1	1	261	0.03249	-0.12877	0.15221	284.160	41.107	40.000

1	1	262	0.03158	−0.09426	0.17584	288.519	29.481	66.000
1	1	263	0.00260	−0.06804	0.19018	272.184	19.699	92.000
1	1	264	−0.03354	−0.08676	0.17931	248.866	27.419	118.000
1	1	265	−0.00529	−0.11382	0.16680	267.341	34.338	24.000
1	1	266	−0.01038	−0.14459	0.14068	265.893	45.860	50.000
1	1	267	−0.01574	−0.16994	0.10806	264.709	57.660	76.000
1	1	268	0.01798	−0.18253	0.08464	275.626	65.227	102.000
1	1	269	0.01154	−0.19674	0.04430	273.356	77.332	8.000
1	1	270	−0.02269	−0.18876	0.06825	263.146	70.252	34.000
1	1	271	−0.05552	−0.17229	0.08965	252.137	63.651	60.000
1	1	272	−0.05041	−0.14992	0.12565	251.414	51.536	86.000
1	1	273	−0.04588	−0.12074	0.15531	249.194	39.750	112.000
1	1	274	0.02518	−0.15945	0.12143	278.975	53.048	18.000
1	1	275	−0.10155	−0.04816	0.16785	205.373	33.805	44.000
1	1	276	−0.13480	−0.03503	0.14630	194.565	43.591	70.000
1	1	277	−0.02518	0.15945	0.12143	98.975	53.048	96.000
1	1	278	0.00884	0.14349	0.14191	86.476	45.371	2.000
2	1	279	0.06343	0.18608	−0.04641	71.176	103.282	28.000
2	1	280	0.02707	0.18774	−0.06947	81.794	110.115	54.000
2	1	281	0.06135	0.17130	−0.08774	70.296	115.743	80.000
2	1	282	0.05294	0.15122	−0.12302	70.706	127.517	106.000
2	1	283	0.04235	0.12542	−0.15257	71.341	139.053	12.000
2	1	284	0.08320	0.12053	−0.13912	55.383	133.528	38.000
2	1	285	0.11938	0.11064	−0.11963	42.823	126.315	64.000
2	1	286	0.10712	0.08196	−0.15038	37.420	138.111	90.000
2	1	287	0.07057	0.09000	−0.16650	51.898	145.515	116.000
2	1	288	0.09851	0.04712	−0.16994	25.563	147.277	22.000
2	1	289	0.07045	0.02284	−0.18793	17.961	158.493	48.000
2	1	290	0.11248	0.00423	−0.16773	2.154	146.136	74.000
2	1	291	0.09241	−0.02944	−0.17719	342.328	151.306	100.000
2	1	292	0.10575	−0.07114	−0.15672	326.072	140.881	6.000
2	1	293	0.14900	−0.00433	−0.13632	358.337	132.443	32.000
2	1	294	0.13386	0.03386	−0.14744	14.195	136.877	58.000
2	1	295	0.13962	0.07052	−0.12782	26.798	129.255	84.000
2	1	296	0.15684	0.08565	−0.09418	28.638	117.791	110.000
2	1	297	0.16501	0.03917	−0.10974	13.353	122.906	16.000
2	1	298	0.17923	0.09061	−0.02174	26.818	96.178	42.000
1	1	299	0.20085	−0.02109	0.00426	354.006	88.791	68.000
2	1	300	0.18973	−0.06757	−0.01552	340.396	94.408	94.000
2	1	301	0.09288	0.14504	−0.10555	57.365	121.502	120.000
2	1	302	0.09757	0.16389	−0.06650	59.233	109.220	26.000
2	1	303	0.01883	−0.00394	−0.20108	348.185	174.536	52.000

Table 4.1. Position (m) and orientation (deg) of the cube corners in the array.