

ORBITAL vs. SUBORBITAL BALLISTIX

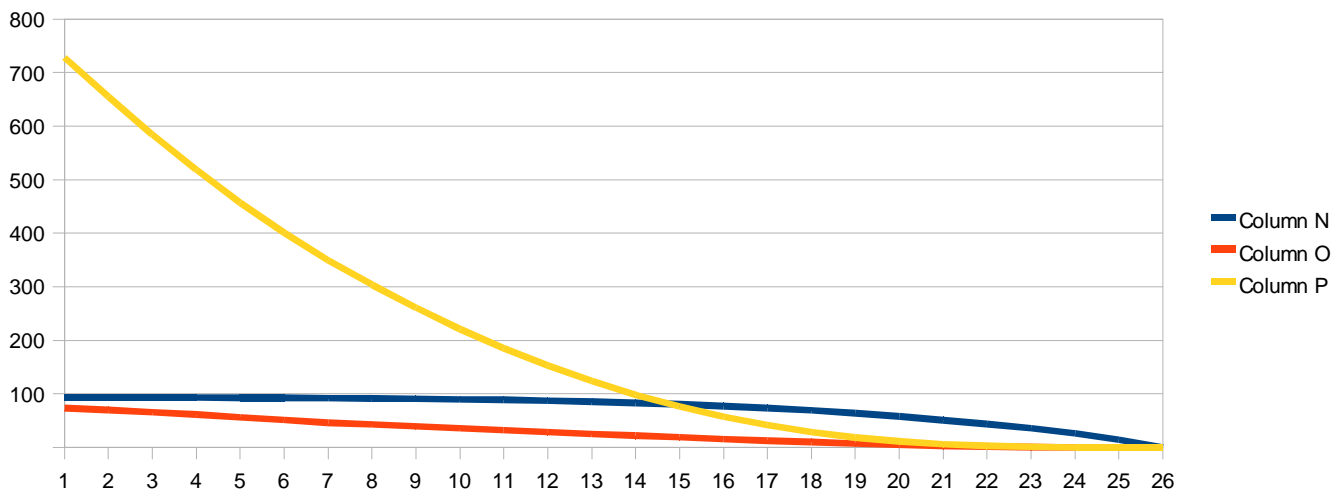
1	Mp	<u>6000</u>	Lb							Mpr	26.55	6.83			
2	Ms	35000	Lb							Apollo	31.25	1.81			
3	Mff	5000	Lb												
4	Mu	<u>24000</u>	Lb												
5	Vo	24000	ft/sec												
6	Vdd	1000	ft/sec												
7	<u>Eh</u>	61000	Btu/lb	550		Ep	prop.eff			P	36/4 (2H2+O2)/2H2				
8															
9	Muh1	Mu.Vu^2													
10		-Mu.Vu'^2													
11		/2g/788/Eh/Ep													
		(1000.Mu/g.l).(1+Gg/Ag)								XX	1000/(32.2.550)	0.06			
12	<u>Mup1</u>	<u>Muh1.Rp</u>	Lb												
13	<u>Mu1</u>	<u>Mup1+Mu</u>	Lb												
1	Muh2	Mu1.Vu^2													
2		-Mu1.Vu'^2													
3		/2g/788/Eh/Ep													
		(1000.Mu1/g.l).(1+Gg/Ag)													
4	<u>Mup2</u>	<u>Muh2.Rp</u>	Lb												
5	<u>M'2</u>	<u>Mup2+Mu</u>	Lb												
6															
7	Muh3	Mu2.Vu^2													
8		-Mu2.Vu'^2													
9		/2g/788/Eh/Ep													
		(1000.Mu2/g.l).(1+Gg/Ag)													
10	<u>Mup3</u>	<u>Muh3.Rp</u>	Lb												
11	<u>Mu3</u>	<u>Mup3+Mu</u>	Lb												
12		p1		32.2											
13	<u>Vu(f/s)</u>	<u>Ep</u>	<u>Prr</u>	<u>Ag</u>	<u>Gg</u>	<u>Mu</u>	<u>Muh1</u>	<u>Mup1</u>	<u>Mu1</u>	<u>Muh2</u>	<u>Mup2</u>	<u>Mu2</u>	<u>Muh3</u>	<u>Mup3</u>	<u>Mu3</u>
14	<u>25000</u>	1.00	9.0	2.6	0.0	<u>24000</u>	380	3420	27420	434	3907	27907	442	3976	27976
15	24000	1.00	9.0	2.5	0.2	27976	425	3823	31800	483	4346	32322	491	4417	32393
16	23000	1.00	9.0	2.4	0.8	32393	471	4239	36632	533	4793	37187	541	4866	37259
17	22000	1.00	9.0	2.3	1.6	37259	518	4659	41918	582	5241	42501	590	5314	42573
18	21000	1.00	9.0	2.2	2.8	42573	564	5076	47650	631	5681	48255	639	5753	48327
19	20000	1.00	9.0	2.1	4.2	48327	609	5481	53808	678	6103	54429	686	6173	54500
20	19000	1.00	9.0	2.0	5.7	54500	652	5865	60365	722	6496	60996	729	6563	61063
21	18000	1.00	9.0	1.9	7.5	61063	691	6216	67280	761	6849	67912	768	6913	67977
22	17000	1.00	9.0	1.8	9.3	67977	725	6525	74502	795	7151	75128	801	7211	75188
23	16000	0.99	9.0	1.7	11.2	75188	761	6849	82037	830	7473	82660	837	7529	82717
24	15000	0.99	9.0	1.6	13.2	82717	783	7049	89767	850	7650	90367	856	7701	90418
25	<u>14000</u>	0.99	9.0	<u>1.5</u>	<u>15.2</u>	<u>90418</u>	797	7175	97593	860	7744	98162	865	7789	98207
26	13000	0.99	9.0	1.4	17.1	98207	802	7217	105424	861	7747	105954	865	7786	105993
27	12000	0.99	9.0	1.3	19.1	105993	796	7167	113161	850	7652	113645	854	7684	113678
28	11000	0.99	9.0	1.2	20.9	113678	780	7020	120698	828	7453	121131	831	7480	121158
29	10000	0.99	9.0	1.1	22.7	121158	752	6772	127929	794	7150	128307	797	7171	128328
30	9000	0.99	9.0	1.0	24.4	128328	713	6420	134748	749	6740	135069	751	6756	135085
31	8000	0.99	9.0	0.9	25.9	135085	663	5966	141051	692	6229	141314	693	6241	141325
32	7000	0.99	9.0	0.9	27.3	141325	601	5413	146738	624	5619	146945	625	5627	146953
33	6000	0.99	9.0	0.8	28.6	146953	530	4768	151720	547	4922	151874	547	4927	151879
34	5000	0.99	9.0	0.8	29.7	151879	448	4035	155915	460	4142	156021	461	4145	156024
35	4000	0.99	9.0	0.7	30.6	156024	359	3231	159255	366	3297	159321	367	3299	159323
36	3000	0.98	9.0	0.6	31.3	159323	266	2391	161714	270	2427	161749	270	2427	161750
37	2000	0.95	9.0	0.5	31.8	161750	169	1519	163268	170	1533	163282	170	1533	163282
38	1000	0.9	9.0	0.4	32.1	163282	63	570	163852	64	572	163854	64	572	163854
39	0	0.8	9.0	0.3	32.2	<u>163854</u>									

