

ELEMENTS AND OPPOSITION DATES OF CENTAURS AND TRANSNEPTUNIAN OBJECTS

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2021 JULY 5.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	$\omega$	$\Omega$	<i>i</i>	<i>e</i>	$\mu$	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
2060 Chiron	5.8	X	180.77494	339.70600	209.27483	6.92981	0.3772113	0.01943445	13.70	8.5	18.9	Ct	10 2.7	18.6
5145 Pholus	7.1	X	117.30327	354.77354	119.44005	24.61691	0.5698408	0.01073807	20.35	8.8	31.9	Ct	6 25.4	21.7
7066 Nessus	9.6	X	86.52700	171.02889	31.31864	15.63373	0.5162273	0.00804107	24.68	11.9	37.4	Ct	9 11.1	24.4
8405 Asbolus	9.1	X	88.92304	290.53425	5.84993	17.61472	0.6215948	0.01288304	18.02	6.8	29.2	Ct	12 16.9	22.9
10199 Chariklo	6.7	X	99.80700	243.11990	300.43567	23.35227	0.1680406	0.01564459	15.83	13.2	18.5	Ct	7 24.4	18.9
10370 Hylonome	8.6	X	74.34665	7.16688	178.26066	4.14081	0.2443178	0.00781444	25.15	19.0	31.3	Ct	7 9.8	22.6
15760 Albion	7.3	X	33.69721	2.49879	359.24198	2.17814	0.0738763	0.00336598	44.10	40.8	47.4	Tn	11 2.9	23.4
15788 1993 SB	7.9	X	358.16517	78.87353	354.64043	1.93567	0.3194998	0.00399980	39.30	26.7	51.9	Tn	12 2.9	22.1
15789 1993 SC	7.0	X	72.19093	317.87524	354.48712	5.14547	0.1887485	0.00394611	39.66	32.2	47.1	Tn	11 7.9	22.9
15807 1994 GV <sub>9</sub>	7.4	X	82.20714	303.43001	176.69831	0.56172	0.0580982	0.00341699	43.66	41.1	46.2	Tn	4 18.9	23.8
15809 1994 JS	7.8	X	357.23238	237.77058	56.33940	14.04261	0.2242358	0.00354393	42.61	33.1	52.2	Tn	7 13.0	23.0
15810 Arawn	7.7	X	34.34704	104.91089	144.81357	3.79627	0.1213766	0.00394468	39.67	34.9	44.5	Tn	7 15.3	23.2
15820 1994 TB	7.3	X	3.77857	98.66773	317.24628	12.14496	0.3174471	0.00397050	39.50	27.0	52.0	Tn	11 25.2	21.6
15836 1995 DA <sub>2</sub>	7.7	X	69.06756	331.07917	127.58809	6.56617	0.0715328	0.00452343	36.21	33.6	38.8	Tn	3 17.7	23.2
15874 1996 TL <sub>66</sub>	5.3	X	9.56441	184.24412	217.73359	23.97129	0.5806193	0.00129471	83.37	35.0	131.8	Sd	12 14.7	21.2
15875 1996 TP <sub>66</sub>	7.0	X	31.12804	74.86935	316.63610	5.70379	0.3312546	0.00399750	39.32	26.3	52.3	Tn	12 24.6	21.8
15883 1997 CR <sub>29</sub>	7.1	X	75.23141	299.27190	127.30082	19.20018	0.2121737	0.00308178	46.77	36.8	56.7	Tn	3 10.1	23.8
16684 1994 JQ <sub>1</sub>	6.7	X	329.84084	252.80046	25.74402	3.75182	0.0540972	0.00335133	44.22	41.8	46.6	Tn	5 25.7	23.0
19255 1994 VK <sub>8</sub>	7.0	X	264.28804	122.27174	72.34285	1.48547	0.0313978	0.00354141	42.63	41.3	44.0	Tn	12 27.8	23.3
19299 1996 SZ <sub>4</sub>	7.9	X	15.29602	29.66759	15.85067	4.73198	0.2586060	0.00395966	39.57	29.3	49.8	Tn	12 4.7	22.7
19308 1996 TO <sub>66</sub>	4.7	X	140.09649	242.73584	355.11688	27.34785	0.1171178	0.00343887	43.47	38.4	48.6	Tn	10 10.7	21.5
19521 Chaos	4.8	X	345.10774	56.46601	49.95284	12.03191	0.1000471	0.00320246	45.58	41.0	50.1	Tn	12 20.1	21.0
20000 Varuna	3.6	X	119.35441	263.21959	97.35024	17.20909	0.0575686	0.00352932	42.72	40.3	45.2	Tn	1 25.9	20.1
20108 1995 QZ <sub>9</sub>	7.7	X	66.19525	143.29127	187.91423	19.53005	0.1493535	0.00396419	39.54	33.6	45.4	Tn	11 18.9	23.5
20161 1996 TR <sub>66</sub>	7.5	X	58.40340	310.09854	342.86834	12.39739	0.4009768	0.00295371	48.11	28.8	67.4	Tn	10 27.7	24.1
24835 1995 SM <sub>55</sub>	4.6	X	337.05014	69.83976	20.95948	27.01217	0.1031345	0.00364872	41.79	37.5	46.1	Tn	11 17.9	20.4
24952 1997 QJ <sub>4</sub>	7.5	X	346.14411	81.37765	346.70117	16.54259	0.2270971	0.00397848	39.44	30.5	48.4	Tn	11 3.1	22.4
24978 1998 HJ <sub>151</sub>	7.5	X	72.30234	132.51097	50.49190	2.39732	0.0468257	0.00343448	43.51	41.5	45.5	Tn	6 11.3	23.8
26181 1996 GQ <sub>21</sub>	4.7	X	12.59655	356.82354	194.26281	13.36471	0.5891072	0.00192924	93.34	38.4	148.3	Sd	5 27.1	21.3
26308 1998 SM <sub>165</sub>	5.5	X	50.38686	131.40417	183.02762	13.47389	0.3745600	0.00297180	47.91	30.0	65.9	Tn	11 12.1	21.8
26375 1999 DE <sub>9</sub>	4.8	X	31.37310	158.98999	323.13516	7.63716	0.4138288	0.00241527	55.02	32.2	77.8	Sd	3 30.8	20.8
28978 Ixion	3.6	X	290.23106	298.52068	71.02536	19.61340	0.2464250	0.00392944	39.77	30.0	49.6	Tn	6 21.7	19.5
29981 1999 TD <sub>10</sub>	8.7	X	8.19869	172.51355	184.53088	5.96352	0.8736004	0.00103615	96.72	12.2	181.2	Sd	1 6.6	23.8
31824 Elatus	10.1	X	205.05401	281.55475	87.14273	5.24576	0.3844199	0.02440518	11.77	7.2	16.3	Ct	4 11.9	22.1
32532 Thereus	9.1	X	231.90918	87.15240	205.19809	20.37165	0.2005035	0.02853941	10.60	8.5	12.7	Ct	2 10.1	20.0
32929 1995 QY <sub>9</sub>	8.4	X	21.71095	25.13427	341.89859	4.82721	0.2671926	0.00392140	39.83	29.2	50.5	Tn	11 6.7	23.2
33001 1997 CU <sub>29</sub>	6.0	X	239.48048	276.13079	350.06087	1.46358	0.0408809	0.00347267	43.19	41.4	45.0	Tn	2 10.3	22.4
33128 1998 BU <sub>48</sub>	6.7	X	82.96837	281.59940	132.89961	14.28004	0.3839499	0.00517296	33.11	20.4	45.8	Sd	3 23.6	22.3
33340 1998 VG <sub>44</sub>	6.5	X	11.55221	323.67366	127.93212	3.04179	0.2484268	0.00404092	39.04	29.3	48.7	Tn	1 10.3	21.2
35671 1998 SM <sub>165</sub>	5.5	X	301.69811	257.84828	192.06839	4.59851	0.0421690	0.00419818	38.06	36.5	39.7	Tn	10 21.8	21.2
38083 Rhadamanthus	7.1	X	108.73297	79.07560	10.07128	12.78375	0.1522196	0.00406144	38.91	33.0	44.8	Tn	4 20.8	23.3
38084 1999 HB <sub>12</sub>	6.8	X	1.91044	66.93279	166.55336	13.15732	0.4166444	0.00236300	55.82	32.6	79.1	Sd	5 21.7	22.0
38628 Huva	4.8	X	8.84721	68.48162	169.44314	15.47466	0.2792107	0.00395295	39.61	28.6	50.7	Tn	6 6.3	19.4
40314 1999 KR <sub>16</sub>	5.5	X	350.65909	59.22245	205.68230	24.83276	0.3081595	0.00287047	49.03	33.9	64.1	Tn	5 27.8	20.9
42301 2001 UR <sub>163</sub>	4.1	X	80.79005	344.53971	301.38158	0.75314	0.2861713	0.00264173	51.83	37.0	66.7	Sd	11 1.7	21.4
42355 Typhon	7.6	X	23.59099	158.90941	352.09294	2.43349	0.5344014	0.00425903	37.69	17.5	57.8	Sd	5 4.8	21.3
44594 1999 OX <sub>3</sub>	7.0	X	355.06213	144.10334	259.07643	2.62481	0.4583037	0.00531942	32.50	17.6	47.4	Sd	10 22.8	19.5
45802 2000 PV <sub>29</sub>	8.0	X	58.83047	98.34066	173.31160	1.17914	0.0137093	0.00339829	43.82	43.2	44.4	Tn	8 25.1	24.4
47171 Lempo	4.8	X	9.25244	294.49915	97.03473	8.42154	0.2277622	0.00396231	39.55	30.5	48.6	Tn	11 12.0	19.7
47932 2000 GN <sub>171</sub>	6.2	X	16.20013	195.87745	26.16736	10.82401	0.2830608	0.00396851	39.51	28.3	50.7	Tn	5 31.3	20.9
48639 1995 TL <sub>8</sub>	4.8	X	47.08697	84.70663	260.08866	0.24919	0.2413782	0.00257660	52.70	40.0	65.4	Sd	11 19.4	21.4
49036 Pelion	10.4	X	114.75578	154.25709	126.77007	9.35027	0.1367099	0.01101470	20.01	17.3	22.7	Ct	11 15.2	23.7
49673 1999 RA <sub>215</sub>	7.7	X	316.25834	266.20761	132.21662	22.46856	0.1074789	0.00343609	43.49	38.8	48.2	Tn	9 11.6	23.8
50000 Quaoar	2.4	X	299.37953	150.65318	189.02219	7.99062	0.0415753	0.00342178	43.61	41.8	45.4	Tn	6 26.1	18.7
52747 1998 HM <sub>151</sub>	7.9	X	322.42017	247.00052	64.11271	0.54949	0.0654685	0.00330121	44.67	41.7	47.6	Tn	6 19.9	24.2
52872 Okyrhoe	10.8	X	200.82518	337.62625	173.07799	15.64042	0.3031648	0.04066990	8.37	5.8	10.9	Ct	9 5.9	21.0
52975 Cyllarus	9.4	X	85.82682	300.68598	51.92772	12.63649	0.3812766	0.00739543	26.09	16.1	36.0	Ct	1 21.0	24.0
53311 Deucalion	6.6	X	305.30927	242.35194	51.36216	0.37243	0.0655719	0.00336091	44.14	41.2	47.0	Tn	5 13.2	22.9
54520 2000 PJ <sub>30</sub>	8.0	X	12.36584	304.55120	293.11934	5.68806	0.7709775	0.00069781	125.89	28.8	222.9	Sd	8 23.0	25.3
54598 Bienor	7.5	X	324.76806	152.94472	337.70131	20.74567	0.1994994	0.01474375	16.47	13.2	19.8	Ct	12 14.2	19.0
55565 2002 AW <sub>197</sub>	3.3	X	294.93297	298.15840	297.59518	24.44514	0.1281074	0.00306518	46.94	40.9	52.9	Tn	2 16.6	19.9
55576 Amycus	7.8	X	52.45995	239.75406	315.57312	13.31172	0.3924985	0.00781247	25.15	15.3	35.0	Ct	7 17.2	21.3
55636 2002 TX <sub>300</sub>	3.5	X	77.53106	341.94892	324.38061	25.82789	0.1262009	0.00344461	43.42	37.9	48.9	Tn	10 20.2	19.9
55637 2002 UX <sub>25</sub>	3.7	X	302.94402	276.41139	204.58509	19.41116	0.1398329	0.00352997	42.72	36.7	48.7	Tn	11 13.2	19.7
55638 2002 VE <sub>95</sub>	5.3	X	29.38327	206.35613	199.72327	16.32671	0.2875769	0.00401948	39.18	27.9	50.4	Tn	12 29.7	20.2
58534 Logos	6.6	X	67.84142	334.45568	132.66281	2.90156	0.1168860	0.00326541	45.00	39.7	50.3	Tn	3 29.4	23.0
59358 1999 CL <sub>158</sub>	6.9	X	54.48971	326.76161	120.18221	10.04768	0.2050666	0.00372881	41.19	32.7	49.6	Tn	3 5.9	22.7
60454 2000 CH <sub>105</sub>	6.4	X	302.70517	294.39647	320.42700	1.16978	0.0864802	0.00336001	44.15	40.3	48.0	Tn	3 28.7	22.6
60458 2000 CM <sub>114</sub>	6.7	X	343.92101	252.00688	312.42561	19.75092	0.4003922	0.00217287	59.04	35.4	82.7	Sd	2 27.5	22.5
60558 Echeclus	9.5	X	63.54733	163.09856	173.21967	4.34326	0.4574151							