Trajectory;

40	<u>Vu(f/s)</u>	<u>Ep</u>	<u>Prr</u>	<u>Ag</u>	<u>Gg</u>	<u>TAN</u>	<u>Phi</u>	<u>COS</u>	<u>dT(s)</u>	<u>T(s)</u>	<u>dH(ft)</u>	<u>H(ft)</u>	<u>H(mi)</u>	<u>dL(mi)</u>	<u>L(mi)</u>
41	25000	1	9.0	2.0	.0	0.00	0	1.00	16	825	0	491350	93	73.5	728.4
42	24000	1	9.0	2.0	.2	0.01	1	0.99	16	810	95	491350	93	70.1	654.8
43	23000	1	9.0	2.0	.8	0.02	3	0.98	16	794	366	491255	93	66.0	584.7
44	22000	1	9.0	2.0	1.6	0.05	6	0.95	16	779	790	490889	93	61.4	518.7
45	21000	1	9.0	2.0	2.8	0.09	10	0.91	16	763	1346	490098	93	56.4	457.2
46	20000	1	9.0	2.0	4.2	0.13	15	0.87	16	748	2012	488752	93	51.2	400.8
47	19000	1	9.0	2.0	5.7	0.18	21	0.82	16	732	2771	486740	92	45.9	349.6
48	18000	1	9.0	1.9	7.5	0.23	27	0.77	16	716	3791	483969	92	42.8	303.7
49	17000	1	9.0	1.8	9.3	0.29	33	0.71	17	700	4986	480178	91	39.5	260.9
50	16000	0.99	9.0	1.7	11.2	0.35	40	0.65	18	683	6368	475192	90	36.1	221.4
51	15000	0.99	9.0	1.6	13.2	0.41	46	0.59	19	665	7950	468824	89	32.6	185.4
52	14000	0.99	9.0	1.5	15.2	0.47	52	0.53	21	645	9755	460874	87	29.0	152.8
53	13000	0.99	9.0	1.4	17.1	0.53	58	0.47	22	624	11808	451119	85	25.5	123.8
54	12000	0.99	9.0	1.3	19.1	0.59	63	0.41	24	602	14149	439311	83	22.1	98.2
55	11000	0.99	9.0	1.2	20.9	0.65	68	0.35	26	578	16829	425162	81	18.9	76.1
56	10000	0.99	9.0	1.1	22.7	0.71	72	0.29	28	553	19921	408333	77	15.7	57.3
57	9000	0.99	9.0	1.0	24.4	0.76	76	0.24	31	524	23528	388412	74	12.8	41.5
58	8000	0.99	9.0	0.9	25.9	0.81	79	0.19	35	493	27801	364884	69	10.2	28.7
59	7000	0.99	9.0	0.9	27.3	0.85	82	0.15	37	459	31032	337082	64	7.3	18.5
60	6000	0.99	9.0	0.8	28.6	0.89	84	0.11	41	422	36775	306050	58	5.3	11.2
61	5000	0.99	9.0	0.8	29.7	0.92	86	0.08	41	381	38161	269275	51	3.1	6.0
62	4000	0.99	9.0	0.7	30.6	0.95	88	0.05	44	339	42123	231114	44	1.7	2.9
63	3000	0.98	9.0	0.6	31.3	0.97	89	0.03	52	295	50280	188991	36	0.8	1.2
64	2000	0.95	9.0	0.5	31.8	0.99	90	0.01	62	243	61319	138711	26	0.3	0.3
65	1000	0.9	9.0	0.4	32.1	1.00	90	0.00	78	181	77392	77392	15	0.0	0.0
66	0	0.8	9.0	0.3	32.2	1.00	90	0.00	104	104	0	0	0	0.0	0.0

sec **825**
min **14**

ft **491350**
mi **93**



Column P =height (miles)
Column O =gradient (miles)
Column N =down range (miles)

Trajectory (takeoff-to-orbit: reversed) (kinetic model)