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Planet	<i>H</i>	<i>G</i>	<i>M</i>	$\omega$	$\Omega$	<i>i</i>	<i>e</i>	$\mu$	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
69990 1998 WU <sub>31</sub>	8.1	X	54.94655	140.65707	237.17302	6.58272	0.1877524	0.00402400	39.15	31.8	46.5	Tn	12 25.1	23.7
73480 2002 PN <sub>34</sub>	8.5	X	40.62841	358.83356	299.00130	16.64462	0.5709138	0.00567920	31.11	13.4	48.9	Sd	11 4.9	22.7
76803 2000 PK <sub>30</sub>	7.3	X	69.34671	130.03032	127.27986	33.64894	0.1244332	0.00406232	38.90	34.1	43.7	Tn	9 6.6	23.1
78799 2002 XW <sub>93</sub>	5.5	X	147.77444	248.00693	46.78547	14.34993	0.2526604	0.00430609	37.42	28.0	46.9	Tn	12 26.5	22.1
79360 Sila-Nunam	5.2	X	302.98865	258.01136	304.45086	2.25614	0.0064911	0.00342541	43.58	43.3	43.9	Tn	2 12.8	21.6
79969 1999 CP <sub>133</sub>	7.4	X	62.11870	156.30302	334.41233	3.18683	0.0800997	0.00480168	34.80	32.0	37.6	Tn	4 9.8	22.7
84927 1999 CC <sub>158</sub>	5.7	X	49.34219	100.23242	336.99543	18.81215	0.2729557	0.00251845	53.50	38.9	68.1	Sd	2 24.2	22.4
79983 1999 DF <sub>9</sub>	5.8	X	25.62403	176.78313	334.95827	9.84791	0.1379453	0.00314320	46.16	39.8	52.5	Tn	3 23.2	21.9
80806 2000 CM <sub>105</sub>	6.6	X	109.31035	0.68451	45.56568	3.75978	0.0675598	0.00362976	41.93	39.1	44.8	Tn	3 4.3	22.9
82075 2000 YW <sub>134</sub>	4.5	X	35.94721	314.96480	127.00474	19.86620	0.2856093	0.00226722	57.39	41.0	73.8	Sd	2 13.2	21.2
82155 2001 FZ <sub>173</sub>	6.1	X	4.79939	199.51408	2.49824	12.73799	0.6193912	0.00125316	85.21	32.4	138.0	Sd	5 3.9	21.4
82157 2001 FM <sub>185</sub>	6.9	X	289.86925	118.02478	150.86337	5.37838	0.0606219	0.00413349	38.45	36.1	40.8	Tn	4 2.9	22.7
82158 2001 FP <sub>185</sub>	6.2	X	2.00132	7.01933	179.44752	30.83835	0.8402410	0.00031341	214.65	34.3	395.0	Sd	5 8.6	22.1
83982 Crantor	8.8	X	79.49411	94.01335	117.37708	12.75141	0.2749442	0.001143416	19.51	14.1	24.9	Ct	8 17.1	21.8
84522 2002 TC <sub>302</sub>	3.9	X	327.19239	86.32409	23.80081	34.99219	0.2913931	0.00239857	55.27	39.2	71.4	Sd	11 5.4	20.3
84719 2002 VR <sub>128</sub>	4.9	X	80.13273	288.69295	22.99750	13.99083	0.2672617	0.00396931	39.51	28.9	50.1	Tn	11 22.4	21.0
84922 2003 VS <sub>2</sub>	4.2	X	27.12969	110.31399	302.60602	14.82516	0.0755501	0.00399316	39.35	36.4	42.3	Tn	12 17.8	19.9
85627 1998 HP <sub>151</sub>	7.4	X	321.74769	250.62586	56.02072	1.51787	0.0929313	0.00335022	44.23	40.1	48.3	Tn	6 12.1	23.5
85633 1998 KR <sub>65</sub>	6.7	X	276.74537	316.23508	101.96276	1.19030	0.0303771	0.00339046	43.88	42.6	45.2	Tn	8 25.3	23.1
86047 1999 OY <sub>3</sub>	6.8	X	65.66442	307.52823	301.72297	24.15792	0.1720678	0.00335216	44.22	36.6	51.8	Tn	8 20.4	23.1
86177 1999 RY <sub>215</sub>	7.1	X	353.57188	50.46332	326.50186	22.12464	0.2428001	0.00319840	45.62	34.5	56.7	Tn	9 21.2	22.5
87269 2000 OM <sub>67</sub>	9.2	X	0.38459	212.50861	142.18565	20.07358	0.9661199	0.00006503	612.45	20.7	1204.1	Sd	11 29.2	24.0
87555 2000 QB <sub>243</sub>	8.2	X	50.26815	285.19798	329.97818	6.75813	0.5638714	0.00472381	35.18	15.3	55.0	Sd	10 4.4	23.3
88267 2001 KE <sub>76</sub>	7.2	X	104.02505	44.29170	112.97710	0.49928	0.0206182	0.00347361	43.18	42.3	44.1	Tn	6 14.7	23.6
88268 2001 KK <sub>76</sub>	6.3	X	322.83511	226.28475	86.96560	1.88767	0.0228018	0.00352683	42.74	41.8	43.7	Tn	6 26.1	22.5
88269 2001 KF <sub>77</sub>	9.5	X	10.56893	266.91819	14.71195	4.35621	0.2441834	0.00735072	26.20	19.8	32.6	Ct	7 23.6	22.5
88611 Teharonhiawako	5.8	X	154.05837	247.75076	304.52732	2.56903	0.0207724	0.00333503	44.37	43.4	45.3	Tn	9 9.6	22.4
90377 Sedna	1.3	X	358.25439	311.12812	144.20973	11.93118	0.8474319	0.00008805	500.38	76.3	924.4	Sd	11 23.4	20.6
90482 Orcus	2.2	X	182.84796	72.70617	268.72493	20.58485	0.2289798	0.00402970	39.11	30.2	48.1	Tn	2 22.6	19.1
90568 2004 GV <sub>9</sub>	3.0	X	41.40487	294.21259	250.63673	21.96270	0.0750086	0.00362431	41.97	38.8	45.1	Tn	5 12.4	19.8
91133 1998 HK <sub>151</sub>	7.6	X	31.82677	182.25007	50.28252	5.94355	0.2312722	0.00394793	39.65	30.5	48.8	Tn	7 4.9	22.7
91205 1999 US <sub>43</sub>	8.0	X	68.44356	139.70152	223.82977	10.60518	0.1345232	0.00401698	39.19	33.9	44.5	Tn	12 19.4	23.8
91554 1999 RZ <sub>215</sub>	7.8	X	7.65523	335.91975	341.56693	25.44739	0.7026520	0.00092691	104.18	31.0	177.4	Sd	9 27.2	23.6
95625 2002 GX <sub>32</sub>	7.4	X	22.30708	186.59204	28.24946	13.94798	0.3779734	0.00252700	53.38	33.2	73.6	Sd	6 14.2	23.1
95626 2002 GZ <sub>32</sub>	6.9	X	5.73674	155.94263	107.30945	15.00675	0.2237583	0.00881667	23.21	18.0	28.4	Ct	6 24.4	19.5
118228 1996 TQ <sub>66</sub>	6.9	X	33.63608	18.57024	10.61240	14.64954	0.1231930	0.00398683	39.39	34.5	44.2	Tn	12 1.9	22.5
118378 1999 HT <sub>11</sub>	7.6	X	328.28291	189.34320	87.95258	5.04905	0.1168773	0.00339354	43.86	38.7	49.0	Tn	5 19.1	23.6
118379 1999 HC <sub>12</sub>	7.6	X	69.69151	95.99750	57.93677	15.34622	0.2310746	0.00322439	45.38	34.9	55.9	Tn	5 29.7	24.0
118698 2000 OY <sub>51</sub>	8.2	X	334.95030	81.08537	284.93978	11.18614	0.2387524	0.00336540	44.10	33.6	54.6	Tn	8 15.5	23.7
118702 2000 OM <sub>67</sub>	6.8	X	11.56474	349.15732	326.97638	23.30162	0.6088529	0.00098130	100.29	39.2	161.4	Sd	9 23.6	23.5
119066 2001 KJ <sub>76</sub>	6.8	X	317.84867	270.19869	47.71328	6.73856	0.0849467	0.00338343	43.94	40.2	47.7	Tn	6 19.8	23.0
119067 2001 KP <sub>76</sub>	6.6	X	303.71249	302.61788	42.86515	7.21054	0.1936464	0.00339325	43.86	35.4	52.4	Tn	6 19.4	22.7
119068 2001 KC <sub>77</sub>	6.7	X	17.56533	180.92145	57.84728	12.90436	0.3614871	0.00237775	55.59	35.5	75.7	Sd	6 28.8	22.5
119069 2001 KN <sub>77</sub>	7.1	X	326.17240	279.74334	45.44946	2.36332	0.2462108	0.00397897	39.44	29.7	49.2	Tn	6 22.2	22.2
119070 2001 KP <sub>77</sub>	7.0	X	23.24257	219.57613	22.15683	3.31741	0.1791287	0.00338031	43.97	36.1	51.8	Tn	6 26.9	22.7
119315 2001 SQ <sub>73</sub>	9.6	X	140.38188	303.81254	16.13192	17.43986	0.1784715	0.01357535	17.40	14.3	20.5	Ct	1 13.1	22.6
119473 2001 UO <sub>18</sub>	7.8	X	350.52254	46.97356	36.31955	3.66746	0.2848049	0.00395820	39.58	28.3	50.9	Tn	11 28.7	22.3
119878 2002 CJ <sub>224</sub>	6.1	X	28.53432	150.74565	37.11539	15.77788	0.3412361	0.00252338	53.43	35.2	71.7	Sd	2 28.9	22.1
119951 2002 KX <sub>14</sub>	4.7	X	274.03466	67.29582	287.11067	0.39845	0.0470409	0.00404989	38.98	37.1	40.8	Tn	6 14.1	20.6
119956 2002 PA <sub>149</sub>	6.2	X	89.16530	155.46604	105.47774	4.04845	0.1747955	0.00338876	43.90	36.2	51.6	Tn	10 5.1	22.7
119976 2002 VR <sub>130</sub>	11.1	X	49.69643	218.17174	181.81669	3.52752	0.3842974	0.00847287	23.83	14.7	33.0	Ct	1 30.9	24.2
119979 2002 WC <sub>19</sub>	4.7	X	321.05093	44.84277	109.67867	9.20185	0.2579724	0.00299949	47.62	35.3	59.9	Tn	12 24.4	20.7
120061 2003 CO <sub>1</sub>	8.9	X	56.20366	116.84237	78.45333	19.72659	0.4720173	0.01037132	20.82	11.0	30.7	Ct	8 2.3	21.9
120132 2003 FY <sub>128</sub>	4.6	X	34.93611	174.45247	341.91159	11.80157	0.2469612	0.00285204	49.25	37.1	61.4	Tn	4 18.1	20.7
120178 2003 OP <sub>32</sub>	4.0	X	72.93216	72.82258	183.04894	27.09910	0.1079223	0.00342955	43.55	38.8	48.2	Tn	9 1.9	20.3
120181 2003 UR <sub>292</sub>	7.0	X	18.00160	247.76470	146.37697	2.71963	0.1743095	0.00534755	32.39	26.7	38.0	Tn	11 23.9	21.3
120216 2004 EW <sub>95</sub>	6.3	X	4.47094	205.10082	25.78603	29.30415	0.3173729	0.00396676	39.52	27.0	52.1	Tn	5 12.5	20.7
120347 Salacia	4.1	X	123.74844	313.18179	279.92948	23.92249	0.1038059	0.00358295	42.30	37.9	46.7	Tn	9 17.9	20.7
120348 2004 TY <sub>364</sub>	4.3	X	276.94121	356.60588	140.31617	24.83189	0.0626608	0.00405888	38.92	36.5	41.4	Tn	11 16.2	20.2
121725 Aphidas	8.6	X	226.47213	215.90939	103.89013	6.78342	0.4663988	0.01301204	17.90	9.6	26.3	Ct	3 1.6	22.6
123509 2000 WK <sub>183</sub>	6.5	X	337.01648	290.57473	185.63192	1.96955	0.0408119	0.00335076	44.23	42.4	46.0	Tn	12 23.8	22.8
126154 2001 YH <sub>140</sub>	5.3	X	29.28098	353.66889	108.91123	11.09984	0.1359290	0.00361428	42.05	36.3	47.8	Tn	2 10.4	21.0
126155 200														

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ECLIPTIC AND EQUINOX 2000.0, EPOCH 2021 JULY 5.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	$\omega$	$\Omega$	<i>i</i>	<i>e</i>	$\mu$	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
135182 2001 QT <sub>322</sub>	6.2	X	89.27598	66.72201	224.22031	1.84134	0.0212196	0.00433503	37.25	36.5	38.0	Tn	10 16.3	21.9
135571 2002 GG <sub>32</sub>	7.2	X	357.90303	231.40879	35.81952	14.69245	0.3574355	0.00236519	55.79	35.8	75.7	Sd	6 11.7	22.8
135742 2002 PB <sub>171</sub>	6.9	X	70.45121	292.45721	336.72107	5.42740	0.1276194	0.00337699	44.00	38.4	49.6	Tn	9 16.5	23.2
136108 Haumea	0.2	X	218.58550	239.34414	122.15633	28.21336	0.1977923	0.00348905	43.05	34.5	51.6	Tn	4 28.5	17.3
136120 2003 LG <sub>7</sub>	7.9	X	17.84879	342.95835	238.34749	20.09632	0.4809335	0.00198627	62.68	32.5	92.8	Sd	6 23.7	23.6
136199 Eris	-1.1	X	206.91127	151.44001	36.00799	43.90756	0.4334287	0.00175740	68.01	38.5	97.5	Sd	10 21.8	18.7
136204 2003 WL <sub>7</sub>	8.7	X	41.37299	69.99629	4.62161	11.18318	0.2557168	0.01098243	20.04	14.9	25.2	Ct	2 10.5	20.9
136472 Makemake	-0.1	X	166.62339	294.98126	79.53498	28.99424	0.1643202	0.00323094	45.32	37.9	52.8	Tn	4 9.1	17.2
137294 1999 RE <sub>215</sub>	6.4	X	76.19283	117.88268	149.26202	1.35086	0.1085190	0.00322825	45.34	40.4	50.3	Tn	9 19.2	22.9
137295 1999 RB <sub>216</sub>	7.3	X	8.02595	208.33955	175.63533	12.67017	0.2965968	0.00298122	47.81	33.6	62.0	Tn	11 4.7	22.6
138537 2000 OK <sub>67</sub>	6.0	X	359.09245	358.19185	4.37945	4.87143	0.1466909	0.00306608	46.93	40.0	53.8	Tn	9 24.9	22.0
138628 2000 QM <sub>251</sub>	7.2	X	50.69303	314.54360	355.50703	15.67057	0.2710631	0.00326231	45.02	32.8	57.2	Tn	10 19.3	23.2
139775 2001 QG <sub>298</sub>	6.8	X	15.51882	208.95729	162.43654	6.48182	0.1976202	0.00396147	39.56	31.7	47.4	Tn	10 30.6	21.9
143685 2003 SS <sub>317</sub>	7.8	X	16.74127	197.45084	177.56300	5.89746	0.2394351	0.00444860	36.61	27.8	45.4	Tn	11 7.2	22.3
143707 2003 UY <sub>117</sub>	5.7	X	14.56426	112.18342	265.13748	7.54784	0.4189726	0.00236372	55.81	32.4	79.2	Sd	11 17.3	21.1
143751 2003 US <sub>292</sub>	8.7	X	22.70123	346.61193	29.15826	7.64163	0.2558156	0.00358260	42.30	31.5	53.1	Tn	11 16.4	23.9
143991 2003 YO <sub>179</sub>	5.8	X	330.08224	64.88679	66.91499	19.40339	0.1320832	0.00333177	44.40	38.5	50.3	Tn	12 24.6	21.8
144897 2004 UX <sub>10</sub>	4.4	X	97.86213	156.75725	147.79144	9.52748	0.0441053	0.00403238	39.09	37.4	40.8	Tn	11 12.8	20.4
145451 2005 RN <sub>43</sub>	4.4	X	6.98840	318.01619	84.61588	28.79021	0.6136887	0.00114010	90.75	35.1	146.4	Sd	12 11.8	20.2
145452 2005 RN <sub>43</sub>	3.7	X	353.27236	167.08540	187.02520	19.23282	0.0298410	0.00364110	41.85	40.6	43.1	Tn	9 8.3	19.8
145453 2005 RR <sub>43</sub>	4.0	X	50.81860	278.79453	85.81001	28.54674	0.1414731	0.00346518	43.25	37.1	49.4	Tn	12 5.1	20.0
145474 2005 QM <sub>278</sub>	6.1	X	353.76607	276.85578	170.24491	16.26068	0.6415817	0.00111015	92.37	33.1	151.6	Sd	11 17.6	21.6
145480 2005 TB <sub>190</sub>	4.4	X	2.54598	171.23169	180.45060	26.42072	0.3981283	0.00146544	76.76	46.2	107.3	Sd	9 21.3	21.1
145486 2005 UJ <sub>438</sub>	10.8	X	53.89675	208.00623	263.01592	3.78251	0.5299241	0.01336736	17.58	8.3	26.9	Ct	5 7.1	22.9
148112 1999 RA <sub>216</sub>	7.1	X	88.55758	94.33384	192.06953	0.79335	0.0424000	0.00335553	44.19	42.3	46.1	Tn	10 13.6	23.5
148209 2000 CR <sub>105</sub>	6.3	X	6.43589	316.17616	128.37546	22.82296	0.7959352	0.00031151	215.52	44.0	387.1	Sd	2 27.2	24.3
148780 Altjira	5.8	X	127.71169	300.65001	1.65072	5.19422	0.0652695	0.00335519	44.19	41.3	47.1	Tn	12 7.7	22.4
148975 2001 XA <sub>255</sub>	11.1	X	25.57532	90.75538	105.89864	12.60992	0.6754728	0.00633333	28.93	9.4	48.5	Ct	7 24.0	23.8
149348 2002 VS <sub>130</sub>	6.3	X	64.14789	87.74800	275.49018	2.99828	0.1238507	0.00326478	45.00	39.4	50.6	Tn	12 13.6	22.6
149349 2002 VA <sub>131</sub>	6.5	X	320.89285	254.17152	242.48221	7.07104	0.2379978	0.00358657	42.27	32.2	52.3	Tn	11 21.2	22.0
149560 2003 QZ <sub>91</sub>	8.1	X	39.63039	138.12605	130.70329	34.74917	0.4790953	0.00363568	41.89	21.8	62.0	Sd	10 2.8	23.4
150642 2001 CZ <sub>31</sub>	5.8	X	342.57717	48.58447	136.29363	10.24183	0.1144841	0.00327504	44.91	39.8	50.0	Tn	3 4.6	21.8
160091 2000 OL <sub>67</sub>	6.9	X	70.83966	316.68726	322.45763	1.97378	0.1125117	0.00321730	45.44	40.3	50.6	Tn	9 25.5	23.3
160147 2001 KN <sub>76</sub>	6.6	X	350.46152	287.45981	327.09653	2.64464	0.0910774	0.00339824	43.82	39.8	47.8	Tn	5 23.6	22.6
160148 2001 KV <sub>76</sub>	7.8	X	356.79021	229.28477	39.65773	15.32873	0.5119127	0.00166950	70.37	34.3	106.4	Sd	6 5.9	23.2
160256 2002 PD <sub>149</sub>	6.3	X	234.92305	35.35766	103.44697	4.90611	0.0559677	0.00346821	43.22	40.8	45.6	Tn	10 4.4	22.8
160427 2005 RL <sub>43</sub>	7.8	X	88.37345	170.77050	162.42167	12.25764	0.0447961	0.00811966	24.52	23.4	25.6	Ct	12 1.9	21.7
168700 2000 QG <sub>147</sub>	8.3	X	25.46515	50.64874	154.85151	4.99044	0.2310620	0.00397565	39.46	30.3	48.6	Tn	5 28.1	23.3
168703 2000 GP <sub>183</sub>	6.0	X	356.00602	222.76634	23.45993	4.92514	0.0777433	0.00391180	39.89	36.8	43.0	Tn	5 21.7	21.7
169071 2001 FR <sub>185</sub>	8.0	X	345.56854	336.64821	287.64899	5.62701	0.1947121	0.00398545	39.40	31.7	47.1	Tn	5 22.9	23.1
174567 Varda	3.4	X	275.76225	180.84937	184.24211	21.51764	0.1446801	0.00315745	46.02	39.4	52.7	Tn	6 15.6	20.1
175113 2004 PF <sub>115</sub>	4.3	X	171.67678	86.09330	84.51742	13.34936	0.0600673	0.00400799	39.25	36.9	41.6	Tn	9 11.7	20.5
181708 1993 FW	6.8	X	351.77866	46.96087	182.98174	7.76029	0.0489137	0.00340699	43.74	41.6	45.9	Tn	5 7.4	20.3
181855 1998 WT <sub>31</sub>	7.3	X	359.91686	40.56691	41.56051	28.67022	0.1804004	0.00317320	45.86	37.6	54.1	Tn	12 9.4	23.1
181867 1999 CV <sub>118</sub>	7.4	X	37.99527	146.78939	305.73885	5.49763	0.2859661	0.00260018	52.38	37.4	67.4	Sd	2 24.4	23.7
181868 1999 CG <sub>119</sub>	7.6	X	335.37283	256.83618	304.36016	16.72205	0.2879311	0.00285644	49.19	35.0	63.4	Tn	2 20.4	23.4
181871 1999 QO <sub>153</sub>	7.4	X	69.94798	155.16555	278.51529	0.80998	0.0829565	0.00344744	43.40	39.8	47.0	Tn	2 20.8	23.7
181874 1999 HW <sub>11</sub>	7.0	X	46.08690	324.64171	198.48758	17.22540	0.2546857	0.00257448	52.72	39.3	66.2	Sd	5 17.2	23.6
181902 1999 RD <sub>215</sub>	7.4	X	8.39650	138.13852	210.27462	25.90204	0.6987233	0.00070839	124.63	37.5	211.7	Sd	11 9.1	24.1
182222 2000 YU <sub>1</sub>	7.1	X	288.10067	315.73824	207.80283	6.10818	0.0936479	0.00343630	43.49	39.4	47.6	Tn	12 13.9	23.4
182223 2000 YC <sub>2</sub>	7.5	X	35.09294	145.64789	227.60775	19.88126	0.3853846	0.00220796	58.41	35.9	80.9	Sd	12 17.8	24.0
182294 2001 KU <sub>76</sub>	6.6	X	359.54726	206.34142	45.04286	10.65932	0.1660397	0.00324481	45.19	37.7	52.7	Tn	5 31.0	22.4
182397 2001 GZ <sub>31</sub>	5.9	X	68.99986	110.54127	140.91948	16.98258	0.2362529	0.00261893	52.13	39.8	64.4	Sd	9 12.9	22.9
182926 2002 FU <sub>6</sub>	7.4	X	313.59364	192.29632	55.37056	2.19751	0.1467193	0.00202326	45.59	38.9	52.3	Tn	3 28.6	23.6
182933 2002 GZ <sub>31</sub>	6.4	X	341.53280	164.74885	117.21477	1.05484	0.2457168	0.00272583	50.75	38.3	63.2	Sd	6 1.6	22.3
182934 2002 GJ <sub>32</sub>	5.4	X	89.36847	254.71464	244.84975	11.59918	0.1057791	0.00334233	44.30	39.6	49.0	Tn	5 21.9	21.9
183595 2003 TG <sub>58</sub>	6.7	X	306.77140	235.78635	276.77955	1.66849	0.1003510	0.00333262	44.39	39.9	48.8	Tn	12 22.0	22.9
183963 2004 DJ <sub>64</sub>	6.8	X	322.30044	133.77773	103.21705	2.44491	0.1012302	0.00335419	44.20	39.7	48.7	Tn	4 1.9	22.9
183964 2004 DJ <sub>71</sub>	7.4	X	5.14656	56.27847	101.70747	11.31489	0.3773813	0.00258555	52.57	37.7	72.4	Sd	3 14.4	22.6
184212 2004 PB <sub>112</sub>	7.3	X	3.06752	3.65861	356.73078	15.40332	0.6787339	0.00085454	109.98	35.3	184.6	Sd	10 12.3	22.9
184314 2005 EO <sub>302</sub>	6.4	X	321.68766	270.26687	0.54539	5.78365	0.1418502	0.00324723	45.16	38.8	51.6	Tn	4 29.6	22.5
187661 2007 JG <sub>43</sub>	9.3	X	42.89960	174.58566	62.53457	33.11134	0.4059678	0.00830634	24.15	14.3				

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ECLIPTIC AND EQUINOX 2000.0, EPOCH 2021 JULY 5.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	$\omega$	$\Omega$	<i>i</i>	<i>e</i>	$\mu$	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
307616 2003 QW <sub>90</sub>	5.0	X	288.32273	83.07869	17.75219	10.33475	0.0745328	0.00337875	43.98	40.7	47.3	Tn	10 14.3	21.3
307982 2004 PG <sub>115</sub>	4.9	X	7.26996	76.05012	230.43840	16.27583	0.6059683	0.00110850	92.47	36.4	148.5	Sd	8 30.3	20.9
308193 2005 CB <sub>79</sub>	4.6	X	323.43037	93.14549	112.92218	28.68545	0.1391925	0.00348234	43.11	37.1	49.1	Tn	3 3.5	20.5
308379 2005 RS <sub>43</sub>	5.0	X	56.02686	267.96312	46.44286	9.99865	0.2029354	0.00295580	48.09	38.3	57.8	Tn	10 27.3	21.4
308460 2005 SC <sub>278</sub>	7.3	X	321.38728	46.11385	27.50926	1.51278	0.0666669	0.00476648	34.97	32.6	37.3	Tn	10 23.9	22.5
308634 2005 XU <sub>100</sub>	6.3	X	85.60339	98.45540	318.49447	7.89646	0.1038638	0.00347711	43.15	38.7	47.6	Tn	2 21.8	22.7
308933 2006 SQ <sub>372</sub>	7.8	X	0.14694	122.57147	197.36458	19.44360	0.9779644	0.00002711	1097.37	24.2	2170.6	Sd	10 7.7	22.6
309139 2006 XQ <sub>51</sub>	9.8	X	106.17013	134.13826	233.88538	31.61400	0.3786705	0.01568818	15.80	9.8	21.8	Sd	2 5.6	22.7
309239 2007 RW <sub>10</sub>	6.6	X	77.48650	96.77692	186.96478	36.03635	0.3022031	0.00589250	30.36	21.2	39.5	Ct	10 31.0	21.6
309737 2008 SJ <sub>236</sub>	12.3	X	116.71973	182.70127	234.50949	6.04850	0.4368437	0.02737383	10.90	6.1	15.7	Ct	4 15.7	23.8
309741 2008 UZ <sub>6</sub>	10.7	X	25.98552	199.42935	240.64221	35.84015	0.6096977	0.00702337	27.00	10.5	43.5	Ct	2 28.1	23.2
310071 2010 KR <sub>59</sub>	7.6	X	24.97766	108.51160	46.81982	19.67233	0.5645681	0.00603100	29.89	13.0	46.8	Sd	5 16.7	20.3
312645 2010 EP <sub>65</sub>	5.3	X	6.64583	352.63637	205.04510	18.91064	0.3032776	0.00301481	47.46	33.1	61.8	Tn	4 20.7	20.5
315530 2008 AP <sub>129</sub>	4.7	X	55.71865	55.88665	14.80429	27.44183	0.1368979	0.00368203	41.53	35.8	47.2	Tn	2 21.0	20.7
315898 2008 QD <sub>4</sub>	11.3	X	161.91471	68.21562	344.78889	42.08374	0.3513534	0.04067716	8.37	5.4	11.3	Ct	4 7.2	22.0
316179 2010 EN <sub>65</sub>	7.0	X	56.34111	224.58365	234.37474	19.23858	0.3105961	0.00585018	30.50	21.0	40.0	Sd	3 26.3	21.5
328884 2010 LJ <sub>109</sub>	10.1	X	86.01768	136.56103	41.58201	24.77977	0.3065266	0.02052830	13.21	9.2	17.3	Ct	7 26.3	21.7
330836 Orius	9.9	X	52.00614	141.18010	50.42247	17.87040	0.4175344	0.00986532	21.53	12.5	30.5	Ct	7 16.3	22.8
332685 2009 HH <sub>36</sub>	10.8	X	61.93744	240.32424	72.16318	23.28633	0.4462844	0.02169405	12.73	7.1	18.4	Ct	12 2.3	21.7
336756 2010 NV <sub>1</sub>	10.4	X	0.82106	132.71977	136.09285	140.72621	0.9661329	0.00021243	278.18	9.4	546.9	Sd	6 25.7	23.8
341275 2007 RG <sub>283</sub>	8.6	X	354.12823	149.26008	311.76952	28.80065	0.2314939	0.01111965	19.88	15.3	24.5	Ct	12 31.2	20.5
341520 Mors-Somnus	6.7	X	6.36334	204.85376	196.64865	11.27255	0.2667849	0.00399658	39.33	28.8	49.8	Tn	11 17.4	21.3
342842 2008 YB <sub>3</sub>	9.3	X	94.47290	330.43878	112.63947	105.05984	0.4416571	0.02500270	11.58	6.5	16.7	Ct	7 23.3	21.1
346889 Rhiponhos	11.8	X	115.82546	13.05371	11.44547	19.94387	0.4444725	0.02795046	10.75	6.0	15.5	Ct	3 17.8	23.2
349933 2009 YF <sub>7</sub>	10.9	X	24.33492	89.62136	97.48224	30.98951	0.4615580	0.02344640	12.09	6.5	17.7	Ct	6 6.1	19.8
353222 2009 YD <sub>7</sub>	9.8	X	2.08369	326.56496	126.10320	30.83907	0.8880210	0.00075652	119.29	13.4	225.2	Sd	2 23.5	22.2
363330 2002 PQ <sub>145</sub>	5.5	X	220.40022	307.17932	165.81666	3.70742	0.0405691	0.00335785	44.17	42.4	46.0	Tn	8 23.6	22.1
363401 2003 LB <sub>7</sub>	6.7	X	39.58916	158.25735	49.70678	2.30078	0.1317410	0.00318209	45.78	39.7	51.8	Tn	6 9.2	22.9
364171 2006 JZ <sub>81</sub>	6.7	X	12.48356	184.41918	36.43303	3.55607	0.0810617	0.00329020	44.77	41.1	48.4	Tn	5 15.9	22.9
382004 2010 RM <sub>64</sub>	11.2	X	35.78251	291.28757	113.94073	27.03653	0.6889777	0.0125685	19.72	6.1	33.3	Ct	3 10.6	23.2
385185 1993 RO	8.4	X	34.65383	188.47301	170.22445	3.71166	0.2016549	0.00398789	39.38	31.4	47.3	Tn	11 13.7	23.6
385191 1997 RT <sub>5</sub>	6.9	X	189.52045	21.73880	163.66168	12.70185	0.0195990	0.00368057	41.55	40.7	42.4	Tn	10 10.4	23.2
385194 1998 KG <sub>62</sub>	6.5	X	249.97597	108.67641	336.87123	0.78273	0.0457769	0.00340414	43.77	41.8	45.8	Tn	8 24.1	22.9
385199 1999 OE <sub>4</sub>	6.8	X	0.37470	213.20217	130.84280	2.14912	0.0545359	0.00318468	45.75	43.3	48.2	Tn	9 7.9	23.1
385201 1999 RN <sub>215</sub>	6.6	X	142.24237	106.35002	140.46727	12.39786	0.0719359	0.00345570	43.33	40.2	46.4	Tn	10 31.4	23.2
385266 2001 QB <sub>298</sub>	6.8	X	48.21010	5.26088	291.38723	1.79492	0.1015038	0.00349903	42.97	38.6	47.3	Tn	9 16.8	22.8
385362 2002 PT <sub>170</sub>	6.4	X	260.40842	131.50220	328.69651	3.68364	0.1401451	0.00309861	46.60	40.1	53.1	Tn	9 7.8	23.3
385363 2002 PW <sub>170</sub>	6.2	X	159.32271	206.23247	339.77670	3.91371	0.0651666	0.00324318	45.20	42.3	48.1	Tn	9 10.5	23.0
385437 2003 GH <sub>55</sub>	6.1	X	27.37911	89.31539	116.44763	1.10217	0.0787507	0.00335132	44.22	40.7	47.7	Tn	5 18.8	22.2
385445 2003 QH <sub>91</sub>	6.8	X	128.59574	268.81419	286.59033	3.65238	0.1446091	0.00393795	39.72	34.0	45.5	Tn	8 27.9	23.2
385446 Manwë	6.6	X	286.39073	16.46646	68.52462	2.66574	0.1121257	0.00337438	44.02	39.1	49.0	Tn	9 23.1	22.9
385447 2003 QF <sub>113</sub>	6.6	X	17.96779	206.70054	114.06058	4.45207	0.0365919	0.00335405	44.20	42.6	45.8	Tn	9 4.1	22.9
385458 2003 SP <sub>317</sub>	7.1	X	309.72081	94.93909	346.96656	5.06342	0.1700482	0.00313556	46.23	38.4	54.1	Tn	10 7.2	23.3
385527 2004 OK <sub>14</sub>	7.5	X	344.99297	206.51520	149.03370	3.45835	0.2512671	0.00334335	44.29	33.2	55.4	Tn	8 23.5	22.8
385528 2004 OR <sub>15</sub>	7.5	X	10.78090	13.66236	285.13491	6.90257	0.3478687	0.00228570	57.08	37.2	76.9	Sd	8 13.6	23.3
385533 2004 QD <sub>29</sub>	7.0	X	71.95956	118.54034	135.20287	23.79059	0.1158754	0.00344799	43.39	38.4	48.4	Tn	9 3.7	23.3
385607 2005 EO <sub>297</sub>	7.2	X	18.58244	348.78374	144.12471	25.10201	0.3387100	0.00200915	62.20	41.1	83.3	Sd	3 14.2	23.6
386723 2009 YE <sub>7</sub>	4.3	X	184.91520	101.38131	141.34947	29.11836	0.1434350	0.00333991	44.32	38.0	50.7	Tn	12 5.1	21.4
386968 2012 BR <sub>61</sub>	9.3	X	17.21014	158.49019	24.45784	2.03885	0.4579263	0.00985428	21.55	11.7	31.4	Ct	5 10.3	20.3
389820 2011 WU <sub>92</sub>	12.9	X	108.63694	22.39971	101.18055	6.45238	0.3694775	0.03748812	8.84	5.6	12.1	Ct	6 16.2	23.0
395699 2012 GN <sub>12</sub>	9.5	X	70.59759	172.09966	350.82203	12.59715	0.3715065	0.01673722	15.14	9.5	20.8	Ct	6 29.2	22.5
408832 2001 QJ <sub>298</sub>	6.2	X	267.66856	284.47518	162.70192	2.14847	0.0371654	0.00332780	44.43	42.8	46.1	Tn	9 13.8	22.8
413666 2005 VJ <sub>119</sub>	10.7	X	21.48347	246.19633	301.49878	6.94478	0.6789677	0.00470074	35.29	11.3	59.3	Sd	7 6.8	23.7
415720 1999 RU <sub>215</sub>	7.3	X	52.85863	330.36657	14.21034	7.71993	0.0740117	0.00347383	43.18	40.0	46.4	Tn	11 6.1	23.5
416400 2003 UZ <sub>117</sub>	5.1	X	346.29265	245.49213	204.56352	27.39993	0.1307586	0.00335866	44.16	38.4	49.9	Tn	12 4.4	21.0
418993 2009 MS <sub>9</sub>	9.8	X	0.39816	128.60919	220.18217	67.98373	0.9715312	0.00012997	385.99	11.0	761.0	Sd	11 21.5	22.6
420356 Praamzius	5.7	X	174.26371	11.73955	314.26674	1.10058	0.0135458	0.00356325	42.45	41.9	43.0	Tn	2 8.7	22.0
427507 2002 DH <sub>5</sub>	10.1	X	80.50349	327.51859	157.11589	22.47057	0.3634731	0.00953627	22.02	14.0	30.0	Ct	5 30.6	23.9
427581 2003 QB <sub>92</sub>	7.9	X	164.87072	65.01355	119.95395	3.48475	0.0868561	0.00473856	35.11	32.1	38.2	Tn	9 16.6	23.7
427614 2003 SR <sub>422</sub>	7.1	X	253.01029	66.61939	99.74657	23.94837	0.0507401	0.00387421	40.15	38.1	42.2	Tn	11 23.1	23.2
432949 2012 HH <sub>2</sub>	6.2	X	40.60037	100.47894	56.46303	28.58591	0.1610373	0.00480002	34.80	29.2	40.4	Tn	4 28.4	21.1
433873 2015 BQ <sub>311</sub>	12.0	X	261.57127	221.55655	117.04106	24.48537	0.2929332	0.05206854	7.10	5.0	9.2	Ct	4 26.8	21.1
434194 2003 FK <sub>127</sub>	7.0	X	350.95906	119.07104	84.34245	2.27193	0.0452100	0.00356792	42.42	40.5	44.3	Tn	4 3.9	23.1
434390 2005 CH <sub>81</sub>	8.2	X	14.32534	15.00058	122.87263	5.14540	0.3131304	0.00243327	54.74	37.6	71.9	Sd	3 7.6	24.1
434709 2006 CJ <sub>69</sub>	7.6	X	344.02309	60.02886	130.50779	17.95295	0.2242654	0.00363126	41.92	32.5	51.3	Tn	3 7.9	22.8
437313 2013 EK <sub>73</sub>	13.2	X	59.71292	49.38471	141.15548	9.00182	0.5838969	0.02107174	12.98	5.4	20.6	Ct	8 12.1	24.4
437360 2013 TV <sub>158</sub>	6.3	X	359.72753	231.86616	180.98652	31.11000	0.6740804	0.00083249	111.91	36.5	187.4	Sd	11 16.2	20.0
437871 2001 FN <sub>185</sub>	7.2	X	9.68477	14.10199	203.35749	21.76012	0.0726537	0.00355227	42.54	39.				

ELEMENTS AND OPPOSITION DATES OF CENTAURS AND TRANSNEPTUNIAN OBJECTS

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2021 JULY 5.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	$\omega$	$\Omega$	<i>i</i>	<i>e</i>	$\mu$	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
451657 2012 <i>WD</i> <sub>36</sub>	6.8	X	339.84517	293.39500	177.20341	23.64967	0.5088080	0.00147314	76.50	37.6	115.4	Sd	11 13.7	23.4
455171 1999 <i>OM</i> <sub>4</sub>	7.1	X	78.42706	136.60968	113.74999	2.08590	0.1209836	0.00311961	46.39	40.8	52.0	Tn	9 6.2	23.7
455206 2001 <i>FE</i> <sub>193</sub>	6.8	X	63.77295	338.12148	154.99600	2.81648	0.1208243	0.00310311	46.55	40.9	52.2	Tn	4 20.8	23.3
455209 2001 <i>KT</i> <sub>76</sub>	7.1	X	63.24234	346.99828	184.53980	1.70811	0.0847691	0.00324343	45.20	41.4	49.0	Tn	5 25.3	23.5
455502 2003 <i>UZ</i> <sub>413</sub>	4.3	X	115.17059	146.37361	135.83746	12.05258	0.2247308	0.00400064	39.30	30.5	48.1	Tn	11 23.4	20.8
456826 2007 <i>TH</i> <sub>422</sub>	7.7	X	21.63451	312.19795	96.32315	28.58231	0.2765147	0.00400421	39.28	28.4	50.1	Tn	12 21.1	22.5
459865 2013 <i>XZ</i> <sub>7</sub>	9.5	X	1.20810	288.46028	266.67293	22.53561	0.3708662	0.00212613	13.39	8.4	18.3	Ct	3 25.3	18.9
459870 2014 <i>AT</i> <sub>28</sub>	12.0	X	39.14269	279.88264	262.59226	165.53250	0.4010547	0.02739155	10.90	6.5	15.3	Ct	6 13.2	21.2
459971 2014 <i>ON</i> <sub>6</sub>	11.6	X	57.60264	195.59956	94.29093	3.94184	0.5652878	0.02021415	13.35	5.8	20.9	Ct	11 19.6	22.9
463368 2012 <i>VU</i> <sub>85</sub>	7.3	X	324.23852	265.33110	252.57405	15.08347	0.3078178	0.00627407	29.11	20.2	38.1	Ct	12 26.3	20.9
463663 2014 <i>HY</i> <sub>123</sub>	11.3	X	19.64765	232.29588	314.65023	13.91891	0.6268523	0.01213787	18.75	7.0	30.5	Ct	6 20.5	21.4
468422 2000 <i>FA</i> <sub>8</sub>	7.5	X	347.40326	53.04280	212.72419	0.75374	0.0283334	0.00339143	43.87	42.6	45.1	Tn	4 22.4	23.8
468861 2013 <i>LU</i> <sub>28</sub>	8.2	X	359.59858	152.93013	275.98597	125.34863	0.9543915	0.00337148	191.65	8.7	374.6	Sd	4 12.4	18.9
469306 1999 <i>CD</i> <sub>158</sub>	5.0	X	251.71780	146.67864	119.08341	25.54969	0.1467031	0.00344373	43.43	37.1	49.8	Tn	2 12.3	21.7
469333 2000 <i>PE</i> <sub>30</sub>	5.9	X	31.24234	148.69304	127.27077	18.36727	0.3479956	0.00241659	55.00	35.9	74.1	Sd	9 3.5	22.1
469361 2001 <i>HY</i> <sub>65</sub>	6.2	X	59.31233	314.46971	188.22720	17.16748	0.1166591	0.00348488	43.09	38.1	48.1	Tn	4 25.9	22.3
469362 2001 <i>XZ</i> <sub>77</sub>	7.4	X	355.46777	53.22600	223.03089	17.51782	0.2883780	0.00391383	39.88	28.4	51.4	Tn	6 17.8	22.0
469372 2001 <i>QP</i> <sub>298</sub>	5.2	X	159.04978	44.23610	164.09588	22.28952	0.1066126	0.00395805	39.58	35.4	43.8	Tn	10 7.4	21.6
469420 2001 <i>XF</i> <sub>254</sub>	7.4	X	8.84767	180.79387	304.97458	2.61727	0.2119428	0.00363336	41.90	33.0	50.8	Tn	2 7.4	22.6
469421 2001 <i>XD</i> <sub>255</sub>	5.5	X	286.44756	113.02032	106.73433	18.13870	0.1087904	0.00402034	39.17	34.9	43.4	Tn	2 3.4	21.4
469438 2002 <i>GV</i> <sub>31</sub>	6.4	X	352.56444	132.23978	59.06889	2.18399	0.0870464	0.00339979	43.80	40.0	47.6	Tn	3 23.5	22.4
469442 2002 <i>FG</i> <sub>166</sub>	7.9	X	346.51895	274.99258	33.02563	7.71297	0.5942435	0.00479684	34.82	14.1	55.5	Sd	5 30.3	20.2
469505 2003 <i>FE</i> <sub>128</sub>	6.3	X	11.89250	54.66782	169.31570	3.38541	0.2537126	0.00295530	48.09	35.9	60.3	Tn	5 26.2	21.9
469506 2003 <i>FF</i> <sub>128</sub>	6.7	X	353.35531	170.95560	91.73482	1.91126	0.2190439	0.00393929	39.71	31.0	48.4	Tn	6 2.6	21.6
469509 2003 <i>HC</i> <sub>57</sub>	5.8	X	306.70329	47.04089	234.00437	1.03741	0.0697159	0.00337317	44.03	41.0	47.1	Tn	5 1.1	22.1
469514 2003 <i>QA</i> <sub>91</sub>	5.6	X	285.83787	324.36339	104.62669	2.41333	0.0686456	0.00329320	44.74	41.7	47.8	Tn	9 11.0	22.0
469584 2003 <i>YW</i> <sub>179</sub>	6.8	X	21.08825	17.70025	97.20084	2.38659	0.1483882	0.00363569	41.89	35.7	48.1	Tn	2 12.0	22.4
469610 2004 <i>HF</i> <sub>79</sub>	6.3	X	335.76177	198.99565	76.63418	1.48717	0.0319754	0.00344398	43.43	42.0	44.8	Tn	5 31.3	22.5
469615 2004 <i>PT</i> <sub>107</sub>	5.8	X	1.04659	19.08625	320.87163	26.04182	0.0651449	0.00377119	40.88	38.2	43.5	Tn	8 29.3	21.6
469704 2005 <i>EC</i> <sub>296</sub>	6.7	X	341.02651	213.50140	24.43674	1.77973	0.1505444	0.00398487	39.40	33.5	45.3	Tn	4 21.9	22.0
469705 2005 <i>EF</i> <sub>298</sub>	5.9	X	340.31461	78.55535	118.09159	2.86933	0.0859078	0.00340284	43.78	40.0	47.5	Tn	3 14.5	21.9
469707 2005 <i>GB</i> <sub>187</sub>	7.0	X	26.09059	350.20622	217.11144	14.69171	0.2362790	0.00396223	39.55	30.2	48.9	Tn	5 30.9	22.0
469708 2005 <i>GC</i> <sub>187</sub>	7.3	X	344.89404	85.85030	205.45807	18.25667	0.3302288	0.00394818	39.65	26.6	52.7	Tn	6 10.8	21.7
469750 2005 <i>PU</i> <sub>21</sub>	6.3	X	357.16502	227.43953	192.48386	6.16889	0.8368555	0.00040883	179.79	29.3	330.3	Sd	10 2.4	21.8
469987 2006 <i>HJ</i> <sub>123</sub>	5.9	X	317.35282	101.74367	222.58328	12.45093	0.3066960	0.00394267	39.68	27.5	51.9	Tn	6 1.1	21.1
470027 2006 <i>RC</i> <sub>103</sub>	5.9	X	337.31498	84.35967	310.20149	17.13899	0.1462716	0.00359259	42.22	36.0	48.4	Tn	9 20.2	21.6
470083 2006 <i>SG</i> <sub>369</sub>	7.5	X	15.79147	289.66895	101.30985	13.60874	0.3711833	0.00297528	47.88	30.1	65.6	Tn	12 1.9	22.5
470308 2007 <i>JH</i> <sub>43</sub>	4.5	X	197.15542	352.45019	64.59805	18.14816	0.0259024	0.00395981	39.57	38.5	40.6	Tn	6 3.1	20.6
470309 2007 <i>JK</i> <sub>43</sub>	7.0	X	10.65119	10.87156	233.60702	44.88252	0.4940656	0.00309456	46.64	23.6	69.7	Sd	6 20.9	21.1
470316 2007 <i>OK</i> <sub>10</sub>	5.0	X	13.65031	53.14842	258.12340	21.65852	0.2940850	0.00276380	50.29	35.5	65.1	Tn	8 21.4	20.7
470443 2007 <i>XV</i> <sub>50</sub>	4.4	X	106.60804	273.32424	53.56944	22.87012	0.0703722	0.00317206	45.87	42.6	49.1	Tn	12 10.9	21.2
470523 2008 <i>CS</i> <sub>190</sub>	6.0	X	39.55327	149.79443	326.71919	15.96924	0.1556338	0.00361343	42.06	35.5	48.6	Tn	3 6.1	21.8
470593 2008 <i>LP</i> <sub>17</sub>	6.2	X	3.16874	164.93070	72.48207	14.09985	0.6692717	0.00114810	90.33	29.9	150.8	Sd	6 8.9	21.0
470596 2008 <i>NW</i> <sub>4</sub>	5.4	X	2.00991	41.88318	285.02862	23.10748	0.1983314	0.00320022	45.61	36.6	54.7	Tn	8 14.9	21.1
470599 2008 <i>OG</i> <sub>19</sub>	4.7	X	4.82914	141.01823	164.14735	13.11715	0.4297530	0.00176994	67.69	38.6	96.8	Sd	8 10.2	20.6
471136 2010 <i>EO</i> <sub>65</sub>	9.5	X	16.86248	271.41864	315.66551	11.34994	0.4442740	0.00777023	25.25	14.0	36.5	Ct	6 25.0	21.3
471137 2010 <i>ET</i> <sub>65</sub>	5.1	X	5.62834	354.42001	189.59428	30.66101	0.3597555	0.00202384	61.90	39.6	84.2	Sd	4 6.7	21.1
471143 <i>Dziewanna</i>	3.9	X	349.25842	284.74759	346.31943	29.48827	0.5352050	0.00168811	69.86	32.5	107.2	Sd	4 28.4	19.5
471149 2010 <i>FB</i> <sub>49</sub>	7.3	X	223.56042	170.98002	184.92074	24.42931	0.1968738	0.00923260	22.50	18.1	26.9	Ct	4 17.5	21.5
471150 2010 <i>FC</i> <sub>49</sub>	5.7	X	258.20831	302.04569	1.80736	39.83921	0.0544440	0.00406414	38.89	36.8	41.0	Tn	3 29.5	21.7
471151 2010 <i>FD</i> <sub>49</sub>	6.2	X	4.78255	142.55712	66.35032	10.72454	0.4222696	0.00239740	55.29	31.9	78.6	Sd	5 3.8	21.3
471152 2010 <i>FE</i> <sub>49</sub>	6.3	X	15.24592	131.71599	57.96482	11.70172	0.3726129	0.00250669	53.67	33.7	73.7	Sd	5 5.8	21.8
471155 2010 <i>GF</i> <sub>65</sub>	7.1	X	346.59254	284.96975	0.59094	12.42057	0.3420260	0.00507419	33.54	22.1	45.0	Tn	6 5.8	20.7
471165 2010 <i>HE</i> <sub>79</sub>	5.1	X	68.29044	283.03779	238.70485	15.71128	0.1777426	0.00404120	39.04	32.1	46.0	Tn	5 31.6	20.8
471172 2010 <i>JC</i> <sub>80</sub>	5.9	X	353.98855	217.24076	50.92795	3.12857	0.4349042	0.00237214	55.68	31.5	79.9	Sd	6 1.5	20.9
471196 2010 <i>PK</i> <sub>66</sub>	5.3	X	12.63286	334.98012	331.66655	13.59979	0.0071357	0.00374682	41.05	40.8	41.3	Tn	8 13.7	21.4
471210 2010 <i>VW</i> <sub>11</sub>	5.3	X	6.38842	259.08551	157.87474	27.80658	0.2779495	0.00273695	50.62	36.5	64.7	Sd	12 5.6	21.0
471237 2011 <i>AC</i> <sub>72</sub>	10.8	X	22.56136	23.20436	119.41453	13.80542	0.5626998	0.00757347	25.68	11.2	40.1	Ct	5 3.7	22.7
471272 2011 <i>FY</i> <sub>9</sub>	8.6	X	10.45017	300.81659	214.34447	37.77696	0.7389768	0.00221496	58.29	15.2	101.4	Sd	5 11.9	22.1
471288 2011 <i>GM</i> <sub>27</sub>	5.0	X	98.53723	194.49225	257.24548	13.02827	0.0261711	0.00343588	43.50	42.4	44.6	Tn	3 29.1	21.4
471318 2011 <i>JF</i> <sub>31</sub>	5.2	X	95.68905	251.91226	236.81114	27.71730	0.1298579	0.00369080	41.47	36.1	46.9	Tn	5 19.7	21.5
471325 2011 <i>KT</i> <sub>19</sub>	7.2	X	37.29459	323.08111	243.80890	110.18755	0.3304590	0.00462038	35.70	23.9	47.5	Sd	5 20.0	21.8
471335 2011 <i>OD</i> <sub>16</sub>	8.6	X	355.36292	201.03024	166.06004	6.28914	0.1864152	0.00388017	24.00	19.5	28.5	Ct	9 25.0	21.4
471339 2011 <i>JH</i> <sub>45</sub>	11.3	X	20.17939	77.06693	330.24713	8.19664	0.1586395	0.02476728	11.66	9.8	13.5	Ct	12 12.2	21.2
471512 2012 <i>CG</i>	8.7	X	47.04788	292.82264	128.85172	14.62182	0.4982870	0.00640905	28.70	14.4	43.0	Ct	3 9.9	22.6
471513 2012 <i>CE</i> <sub>17</sub>	8.8	X	13.60245	357.17130	174.51245	5.91484	0.1142390	0.00994215	21.42</					

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Planet	<i>H</i>	<i>G</i>	<i>M</i>	$\omega$	$\Omega$	<i>i</i>	<i>e</i>	$\mu$	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
483002 2014 QS <sub>441</sub>	5.4	X	317.34766	265.19807	185.83923	37.81777	0.0824712	0.00304897	47.10	43.2	51.0	Tn	11 5.3	21.9
486958 Arrokoth	11.1	X	316.24805	177.62963	159.11764	2.44703	0.0440194	0.00331139	44.58	42.6	46.5	Tn	7 11.5	27.5
487581 2015 BE <sub>519</sub>	5.5	X	84.36834	285.51657	153.18283	24.81542	0.0641667	0.00301359	47.47	44.4	50.5	Tn	3 12.3	22.3
488644 2003 HY <sub>56</sub>	7.9	X	298.66677	250.44470	35.66235	2.58183	0.0391991	0.00354747	42.58	40.9	44.2	Tn	4 30.9	24.1
491767 2012 VU <sub>113</sub>	7.7	X	23.03178	313.41080	65.48913	30.13743	0.0806641	0.00395371	39.61	36.4	42.8	Tn	11 13.9	23.4
491768 2012 VV <sub>113</sub>	7.4	X	358.24956	293.24694	115.89515	15.68158	0.1179504	0.00313727	46.21	40.8	51.7	Tn	11 14.6	23.5
492338 2014 FW	9.9	X	9.62207	115.15155	98.23566	12.67877	0.6319223	0.00623553	29.23	10.8	47.7	Ct	6 14.2	20.8
493480 2014 YZ <sub>49</sub>	5.3	X	2.98642	51.68852	131.10060	17.21287	0.0135411	0.00388894	40.05	39.5	40.6	Tn	3 31.1	21.3
494158 2016 EX	12.6	X	33.33156	177.53837	70.02097	6.33421	0.3002546	0.03915674	8.59	6.0	11.2	Ct	8 2.7	20.8
495189 2012 VR <sub>113</sub>	6.5	X	43.96142	220.91745	120.86990	19.29266	0.1764039	0.00297225	47.91	39.5	56.4	Tn	11 11.4	22.9
495190 2012 VS <sub>113</sub>	7.1	X	9.49743	219.78254	171.48088	26.75480	0.3121916	0.00239901	55.26	38.0	72.5	Sd	11 16.5	23.0
495297 2013 TJ <sub>159</sub>	6.6	X	18.10730	174.48743	165.10316	4.79815	0.3243280	0.00250909	53.64	36.2	71.0	Sd	10 10.7	22.4
495603 2015 AM <sub>281</sub>	4.8	X	337.05186	158.26946	21.97500	26.75628	0.2455056	0.00242584	54.86	41.4	68.3	Sd	2 22.9	21.2
495613 2015 FG <sub>345</sub>	5.2	X	299.84054	225.06723	58.65673	36.04643	0.1291501	0.00361047	42.08	36.6	47.5	Tn	4 30.5	21.3
496315 2013 GP <sub>136</sub>	6.6	X	357.02187	42.82047	210.75241	33.56563	0.7302288	0.00052618	151.96	41.0	262.9	Sd	5 6.9	22.9
499514 2010 OO <sub>127</sub>	4.6	X	247.70345	244.21187	219.87849	25.87765	0.1261681	0.00355892	42.49	37.1	47.8	Tn	8 26.3	21.2
499522 2010 PL <sub>66</sub>	7.6	X	305.70100	95.83703	8.50382	24.27281	0.3806650	0.01006420	21.25	13.2	29.3	Ct	9 30.8	20.4
500828 2013 GR <sub>136</sub>	7.8	X	332.77548	57.53831	198.74280	1.64412	0.0782848	0.00341558	43.67	40.2	47.1	Tn	5 5.1	23.9
500829 2013 GT <sub>136</sub>	7.4	X	185.90896	355.03973	40.86481	12.12790	0.1546496	0.00357583	42.35	35.8	48.9	Tn	4 30.6	24.3
500830 2013 GU <sub>136</sub>	7.9	X	36.90768	126.67071	49.17843	8.32447	0.1654499	0.00336490	44.11	36.8	51.4	Tn	5 6.8	23.7
500831 2013 GV <sub>136</sub>	8.2	X	78.15481	290.43375	216.06545	7.45421	0.0320205	0.00373883	41.11	39.8	42.4	Tn	5 9.1	24.3
500832 2013 GZ <sub>136</sub>	8.2	X	355.92113	36.81171	213.94979	18.37251	0.6121921	0.00120803	87.31	33.9	140.8	Sd	5 10.7	23.6
500833 2013 GD <sub>137</sub>	8.3	X	23.48259	353.79127	204.47062	6.94786	0.1028023	0.00398753	39.39	35.3	43.4	Tn	5 8.1	23.8
500834 2013 GK <sub>137</sub>	7.2	X	166.85259	11.21550	45.00199	9.88862	0.1777320	0.00402012	39.17	32.2	46.1	Tn	5 7.2	23.8
500835 2013 GN <sub>137</sub>	7.0	X	40.43768	104.96988	72.39966	2.76176	0.0627710	0.00336798	44.08	41.3	46.8	Tn	5 3.5	23.2
500836 2013 GQ <sub>137</sub>	7.4	X	51.93865	70.36676	90.48995	2.84682	0.1286881	0.00319398	45.66	39.8	51.5	Tn	5 6.6	23.7
500837 2013 GT <sub>137</sub>	7.4	X	81.11152	108.64847	25.34589	2.30144	0.1027463	0.00331144	44.58	40.0	49.2	Tn	5 7.1	23.8
500838 2013 GV <sub>137</sub>	6.8	X	233.73479	288.78704	69.79506	3.19711	0.0852330	0.00339827	43.82	40.1	47.6	Tn	5 5.8	23.5
500839 2013 GW <sub>137</sub>	7.7	X	348.33956	192.26086	46.31374	5.02314	0.0632947	0.00351039	42.88	40.2	45.6	Tn	5 5.7	23.8
500840 2013 GA <sub>138</sub>	7.8	X	337.56003	189.32736	63.41456	3.90172	0.0472139	0.00339634	43.83	41.8	45.9	Tn	5 8.9	24.0
500856 2013 HT <sub>156</sub>	7.6	X	232.11074	302.16042	54.49449	3.68203	0.0186650	0.00337175	44.05	43.2	44.9	Tn	5 7.7	24.1
500876 2013 JD <sub>64</sub>	8.0	X	1.15948	178.61658	67.54342	50.29049	0.4139712	0.00159005	72.70	42.6	102.8	Sd	5 29.8	24.3
500877 2013 JE <sub>64</sub>	8.2	X	30.78887	89.94294	107.16663	8.32267	0.2852116	0.00296957	47.94	34.3	61.6	Tn	6 2.6	24.0
500878 2013 JG <sub>64</sub>	7.7	X	224.78014	182.14275	208.00780	18.22559	0.1081370	0.00364005	41.85	37.3	46.4	Tn	5 28.8	24.3
500879 2013 JH <sub>64</sub>	5.8	X	54.32213	60.37287	86.05297	13.70971	0.3809957	0.00216409	59.20	36.6	81.7	Sd	5 27.4	24.1
500880 2013 JJ <sub>64</sub>	7.4	X	303.95985	183.61048	128.26427	7.64038	0.0869733	0.00296836	47.95	43.8	52.1	Tn	5 29.7	24.0
500881 2013 JM <sub>64</sub>	8.2	X	32.88095	52.31572	165.51131	7.28675	0.0491247	0.00355493	42.52	40.4	44.6	Tn	6 5.4	24.3
500882 2013 JN <sub>64</sub>	8.3	X	15.88161	79.75958	146.55909	7.73387	0.2901431	0.00253100	53.33	37.9	68.8	Sd	6 7.5	24.2
500883 2013 JP <sub>65</sub>	7.4	X	96.63066	274.16822	214.93897	19.82857	0.2518081	0.00397920	39.44	29.5	49.4	Tn	6 2.9	23.7
500884 2013 JK <sub>65</sub>	9.6	X	354.61714	186.86642	83.12027	20.02463	0.2615992	0.00394398	39.67	29.3	50.1	Tn	6 11.6	24.3
500885 2013 JL <sub>65</sub>	9.0	X	59.50967	26.30975	145.85492	7.24352	0.2291024	0.00398384	39.41	30.4	48.4	Tn	6 8.8	24.6
500886 2013 JN <sub>65</sub>	7.4	X	208.03366	318.43712	79.94825	19.61662	0.0105429	0.00378468	40.78	40.4	41.2	Tn	5 28.7	24.5
500887 2013 JO <sub>65</sub>	8.0	X	323.10551	116.31657	175.25153	9.96306	0.0846939	0.00354831	42.57	39.0	46.2	Tn	5 30.9	24.2
500888 2013 JP <sub>65</sub>	8.0	X	71.71698	337.78234	192.16870	12.47917	0.0614992	0.00370074	41.39	38.8	43.9	Tn	5 30.8	24.1
501105 2013 SA <sub>87</sub>	7.1	X	22.16333	141.61321	207.58566	40.74362	0.0768958	0.00362887	41.94	38.7	45.2	Tn	10 8.3	23.0
501214 2013 TC <sub>146</sub>	6.5	X	108.41860	56.28398	147.51002	14.16477	0.1612256	0.00770163	25.39	21.3	29.5	Ct	8 22.0	20.8
501546 2014 JJ <sub>80</sub>	5.5	X	345.23277	97.71504	261.49857	18.68167	0.2801570	0.00344807	43.45	31.3	55.6	Tn	8 18.1	20.6
501581 2014 OB <sub>394</sub>	6.1	X	355.77492	9.71244	8.08485	20.68752	0.2547074	0.00305580	47.01	35.0	59.0	Tn	10 3.6	21.5
503273 2015 PN <sub>291</sub>	11.6	X	16.36475	30.62849	12.77208	9.48372	0.5429566	0.01787705	14.49	6.6	22.4	Ct	—	—
503858 1998 HQ <sub>151</sub>	8.8	X	40.65897	347.35261	228.88466	11.93905	0.2858699	0.00394254	39.68	28.3	51.0	Tn	7 5.4	24.0
503883 2001 QF <sub>331</sub>	7.8	X	350.55606	248.56680	156.71963	2.67121	0.2558028	0.00355820	42.49	31.6	53.4	Tn	10 23.8	22.8
504555 2008 SO <sub>266</sub>	6.2	X	45.02167	173.26588	158.61305	18.77574	0.2465237	0.00395560	39.60	29.8	49.4	Tn	11 8.6	21.6
504847 2010 RE <sub>188</sub>	6.3	X	351.76837	208.94465	189.15480	6.74510	0.1515137	0.00313205	46.26	39.3	53.3	Tn	10 21.5	22.3
505412 2013 QO <sub>95</sub>	6.7	X	5.05074	311.47868	83.04433	20.62093	0.0359947	0.00388104	40.10	38.7	41.5	Tn	11 9.1	22.6
505446 2013 SP <sub>99</sub>	7.3	X	50.27332	254.36393	71.94476	0.79090	0.0648763	0.00337301	44.03	41.2	46.9	Tn	10 16.7	23.5
505447 2013 SQ <sub>99</sub>	6.4	X	142.64664	178.53852	52.02956	3.46364	0.0896611	0.00333291	44.39	40.4	48.4	Tn	10 13.5	23.2
505448 2013 SA <sub>100</sub>	5.9	X	254.14102	112.87729	27.82625	8.45950	0.1613596	0.00310836	46.50	39.0	54.0	Tn	10 12.6	22.9
505476 2013 UL <sub>15</sub>	6.6	X	54.21547	237.26763	81.94544	2.02406	0.1023127	0.00315266	46.06	41.4	50.8	Tn	10 18.2	23.0
505477 2013 UM <sub>15</sub>	6.9	X	79.97721	185.85580	110.91032	1.84105	0.0778880	0.00323384	45.29	41.8	48.8	Tn	10 20.2	23.4
505478 2013 UT <sub>15</sub>	6.2	X	354.34729	251.65417	191.92889	10.63299	0.7821755	0.00034208	202.48	44.1	360.9	Sd	10 16.2	23.8
505624 2014 GU <sub>53</sub>	5.7	X	324.55305	117.35217	178.66592	23.51049	0.1744978	0.00341590	43.66	36.0	51.3	Tn	5 29.8	21.6
505679 2014 WT <sub>69</sub>	5.7	X	68.34195	77.25762	260.81118	11.93360	0.0776940	0.00299233	47.69	44.0	51.4	Tn	11 17.0	22.4
506028 2015 HO <sub>171</sub>	11.8	X	75.45840	63.43852	278.49322	33.24964	0.2343726	0.03854757	8.68	6.6	10.7	Ct	12 23.9	21.1
506121 2016 BP <sub>81</sub>	6.2	X	70.84690	276.65344	29.00436	4.17400	0.0798461	0.00338596	43.92	40.4	47.4	Tn	10 19.4	22.5
506439 2000 YB <sub>2</sub>	6.7	X	106.78892	201.41573	135.47310	3.82827	0.0332905	0.00410214	38.65	37.4	39.9	Tn	12 20.1	22.6
506479 2003 HB <sub>57</sub>	7.4	X	2.17729	11.10397	197.92431	15.51552	0.7618201	0.00048650	160.11	38.1	282.1	Sd	5 15.2	23.4
508338 2015 SO <sub>20</sub>	6.5	X	0.64162	354.62274	33.61623	23.39059	0.8038459	0.00044836	169.06	33.2	305.0	Sd	10 31.3	21.7
508770 1995 WY <sub>2</sub>	7.1	X	291.31253	111.64211	78.70639	1.64457	0.1245986							

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Planet	<i>H</i>	<i>G</i>	<i>M</i>	$\omega$	$\Omega$	<i>i</i>	<i>e</i>	$\mu$	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>		
517717	2015	KZ <sub>120</sub>	10.0	X	2.60251	66.47017	250.01137	85.53992	0.8217010	0.00306356	46.95	8.4	85.5	Sd	8 30.9	20.3
518151	2016	FH <sub>13</sub>	10.1	X	21.21042	306.77165	176.40910	93.62864	0.6147114	0.00811011	24.53	9.5	39.6	Ct	3 28.5	21.7
523588	2000	CN <sub>105</sub>	5.6	X	129.46496	6.25517	28.77615	3.42486	0.0998312	0.00334198	44.31	39.9	48.7	Tn	3 13.9	22.4
523591	2001	QD <sub>298</sub>	6.4	X	65.02447	204.79592	70.63961	5.02367	0.0603536	0.00349518	43.00	40.4	45.6	Tn	9 12.2	22.6
523597	2002	QX <sub>47</sub>	8.8	X	71.66694	4.46955	275.86753	7.27568	0.3742240	0.00763604	25.54	16.0	35.1	Ct	10 27.3	23.0
523601	2003	UY <sub>413</sub>	5.5	X	48.22881	345.58313	341.10603	20.70498	0.2136541	0.00301123	47.49	37.3	57.6	Tn	10 21.9	21.8
523615	2006	UU <sub>321</sub>	7.5	X	45.82737	266.68478	65.96832	2.32665	0.0430283	0.00337652	44.00	42.1	45.9	Tn	10 16.6	23.8
523617	2007	PS <sub>45</sub>	5.6	X	34.75041	190.27550	130.89317	19.50634	0.2021798	0.00296756	47.96	38.3	57.7	Tn	10 11.9	21.8
523618	2007	RT <sub>15</sub>	6.8	X	35.39763	275.51127	82.20128	12.93579	0.2329134	0.00396593	39.53	30.3	48.7	Tn	11 18.2	22.0
523620	2007	RH <sub>283</sub>	8.6	X	165.88842	329.67880	286.37743	21.39352	0.3401830	0.01551201	15.92	10.5	21.3	Ct	12 2.2	21.9
523622	2007	TG <sub>422</sub>	6.5	X	0.48349	285.51837	112.83452	18.62127	0.9313442	0.00008376	517.32	35.5	999.1	Sd	12 9.1	22.4
523624	2008	CT <sub>190</sub>	5.8	X	9.15851	47.51420	103.76260	38.89330	0.3375155	0.00260187	52.35	34.7	70.0	Sd	3 22.9	21.4
523627	2008	QB <sub>43</sub>	6.0	X	341.51568	74.85655	320.34793	26.30370	0.1001407	0.00361957	42.01	37.8	46.2	Tn	9 23.6	21.9
523629	2008	SP <sub>266</sub>	5.9	X	6.79835	236.59572	141.05212	19.48107	0.1252968	0.00372470	41.22	36.1	46.4	Tn	10 25.9	21.5
523634	2010	AH <sub>2</sub>	5.8	X	320.79861	56.64462	127.67523	18.07244	0.0408164	0.00385206	40.30	38.7	41.9	Tn	2 11.1	21.7
523635	2010	DN <sub>93</sub>	4.8	X	45.13904	30.42164	91.24444	40.59909	0.1816234	0.00242526	54.87	44.9	64.8	Sd	4 14.4	21.8
523639	2010	RE <sub>64</sub>	4.4	X	323.29471	19.60091	67.43012	13.53670	0.4475297	0.00182736	66.26	36.6	95.9	Sd	10 2.0	21.5
523640	2010	RO <sub>64</sub>	5.2	X	8.55677	311.85417	60.83490	17.04869	0.1272901	0.00304353	47.16	41.2	53.2	Tn	10 22.8	21.4
523642	2010	SS <sub>43</sub>	5.9	X	322.20972	110.20524	341.25524	34.42118	0.2172211	0.00321590	45.46	35.6	55.3	Tn	10 10.9	21.9
523643	2010	TY <sub>53</sub>	5.7	X	328.52802	2.79110	111.22843	22.46124	0.4589045	0.00403309	39.09	21.2	57.0	Sd	11 7.8	20.2
523644	2010	VX <sub>11</sub>	6.4	X	349.77753	292.12408	170.43907	22.31028	0.2832421	0.00399482	39.34	28.2	50.5	Tn	12 17.9	21.0
523645	2010	VE <sub>201</sub>	5.0	X	172.21276	90.12512	156.25002	28.83524	0.1124079	0.00346879	43.22	38.4	48.1	Tn	11 27.7	21.9
523646	2010	VL <sub>201</sub>	5.9	X	340.76181	341.53580	104.02034	5.53101	0.0445204	0.00447860	36.45	34.8	38.1	Tn	11 28.3	21.3
523647	2010	VV <sub>224</sub>	6.0	X	344.75829	215.99642	225.20864	25.09286	0.1570861	0.00336012	44.15	37.2	51.1	Tn	11 23.2	21.7
523649	2010	XZ <sub>78</sub>	13.2	X	158.13785	228.40883	252.31063	39.17950	0.2922459	0.04649790	7.66	5.4	9.9	Ct	7 1.7	23.2
523652	2011	LZ <sub>28</sub>	7.1	X	352.88396	99.73329	315.18253	13.47616	0.5624327	0.00193194	68.85	27.9	99.8	Sd	10 13.6	21.8
523653	2011	OA <sub>60</sub>	5.1	X	25.94482	143.15977	129.45640	23.00183	0.1466610	0.00373016	41.18	35.1	47.2	Tn	7 30.6	20.6
523655	2011	VJ <sub>24</sub>	5.9	X	350.68036	120.83355	12.67639	9.54117	0.1877424	0.00398808	39.38	32.0	46.8	Tn	1 21.1	21.0
523658	2012	DW <sub>98</sub>	6.0	X	356.96908	0.95007	209.72064	19.05039	0.0319793	0.00375070	41.03	39.7	42.3	Tn	4 17.0	22.0
523659	2012	HG <sub>84</sub>	5.4	X	323.15544	25.12301	266.43196	10.85995	0.0919713	0.00347274	43.19	39.2	47.2	Tn	5 28.8	21.4
523671	2013	FZ <sub>27</sub>	4.3	X	283.37195	343.51445	285.20304	14.05687	0.2182886	0.00297924	47.83	37.4	58.3	Tn	3 1.4	21.1
523672	2013	FJ <sub>28</sub>	8.1	X	329.98818	78.88224	184.94555	21.87923	0.4437044	0.00475624	35.02	19.5	50.6	Tn	3 31.3	22.0
523673	2013	MZ <sub>11</sub>	8.0	X	326.90978	18.74793	19.92632	6.36073	0.3102998	0.00815327	24.45	16.9	32.0	Ct	9 3.4	20.8
523674	2013	MA <sub>12</sub>	5.6	X	261.17530	311.32334	114.97358	23.32819	0.0641780	0.00364472	41.82	39.1	44.5	Tn	8 14.9	21.9
523675	2013	PV <sub>74</sub>	5.6	X	31.71859	238.65178	49.07816	2.27600	0.2341469	0.00274544	50.51	38.7	62.3	Sd	9 1.5	21.8
523676	2013	UL <sub>10</sub>	12.8	X	81.85497	186.16811	233.97814	19.16456	0.3775026	0.03156798	9.92	6.2	13.7	Ct	3 16.5	23.1
523677	2013	UF <sub>15</sub>	6.2	X	6.74910	8.54581	39.34653	12.36915	0.1656087	0.00357706	42.34	35.3	49.4	Tn	11 19.2	21.8
523678	2013	UX <sub>26</sub>	5.3	X	311.24093	295.83074	292.41474	3.59083	0.0058318	0.00321540	45.46	45.2	45.7	Tn	3 17.8	21.7
523680	2013	YJ <sub>151</sub>	5.6	X	13.35430	141.10154	302.86795	33.70510	0.4349354	0.00160790	72.16	40.8	103.5	Sd	1 20.6	21.9
523681	2014	BV <sub>64</sub>	4.7	X	264.46858	349.27773	279.33202	15.45463	0.1466917	0.00320945	45.52	38.8	52.2	Tn	2 19.2	21.5
523682	2014	CN <sub>23</sub>	8.8	X	268.34625	11.09353	359.90731	14.14459	0.3076275	0.01487390	16.38	11.3	21.4	Ct	5 23.9	21.4
523683	2014	CP <sub>23</sub>	6.1	X	359.01465	21.60706	145.88669	28.55201	0.2661227	0.00263246	51.95	38.1	65.8	Sd	3 7.5	21.9
523684	2014	CQ <sub>23</sub>	5.7	X	303.05907	239.08130	30.59580	8.71260	0.1597819	0.00317612	45.84	38.5	53.2	Tn	4 6.4	22.0
523686	2014	DB <sub>143</sub>	9.1	X	70.79265	339.30025	207.89832	21.34124	0.0898714	0.01083763	20.22	18.4	22.0	Ct	6 17.8	22.1
523687	2014	DF <sub>143</sub>	5.5	X	102.34971	66.11828	35.58971	23.75279	0.0462829	0.00354787	42.58	40.6	44.5	Tn	4 20.6	21.8
523688	2014	DK <sub>143</sub>	5.5	X	93.55917	336.35632	153.64456	10.86675	0.1567066	0.00358023	42.32	35.7	48.9	Tn	5 24.2	21.9
523689	2014	DL <sub>143</sub>	6.2	X	338.65063	210.00102	18.88752	9.38873	0.2169286	0.00308123	46.77	36.6	56.9	Tn	4 5.3	22.0
523690	2014	DN <sub>143</sub>	5.3	X	281.08315	323.67168	303.80723	6.79227	0.0693565	0.00306882	46.90	43.6	50.2	Tn	3 18.3	22.0
523691	2014	DO <sub>143</sub>	5.7	X	354.10381	331.32577	180.47149	4.19375	0.0964509	0.00303372	47.26	42.7	51.8	Tn	2 12.1	22.0
523692	2014	EZ <sub>51</sub>	3.8	X	269.35218	330.47281	27.64273	10.28961	0.2302491	0.00260467	52.32	40.3	64.4	Sd	5 21.4	21.2
523693	2014	FT <sub>71</sub>	5.0	X	239.28506	351.22116	346.54688	27.99218	0.1456954	0.00343724	43.48	37.1	49.8	Tn	4 3.1	21.8
523695	2014	GS <sub>53</sub>	6.4	X	116.36160	332.28100	132.42700	15.17399	0.0958377	0.00509621	33.44	30.2	36.6	Tn	5 15.2	21.9
523696	2014	GW <sub>53</sub>	5.5	X	296.48315	240.33596	54.84534	21.92103	0.0858995	0.00371751	41.27	37.7	44.8	Tn	5 5.1	21.5
523697	2014	GY <sub>53</sub>	6.8	X	39.87937	22.20275	137.44037	16.18784	0.2911128	0.00399564	39.33	27.9	50.8	Tn	5 12.8	21.9
523698	2014	GD <sub>54</sub>	6.6	X	2.94171	302.76539	253.31590	4.74756	0.6083559	0.00118464	88.46	34.6	142.3	Sd	4 19.7	22.0
523699	2014	GH <sub>54</sub>	6.1	X	359.45169	200.54939	31.81269	27.03904	0.3773293	0.00213834	59.67	37.2	82.2	Sd	5 6.9	21.8
523700	2014	GM <sub>54</sub>	7.1	X	23.71891	73.02756	159.98734	54.18039	0.3913526	0.00393064	39.76	24.2	55.3	Sd	7 16.4	21.6
523701	2014	HT <sub>199</sub>	7.0	X	356.77575	173.33429	73.53426	14.44867	0.2437453	0.00398127	39.43	29.8	49.0	Tn	5 23.3	22.0
523702	2014	HW <sub>199</sub>	6.3	X	30.69980	341.00947	222.77202	15.48383	0.1783760	0.00312200	46.36	38.1	54.6	Tn	5 28.8	22.0
523703	2014	HX <sub>199</sub>	7.1	X	359.48610	133.20262	109.92002	14.72954	0.2291443	0.00393822	39.71	30.6	48.8	Tn	5 26.3	22.0
523704	2014	HB <sub>200</sub>	7.5	X	2.06145	187.07670	39.70625	8.99399	0.2426938	0.00397174	39.49	29.9	49.1	Tn	5 10.0	22.2
523705	2014	HE <sub>200</sub>	6.5	X	342.90828	36.64730	231.39443	9.40210	0.3548538	0.00258606	52.57	33.9	71.2	Sd	5 11.5	22.0
523706	2014	HF <sub>200</sub>	5.9	X	349.78097	253.88968	21.59902	9.72745	0.4223074	0.00205187	61.33	35.4	87.2	Sd	5 27.9	21.5
523708	2014	JB <sub>80</sub>	10.9	X	14.76809	154.01866	131.58221	13.35598	0.3451277	0.01156356	19.37	12.7	26.1	Ct	8 10.9	22.0
523709	2014	JD <sub></sub>														

ELEMENTS AND OPPOSITION DATES OF CENTAURS AND TRANSNEPTUNIAN OBJECTS

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2021 JULY 5.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	$\omega$	$\Omega$	<i>i</i>	<i>e</i>	$\mu$	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>		
523725	2014	MC <sub>70</sub>	6.2	X	12.30038	282.68875	25.68450	7.67941	0.1338763	0.00320781	45.53	39.4	51.6	Tn	8 20.6	22.2
523726	2014	MJ <sub>70</sub>	6.2	X	358.75168	252.87175	95.92017	15.50308	0.6999783	0.00069943	125.69	37.7	213.7	Sd	9 7.0	22.0
523727	2014	NW <sub>65</sub>	6.6	X	305.86057	232.79149	215.93067	20.44006	0.5179306	0.00879066	23.25	11.2	35.3	Ct	8 21.4	20.1
523729	2014	OX <sub>393</sub>	11.1	X	16.12832	330.51532	45.90809	14.69917	0.5337253	0.00758551	25.65	12.0	39.3	Ct	12 6.1	22.6
523730	2014	OH <sub>394</sub>	6.1	X	320.69749	74.41663	290.23015	9.66982	0.1701356	0.00313162	46.27	38.4	54.1	Tn	8 2.0	22.2
523731	2014	OK <sub>394</sub>	6.2	X	31.71287	248.14325	128.37009	4.14004	0.1661963	0.00356820	42.41	35.4	49.5	Tn	11 24.2	21.8
523733	2014	PR <sub>70</sub>	10.5	X	1.76594	52.41450	337.30424	7.61332	0.7976390	0.00164031	71.21	14.4	128.0	Sd	11 18.5	22.3
523734	2014	QV <sub>441</sub>	8.7	X	3.63459	234.28447	159.09317	26.46285	0.4086696	0.00549913	31.79	18.8	44.8	Tn	11 11.9	21.5
523735	2014	QX <sub>441</sub>	5.5	X	30.05097	298.45399	43.92643	25.97104	0.0453118	0.00409409	38.70	36.9	40.5	Tn	10 16.4	21.2
523736	2014	QA <sub>442</sub>	5.5	X	349.76110	280.87764	109.27552	27.40381	0.1877907	0.00344263	43.44	35.3	51.6	Tn	10 20.1	21.1
523738	2014	SH <sub>349</sub>	5.4	X	100.46875	97.80384	202.53190	17.26070	0.1549033	0.00346123	43.28	36.6	50.0	Tn	11 21.3	22.0
523739	2014	TZ <sub>33</sub>	11.3	X	9.30336	159.09307	171.71608	85.90751	0.7546269	0.00414858	38.36	9.4	67.3	Sd	10 26.1	23.1
523740	2014	TV <sub>85</sub>	9.5	X	1.97055	270.00261	257.01016	12.22456	0.3214897	0.00982340	21.59	14.7	28.5	Ct	3 4.1	21.2
523741	2014	TY <sub>85</sub>	6.6	X	7.87122	8.63304	42.38581	19.11333	0.2072156	0.00374645	41.06	32.5	49.6	Tn	11 23.9	21.7
523742	2014	TZ <sub>85</sub>	4.8	X	157.41841	333.82782	336.86530	14.96778	0.2586110	0.00343432	43.51	32.3	54.8	Tn	1 19.7	22.2
523743	2014	TA <sub>86</sub>	6.0	X	39.89596	141.22310	219.27793	9.28785	0.1106135	0.00357199	42.38	37.7	47.1	Tn	11 12.8	21.9
523744	2014	TC <sub>86</sub>	5.8	X	35.92393	18.33084	65.22294	1.27246	0.0618766	0.00339284	43.86	41.1	46.6	Tn	1 23.6	22.0
523745	2014	TD <sub>86</sub>	5.4	X	152.77536	275.89249	52.64325	1.69366	0.0143756	0.00352103	42.79	42.2	43.4	Tn	1 21.9	21.8
523746	2014	UT <sub>114</sub>	9.0	X	1.79597	119.34488	319.51884	15.21648	0.4735209	0.00594604	30.18	15.9	44.5	Sd	12 20.6	21.0
523748	2014	UP <sub>224</sub>	6.0	X	277.78736	349.77152	178.65526	18.36473	0.0822130	0.00379119	40.73	37.4	44.1	Tn	12 10.6	22.1
523749	2014	UR <sub>224</sub>	5.5	X	348.74617	207.51137	244.22742	10.67333	0.2198074	0.00276213	50.31	39.3	61.4	Sd	12 6.7	21.5
523750	2014	US <sub>224</sub>	5.0	X	287.26442	176.11630	317.87631	11.03808	0.1127718	0.00307773	46.81	41.5	52.1	Tn	11 8.0	21.6
523751	2014	UU <sub>224</sub>	7.1	X	2.61587	265.37635	167.03438	15.26394	0.2247994	0.00397037	39.50	30.6	48.4	Tn	12 11.1	22.0
523752	2014	VU <sub>37</sub>	5.1	X	204.24207	342.14877	248.15915	28.62292	0.0442693	0.00379757	40.69	38.9	42.5	Tn	12 5.0	21.3
523753	2014	VV <sub>508</sub>	9.4	X	1.33278	110.89020	34.22666	21.20050	0.7086128	0.00252067	53.47	15.6	91.4	Sd	3 3.9	21.4
523754	2014	WX <sub>508</sub>	11.1	X	6.14802	264.84469	257.64297	11.57535	0.2863891	0.01242204	18.46	13.2	23.8	Ct	3 7.0	22.3
523755	2014	WZ <sub>508</sub>	7.8	X	7.20223	150.02116	338.83403	24.27766	0.6938655	0.00147113	76.57	23.4	129.7	Sd	3 13.4	22.2
523756	2014	WD <sub>509</sub>	5.9	X	327.81793	254.46205	201.52025	1.33446	0.0476679	0.00340001	43.80	41.7	45.9	Tn	11 23.8	22.1
523757	2014	WH <sub>509</sub>	5.2	X	72.85599	319.99632	76.45180	18.17339	0.1792438	0.00338827	43.90	36.0	51.8	Tn	2 1.1	21.6
523758	2014	WJ <sub>509</sub>	5.6	X	310.69897	96.21574	100.38574	20.96402	0.1381176	0.00353102	42.71	36.8	48.6	Tn	2 3.9	21.6
523759	2014	WK <sub>509</sub>	4.4	X	275.25346	134.65790	40.92942	14.48746	0.2058611	0.00271221	50.92	40.4	61.4	Sd	11 28.3	21.6
523760	2014	WQ <sub>509</sub>	5.7	X	228.96118	210.41047	40.59118	9.81113	0.1437571	0.00402103	39.17	33.5	44.8	Tn	1 9.7	22.1
523761	2014	WU <sub>509</sub>	5.9	X	290.11747	334.56596	193.04277	19.59268	0.0695864	0.00369914	41.41	38.5	44.3	Tn	12 21.9	22.0
523762	2014	WX <sub>509</sub>	6.2	X	20.72888	153.58689	333.71905	12.02617	0.1403957	0.00356639	42.43	36.5	48.4	Tn	2 22.9	21.9
523763	2014	WY <sub>509</sub>	5.5	X	194.50859	62.40978	251.27671	15.88913	0.0988815	0.00388896	40.05	36.1	44.0	Tn	2 8.3	22.0
523764	2014	WC <sub>510</sub>	7.2	X	344.88113	288.82713	194.39124	19.53807	0.2480976	0.00399983	39.30	29.6	49.1	Tn	12 29.2	22.0
523765	2014	WD <sub>510</sub>	6.0	X	11.01284	11.37532	79.37523	19.05072	0.3396845	0.00223958	57.86	38.2	77.5	Sd	1 14.0	21.9
523766	2014	WF <sub>510</sub>	7.0	X	23.13574	196.83326	197.03510	26.04655	0.2247317	0.00398130	39.43	30.6	48.3	Tn	12 3.7	22.1
523767	2014	WH <sub>510</sub>	6.6	X	5.87152	213.11188	269.51548	18.64013	0.5694544	0.00149081	75.89	32.7	119.1	Sd	2 9.2	21.9
523768	2014	WQ <sub>510</sub>	5.6	X	154.46168	16.32671	334.49819	22.95416	0.1624629	0.00399671	39.32	32.9	45.7	Tn	2 21.0	22.1
523769	2014	WS <sub>510</sub>	5.5	X	33.74482	268.75064	161.79623	8.92941	0.3719395	0.00242693	54.84	34.4	75.2	Sd	2 7.2	21.7
523770	2014	XO <sub>40</sub>	8.0	X	355.72105	24.14523	212.08904	26.89976	0.7226041	0.00221444	58.29	16.2	100.4	Sd	4 7.2	20.5
523771	2014	XQ <sub>40</sub>	7.1	X	358.31445	294.54548	258.81141	11.52057	0.7254017	0.00096622	101.33	27.8	174.8	Sd	3 13.0	21.7
523772	2014	XR <sub>40</sub>	5.2	X	269.04391	282.79854	3.11877	24.91000	0.1448534	0.00352361	42.77	36.6	49.0	Tn	3 20.3	21.6
523773	2014	XS <sub>40</sub>	5.4	X	37.26877	260.94235	186.49867	27.59544	0.1635877	0.00359376	42.21	35.3	49.1	Tn	2 3.3	21.2
523774	2014	XV <sub>40</sub>	6.1	X	352.40403	63.21921	93.33926	36.42004	0.4183203	0.00210541	60.29	35.1	85.5	Sd	2 6.4	21.7
523776	2014	YB <sub>50</sub>	6.1	X	349.47417	35.88833	104.06366	28.66959	0.0898416	0.00370482	41.36	37.6	45.1	Tn	1 26.9	21.9
523777	2014	YF <sub>50</sub>	5.4	X	359.79313	87.07538	72.88332	18.20094	0.5467241	0.00140939	78.79	35.7	121.9	Sd	3 6.8	21.0
523778	2014	YK <sub>50</sub>	5.9	X	359.56198	169.58556	27.86771	29.66321	0.6673843	0.00077746	117.13	39.0	195.3	Sd	4 8.5	21.8
523780	2015	AN <sub>281</sub>	5.2	X	266.53081	228.88533	53.23058	17.47689	0.1442326	0.00365587	41.73	35.7	47.8	Tn	3 20.2	21.6
523782	2015	BD <sub>518</sub>	9.4	X	11.69906	168.50809	344.06924	17.21395	0.2976831	0.00883855	23.17	16.3	30.1	Ct	3 12.2	21.5
523783	2015	BG <sub>518</sub>	12.0	X	22.38005	11.34156	213.66548	1.81779	0.3046049	0.01758658	14.64	10.2	19.1	Ct	6 18.0	22.2
523784	2015	BJ <sub>518</sub>	8.3	X	288.10333	325.63183	328.57875	6.43934	0.3152809	0.00908822	21.47	14.7	28.2	Ct	3 23.8	21.6
523785	2015	CM <sub>3</sub>	12.8	X	44.85617	163.07899	314.96382	16.76405	0.5060518	0.01870900	14.05	6.9	21.2	Ct	4 24.3	23.5
523787	2015	DV <sub>224</sub>	7.7	X	15.25490	207.56913	209.30013	29.48788	0.6052185	0.00236263	55.83	22.0	89.6	Sd	3 30.7	22.2
523789	2015	FN <sub>345</sub>	6.2	X	323.15360	118.93787	172.69520	27.98184	0.0976887	0.00361758	42.03	37.9	46.1	Tn	5 31.2	22.2
523790	2015	HP <sub>9</sub>	10.4	X	43.80678	36.03517	140.87423	3.06856	0.2696347	0.01270918	18.19	13.3	23.1	Ct	5 29.1	22.2
523791	2015	HT <sub>171</sub>	12.4	X	60.94389	140.59989	58.72845	33.22447	0.2896829	0.02508003	11.56	8.2	14.9	Ct	7 16.5	22.8
523793	2015	OV <sub>79</sub>	6.0	X	285.03812	305.90030	117.46537	30.28325	0.0877522	0.00377417	40.86	37.3	44.4	Tn	9 5.6	22.1
523794	2015	RR <sub>245</sub>	3.8	X	325.63586	260.17519	211.77173	7.54602	0.5843754	0.00132085	82.27	34.2	130.3	Sd	10 2.4	21.7
523797	2016	NM <sub>56</sub>	11.4	X	3.42030	345.53634	349.97025	143.99718	0.8525767	0.00163170	71.46	10.5	132.4	Sd	7 21.1	23.1
523798	2017	CX <sub>33</sub>	11.1	X	2.46643	162.93327	315.89076	72.07788	0.8568731	0.00158195	72.95	10.4	135.5	Sd	2 5.1	22.2
523800	2017	KZ <sub>31</sub>	10.2	X	4.10862	301.15749	144.77965	161.71555	0.7980943	0.00246304	54.30	11.0	97.6	Sd	2 21.1	21.3
523899	1997	CV <sub>29</sub>	7.3	X	17.13065	32.50909	121.33566	8.04033	0.0412510	0.00362618	41.96	40.2	43.7	Tn	3 15.1	23.



ELEMENTS AND OPPOSITION DATES OF CENTAURS AND TRANSNEPTUNIAN OBJECTS

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2021 JULY 5.0 TT

Planet	<i>H</i>	<i>G</i>	<i>M</i>	$\omega$	$\Omega$	<i>i</i>	<i>e</i>	$\mu$	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
524834 2003 YL <sub>179</sub>	7.3	X	115.30359	78.14875	262.16606	2.53298	0.0032699	0.00409697	38.68	38.6	38.8	Tn	12 28.5	23.2
525257 2004 VS <sub>75</sub>	6.7	X	70.50657	294.69105	23.50645	7.37545	0.1070199	0.00330311	44.65	39.9	49.4	Tn	11 2.8	23.1
525258 2004 VT <sub>75</sub>	6.4	X	81.86505	272.90883	26.56380	12.81902	0.2138303	0.00397707	39.45	31.0	47.9	Tn	11 6.9	22.4
525460 2005 EX <sub>297</sub>	6.5	X	278.57674	232.30414	28.19899	4.80858	0.1135537	0.00339997	43.80	38.8	48.8	Tn	3 7.8	22.9
525461 2005 EN <sub>302</sub>	6.9	X	149.66574	7.27268	47.79566	3.06197	0.0831423	0.00327667	44.89	41.2	48.6	Tn	4 19.5	23.7
525462 2005 EO <sub>304</sub>	6.2	X	329.59568	152.20592	93.96435	3.41336	0.0687951	0.00320306	45.58	42.4	48.7	Tn	4 22.6	22.5
525595 2005 JP <sub>179</sub>	6.7	X	65.33280	25.47500	137.94890	2.09450	0.0247552	0.00350009	42.96	41.9	44.0	Tn	5 12.5	23.0
525596 2005 JR <sub>179</sub>	6.8	X	85.38298	60.32989	71.10748	3.74522	0.1120367	0.00307268	46.86	41.6	52.1	Tn	5 10.7	23.5
525729 2005 RQ <sub>43</sub>	6.3	X	65.39672	269.29072	66.27772	20.20676	0.0984585	0.00369028	41.47	37.4	45.6	Tn	11 16.7	22.3
525815 2005 SD <sub>278</sub>	6.2	X	31.14144	218.08635	152.42007	17.85386	0.2847428	0.00237649	55.61	39.8	71.4	Sd	11 30.9	22.7
525816 2005 SF <sub>278</sub>	6.6	X	358.17861	320.14540	101.53412	13.35667	0.1882482	0.00340286	43.78	35.5	52.0	Tn	11 24.6	22.1
527328 2007 TK <sub>422</sub>	9.3	X	128.13846	200.80374	65.34614	3.06661	0.1931579	0.01013557	21.15	17.1	25.2	Ct	11 12.9	23.1
527443 2007 UM <sub>126</sub>	10.5	X	148.69371	104.14810	184.75119	41.74234	0.3405804	0.02138479	12.85	8.5	17.2	Ct	12 24.9	23.0
527603 2007 VJ <sub>305</sub>	6.9	X	1.98946	338.29513	24.35332	11.96635	0.8234524	0.00350677	199.16	35.2	363.2	Sd	10 29.8	22.7
527604 2007 VL <sub>305</sub>	8.1	X	20.79920	214.86441	188.51628	28.09542	0.0640543	0.00599039	30.03	28.1	31.9	Tn	12 1.1	22.7
528219 2008 KV <sub>42</sub>	8.8	X	341.24406	132.60644	260.90978	103.41382	0.4968099	0.00361631	42.04	21.2	62.9	Sd	5 28.7	23.0
528381 2008 ST <sub>291</sub>	4.4	X	23.54653	200.80374	330.86938	20.72384	0.1931579	0.00096919	101.13	42.5	159.7	Sd	10 3.3	22.4
529780 2010 MQ <sub>116</sub>	5.4	X	238.94635	165.70089	5.07137	30.73672	0.1738225	0.00360117	42.15	34.8	49.5	Tn	10 18.8	22.1
529823 2010 PP <sub>81</sub>	6.8	X	3.33410	173.80109	172.21390	30.70493	0.2884363	0.00254961	53.07	37.8	68.4	Sd	9 15.6	22.5
529938 2010 TM <sub>182</sub>	7.0	X	339.23964	29.68853	44.82372	5.61465	0.1677404	0.00396201	39.55	32.9	46.2	Tn	11 8.5	22.2
529939 2010 TU <sub>191</sub>	10.8	X	34.02928	344.48015	60.81092	1.81430	0.2866498	0.01049564	20.66	14.7	26.6	Ct	1 2.1	22.9
529940 2010 TV <sub>192</sub>	6.4	X	27.13858	109.04130	243.61408	13.02785	0.3243288	0.00242391	54.89	37.1	72.7	Sd	11 7.3	22.5
530055 2010 VW <sub>224</sub>	5.5	X	187.74040	149.13361	102.36601	8.91132	0.1391155	0.00340842	43.73	37.6	49.8	Tn	12 10.6	22.5
530231 2011 BV <sub>163</sub>	6.6	X	352.63864	42.36279	105.62674	4.54485	0.0964738	0.00339273	43.86	39.6	48.1	Tn	2 7.9	22.6
530664 2011 SO <sub>277</sub>	7.6	X	146.37889	136.24568	113.39566	9.64210	0.0099390	0.00592153	30.26	30.0	30.6	Tn	11 3.2	22.4
530838 2011 UC <sub>411</sub>	8.0	X	20.87302	88.21521	289.02697	4.65923	0.2748972	0.00398566	39.40	28.6	50.2	Tn	11 16.8	22.8
530839 2011 UK <sub>411</sub>	6.9	X	348.67640	209.52470	219.25781	13.41875	0.2339999	0.00356797	42.42	32.5	52.3	Tn	11 13.8	22.0
530930 2011 WG <sub>157</sub>	7.2	X	215.19964	219.17109	352.01028	22.28254	0.0265127	0.00598971	30.03	29.2	30.8	Tn	11 21.7	22.1
530941 2011 XJ <sub>4</sub>	7.0	X	14.35460	190.56408	335.35619	11.21832	0.1877683	0.00322518	45.37	36.9	53.9	Tn	3 24.4	22.7
530955 2011 YN <sub>79</sub>	6.2	X	359.73725	44.83456	96.92717	25.97255	0.4582767	0.00158964	72.71	39.4	106.0	Sd	2 12.4	22.2
531015 2012 BX <sub>154</sub>	6.4	X	20.18185	128.87509	341.04553	10.17734	0.4884238	0.00159196	72.64	37.2	108.1	Sd	3 8.9	22.8
531016 2012 BZ <sub>154</sub>	7.0	X	7.35073	173.92574	289.20779	26.43809	0.5261018	0.00148668	76.03	36.0	116.0	Sd	1 25.3	22.8
531017 2012 BA <sub>155</sub>	6.1	X	336.59096	341.72462	228.46408	14.38497	0.3717310	0.00242548	54.86	34.5	75.3	Sd	2 22.4	22.0
531040 2012 CS <sub>57</sub>	6.3	X	277.98970	83.61662	150.57301	17.07565	0.0331399	0.00348741	43.07	41.6	44.5	Tn	2 16.5	22.6
531074 2012 DX <sub>98</sub>	7.3	X	3.64943	189.11909	9.75572	13.13879	0.2654139	0.00298175	47.81	35.1	60.5	Tn	4 13.2	22.8
531075 2012 DY <sub>98</sub>	7.2	X	5.23109	160.79915	15.67973	18.73141	0.4968692	0.00168899	69.83	35.1	104.5	Sd	4 3.9	22.7
531076 2012 DA <sub>99</sub>	6.8	X	355.36713	149.10740	56.58251	3.23807	0.0323996	0.00352761	42.74	41.4	44.1	Tn	4 11.2	23.0
531077 2012 DB <sub>99</sub>	6.3	X	94.99278	41.68509	48.45076	9.70327	0.1871772	0.00399573	39.33	32.0	46.7	Tn	4 17.2	22.4
531141 2012 FK <sub>84</sub>	6.5	X	6.12777	83.40167	134.65614	16.47128	0.1638640	0.00310689	46.51	38.9	54.1	Tn	5 11.9	22.4
531142 2012 FL <sub>84</sub>	6.8	X	5.71034	141.88806	53.01026	26.00342	0.6277872	0.00093244	103.77	38.6	168.9	Sd	5 7.9	22.9
531224 2012 HK <sub>85</sub>	6.9	X	349.23217	174.65876	75.86935	4.81239	0.3391480	0.00224440	57.77	38.2	77.4	Sd	5 8.8	22.8
531682 2012 UB <sub>178</sub>	6.0	X	150.76112	87.58127	180.26043	8.94128	0.1152844	0.00353251	42.70	37.8	47.6	Tn	11 28.2	22.7
531683 2012 UC <sub>178</sub>	6.8	X	59.49289	169.94462	178.22086	2.45634	0.1698465	0.00358369	42.29	35.1	49.5	Tn	11 29.4	22.8
531684 2012 UE <sub>178</sub>	6.2	X	215.02634	131.30834	89.99755	4.18589	0.0483281	0.00341350	43.69	41.6	45.8	Tn	12 6.2	22.8
531917 2013 BN <sub>82</sub>	6.7	X	17.59998	277.45951	193.69036	6.60988	0.2038382	0.00345675	43.32	34.5	52.2	Tn	2 4.6	22.2
531942 2013 CV <sub>82</sub>	11.7	X	23.04942	41.16245	137.21093	18.53321	0.3747622	0.01400345	17.05	10.7	23.4	Ct	5 13.7	22.4
532026 2013 EC <sub>138</sub>	6.0	X	341.50274	212.37546	310.96494	8.43860	0.1307783	0.00304982	47.09	40.9	53.3	Tn	2 7.1	22.1
532027 2013 EH <sub>154</sub>	8.0	X	318.18772	354.92447	267.56454	8.16418	0.1976044	0.00550149	31.78	25.5	38.1	Tn	4 8.9	22.4
532037 2013 FY <sub>27</sub>	3.2	X	215.33337	139.41780	186.96083	33.24095	0.4003613	0.00219921	58.56	35.1	82.0	Sd	3 1.9	22.2
532038 2013 FB <sub>28</sub>	6.0	X	50.10412	168.74292	320.87884	15.68591	0.0591686	0.00319854	45.62	42.9	48.3	Tn	3 19.7	22.5
532039 2013 FR <sub>28</sub>	7.3	X	23.00494	132.70833	41.90981	2.99790	0.2379401	0.00342767	43.56	33.2	53.9	Tn	4 22.1	22.7
532092 2013 HU <sub>156</sub>	5.5	X	70.57168	342.98153	185.42364	20.80880	0.1199440	0.00394841	39.64	34.9	44.4	Tn	6 4.1	21.4
532093 2013 HV <sub>156</sub>	5.2	X	282.45026	182.43365	168.80904	18.13797	0.1795857	0.00300113	47.60	39.1	56.1	Tn	6 5.5	22.0
532094 2013 HX <sub>156</sub>	8.1	X	211.70772	259.05831	137.36072	14.90099	0.1951671	0.00814894	24.46	19.7	29.2	Ct	5 22.8	22.7
532095 2013 HY <sub>156</sub>	6.9	X	349.51108	158.69276	86.26907	21.37580	0.0648608	0.00376650	40.91	38.3	43.6	Tn	5 18.4	22.8
532184 2013 OR <sub>11</sub>	7.3	X	8.38399	316.48591	53.21485	21.16974	0.6283406	0.00137061	80.27	29.8	130.7	Sd	11 16.5	22.5
532660 2013 VE <sub>2</sub>	13.1	X	121.31575	260.05871	115.46862	7.05552	0.2321479	0.03716378	8.89	6.8	11.0	Ct	2 22.7	23.1
533028 2014 AL <sub>55</sub>	6.6	X	333.60685	75.45259	104.64570	4.32383	0.2428709	0.00344930	43.38	32.8	53.9	Tn	2 5.8	22.0
533085 2014 BW <sub>64</sub>	6.5	X	46.30046	101.42213	320.13718	15.74883	0.3391580	0.00320558	45.55	30.1	61.0	Tn	2 12.3	22.4
533205 2014 DD <sub>143</sub>	6.1	X	13.84281	326.13169	199.21498	1.92792	0.0131652	0.00342209	43.61	43.0	44.2	Tn	3 19.6	22.4
533206 2014 DE <sub>143</sub>	6.0	X	208.01903	171.39769	164.19396	6.49674	0.0194976	0.00349042	43.04	42.2	43.9	Tn	3 23.7	22.4
533207 2014 DJ <sub>143</sub>	6.6	X	30.44524	110.44386	99.79792	6.9								

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Planet	<i>H</i>	<i>G</i>	<i>M</i>	$\omega$	$\Omega$	<i>i</i>	<i>e</i>	$\mu$	<i>a</i>	<i>q</i>	<i>Q</i>	<i>T</i>	Oppos.	<i>V</i>
534073 2014 QL <sub>441</sub>	6.6	X	18.81603	290.25828	75.77008	26.29660	0.2656465	0.00287132	49.02	36.0	62.0	Tn	11 9.5	22.3
534074 2014 QZ <sub>441</sub>	5.9	X	245.57914	173.84872	335.01885	6.53202	0.0762571	0.00356691	42.42	39.2	45.7	Tn	10 18.4	22.3
534161 2014 RO <sub>63</sub>	7.3	X	347.14971	336.50113	117.49958	9.68619	0.1915260	0.00401155	39.23	31.7	46.7	Tn	12 8.9	22.4
534251 2014 SW <sub>223</sub>	13.1	X	122.70277	289.31523	22.49915	10.72543	0.1540911	0.03659715	8.98	7.6	10.4	Ct	12 24.8	23.0
534314 2014 SJ <sub>349</sub>	7.2	X	359.04460	296.05979	123.72289	8.92916	0.1648753	0.00358124	42.31	35.3	49.3	Tn	11 23.5	22.7
534315 2014 SK <sub>349</sub>	7.9	X	14.33790	315.57901	59.88006	9.39447	0.2938443	0.00394415	39.67	28.0	51.3	Tn	11 6.9	22.5
534405 2014 TW <sub>85</sub>	6.1	X	62.95396	242.65843	106.56627	0.94234	0.0209776	0.00349526	43.00	42.1	43.9	Tn	11 17.5	22.4
534625 2014 UQ <sub>224</sub>	5.5	X	194.96647	225.83688	16.50813	1.94265	0.0509991	0.00333345	44.38	42.1	46.6	Tn	12 8.4	22.2
534626 2014 UT <sub>224</sub>	6.6	X	12.81174	328.67128	81.79673	3.88441	0.2656392	0.00297151	47.92	35.2	60.6	Tn	12 6.2	22.1
534627 2014 UV <sub>224</sub>	6.1	X	340.49252	222.14330	249.89149	3.95104	0.5245344	0.00162547	71.64	34.1	109.2	Sd	11 11.4	22.3
534631 2014 UX <sub>229</sub>	8.3	X	12.17562	2.93640	15.21147	15.94638	0.3391335	0.00392044	39.83	26.3	53.3	Tn	11 3.9	22.6
535017 2014 WY <sub>508</sub>	7.5	X	2.02285	170.98979	343.64325	21.27026	0.7062685	0.00101625	97.98	28.8	167.2	Sd	3 9.3	22.1
535018 2014 WA <sub>509</sub>	6.0	X	65.21577	335.80757	120.24933	3.00376	0.0525821	0.00340133	43.79	41.5	46.1	Tn	3 7.9	22.3
535019 2014 WE <sub>509</sub>	7.2	X	36.10469	3.94964	125.54596	13.91378	0.0868053	0.00451700	36.24	33.1	39.4	Tn	3 15.6	22.5
535020 2014 WG <sub>509</sub>	5.8	X	110.14753	181.19550	129.58513	21.43092	0.0845388	0.00354848	42.57	39.0	46.2	Tn	12 6.5	22.3
535021 2014 WL <sub>509</sub>	6.1	X	282.18033	50.04131	184.21247	15.14733	0.1293874	0.00372479	41.22	35.9	46.5	Tn	2 7.5	22.2
535022 2014 WY <sub>509</sub>	6.2	X	294.46679	317.42292	276.86819	7.11465	0.0521205	0.00361307	42.06	39.9	44.3	Tn	2 28.6	22.4
535023 2014 WO <sub>509</sub>	6.3	X	7.35719	50.43737	109.11377	3.75747	0.0870119	0.00340839	43.73	39.9	47.5	Tn	3 9.8	22.3
535024 2014 WR <sub>509</sub>	7.3	X	328.07342	65.36953	51.82823	26.40781	0.3429117	0.00399617	39.33	25.8	52.8	Tn	11 17.1	22.0
535025 2014 WT <sub>509</sub>	7.2	X	13.95429	225.65958	182.26442	12.25352	0.2535961	0.00301102	47.50	35.5	59.5	Tn	12 5.9	22.8
535026 2014 WV <sub>509</sub>	6.7	X	18.39917	196.88040	205.57316	25.36219	0.1761699	0.00309202	46.66	38.4	54.9	Tn	12 1.6	22.7
535027 2014 WY <sub>509</sub>	5.8	X	283.29862	317.7414	299.01762	11.51831	0.1740944	0.00340020	43.80	36.2	51.4	Tn	2 24.4	22.2
535028 2014 WA <sub>510</sub>	5.9	X	94.44131	324.35179	104.58982	2.15625	0.0386204	0.00324727	45.16	43.4	46.9	Tn	3 8.8	22.4
535029 2014 WG <sub>510</sub>	6.7	X	69.05995	177.24887	167.30541	17.48714	0.2168290	0.00401511	39.20	30.7	47.7	Tn	12 12.6	22.5
535030 2014 WJ <sub>510</sub>	6.6	X	3.87622	183.81254	332.56914	24.39887	0.4860899	0.00176815	67.73	34.8	100.7	Sd	3 5.0	22.1
535031 2014 WL <sub>510</sub>	6.5	X	347.78379	321.31215	219.94637	4.67078	0.4330955	0.00197850	62.84	35.6	90.1	Sd	2 14.7	22.3
535032 2014 WP <sub>510</sub>	7.3	X	44.92981	299.07767	73.95023	8.21918	0.1801912	0.00397328	39.48	32.4	46.6	Tn	12 7.9	22.8
535167 2014 XT <sub>40</sub>	7.3	X	18.11831	173.11370	223.80909	7.33424	0.1929351	0.00397810	39.45	31.8	47.1	Tn	11 27.4	22.4
535168 2014 XU <sub>40</sub>	7.1	X	327.99518	228.01342	258.37721	4.77005	0.1722101	0.00399666	39.33	32.6	46.1	Tn	12 14.7	22.4
535169 2014 XX <sub>40</sub>	7.3	X	2.32342	325.18452	202.28125	19.70097	0.5940104	0.00139597	79.29	32.2	126.4	Sd	3 16.5	22.4
535228 2014 YE <sub>50</sub>	5.5	X	43.49325	286.29605	121.24097	26.93570	0.3782682	0.00216894	59.11	36.7	81.5	Sd	1 31.8	22.4
535229 2014 YG <sub>50</sub>	7.2	X	46.03737	106.93031	303.77753	19.11860	0.1959046	0.00401102	39.23	31.5	46.9	Tn	1 16.2	22.6
535230 2014 YH <sub>50</sub>	6.3	X	15.41074	12.62851	102.17465	40.75950	0.3161377	0.00232879	56.37	38.5	74.2	Sd	2 16.1	22.4
535231 2014 YJ <sub>50</sub>	6.8	X	54.33162	46.56876	12.23787	7.29220	0.1969676	0.00400841	39.25	31.5	47.0	Tn	2 4.4	22.4
535466 2015 AK <sub>281</sub>	6.9	X	14.69365	77.18570	65.94911	16.92683	0.2121340	0.00355199	42.54	33.5	51.6	Tn	3 13.9	22.2
535985 2015 BF <sub>515</sub>	9.9	X	48.74879	103.53749	322.27774	28.37872	0.1654183	0.01080081	20.27	16.9	23.6	Ct	2 1.2	22.5
535986 2015 BN <sub>518</sub>	6.8	X	340.18344	204.30843	312.21732	22.59290	0.2175061	0.00314990	46.09	36.1	56.1	Tn	1 26.1	22.5
535987 2015 BO <sub>518</sub>	6.8	X	322.50347	236.00056	340.82585	7.70173	0.2307561	0.00313507	46.24	35.6	56.9	Tn	2 27.3	22.7
535988 2015 BU <sub>518</sub>	7.5	X	16.37594	132.68556	61.32077	11.38893	0.2730323	0.00341310	43.69	31.8	55.6	Tn	5 4.9	22.6
535989 2015 BV <sub>518</sub>	5.8	X	123.55679	276.10380	98.32283	1.79070	0.0387688	0.00331359	44.56	42.8	46.3	Tn	2 10.3	22.4
535990 2015 BW <sub>518</sub>	6.7	X	7.64415	98.81408	35.67758	9.25281	0.1478318	0.00330763	44.61	38.0	51.2	Tn	2 16.5	22.5
535991 2015 BD <sub>519</sub>	5.9	X	318.65207	95.52548	120.60575	10.39474	0.3420516	0.00243081	54.78	36.0	73.5	Sd	2 8.6	22.2
535992 2015 BF <sub>519</sub>	7.7	X	347.63873	266.66698	290.46405	19.21235	0.3186449	0.00404672	39.00	26.6	51.4	Tn	3 3.4	22.1
535993 2015 BG <sub>519</sub>	6.5	X	217.17938	353.10346	330.76856	34.47136	0.0323763	0.00407676	38.81	37.6	40.1	Tn	3 8.2	22.5
535994 2015 BH <sub>519</sub>	6.3	X	336.06139	241.28886	7.33484	27.89628	0.3252100	0.00250772	53.66	36.2	71.1	Sd	4 6.9	22.2
536287 2015 CL <sub>62</sub>	6.5	X	326.45281	209.12145	335.65912	19.07905	0.1350387	0.00370621	41.35	35.8	46.9	Tn	2 11.9	22.2
536919 2015 FL <sub>345</sub>	5.9	X	294.53481	177.64556	116.97656	5.35957	0.1299544	0.00317297	45.87	39.9	51.8	Tn	4 26.8	22.3
536920 2015 FM <sub>345</sub>	6.3	X	68.93484	50.74344	103.54420	17.11146	0.0288020	0.00354612	42.59	41.4	43.8	Tn	5 12.1	22.6
536921 2015 FO <sub>345</sub>	7.1	X	32.36498	33.22192	152.97816	20.15154	0.1293872	0.00386962	40.18	35.0	45.4	Tn	5 12.7	22.7
536922 2015 FP <sub>345</sub>	6.9	X	32.98389	34.17405	130.30694	10.03808	0.2145928	0.00342513	43.59	34.2	52.9	Tn	4 27.8	22.5
538495 2016 EB <sub>195</sub>	12.0	X	38.36525	91.67016	59.28848	20.83991	0.4584624	0.01726205	14.83	8.0	21.6	Ct	5 19.5	22.5
538690 2016 FP <sub>59</sub>	5.8	X	94.10612	167.59554	270.11886	4.20589	0.1599730	0.00312372	46.35	38.9	53.8	Tn	3 28.3	22.6
538691 2016 FW <sub>59</sub>	6.1	X	234.45977	32.44355	290.39659	6.30308	0.0735351	0.00346753	43.23	40.1	46.4	Tn	3 28.5	22.7
541132 2015 TG <sub>387</sub>	5.5	X	359.53378	117.70286	300.80146	11.65620	0.9474870	0.00002256	1240.28	65.1	2415.4	Sd	9 28.8	24.4
542258 2013 AP <sub>183</sub>	5.6	X	46.43724	216.03082	193.16197	3.33958	0.3692816	0.00226010	57.51	36.3	78.7	Sd	2 4.0	22.5
542889 2013 MY <sub>11</sub>	8.5	X	9.74532	195.72403	99.60663	14.49223	0.5934979	0.00255412	53.00	21.5	84.5	Sd	9 7.2	22.3
543354 2014 AN <sub>55</sub>	4.1	X	317.66488	307.82999	283.91229	9.43180	0.3853170	0.00236828	55.74	34.3	77.2	Sd	2 13.5	20.7
543375 2014 BX <sub>64</sub>	5.8	X	102.50531	71.82822	323.08492	11.19077	0.0490668	0.00366987	41.63	39.6	43.7	Tn	2 11.2	22.0
543376 2014 BE <sub>70</sub>	6.1	X	358.34750	287.49503	239.65106	25.43882	0.6186458	0.00094830	102.61	39.1	166.1	Sd	2 17.1	22.1
543377 2014 BF <sub>70</sub>	9.6	X	358.13498	280.15141	307.37901	11.35787	0.8707013	0.00116678	89.36	11.6	167.2	Sd	3 12.5	21.1
543435 2014 GC <sub>54</sub>	7.0	X	19.32487	132.07348	67.35225	20.16144	0.2569451	0.00400323	39.28	29.2	49.4	Tn	5 15.3	21.8
543454 2014 HZ <sub>199</sub>	5.0	X	68.83887	84.15727	57.08405	27.87633	0.1526511	0.00348251	43.11	36.5	49.7	Tn	5 10.3	21.2
543733 2014 OZ <sub>393</sub>	6.3	X	18.86863	183.42411	211.20148	16.66897	0.1875160	0.00313165	46.27	37.6	54.9	Tn	11 25.9	22.1
543734 2014 OL <sub>394</sub>	7.7	X	6.74075	171.49922	208.43938	4.58095	0.2733958	0.00357618	42.35	30.8	53.9	Tn	10 26.5	22.6
543735 2014 OS <sub>394</sub>	6.1	X	357.32956	251.44307	194.24953	14.11033	0.7519669	0.00053830	149.67	37.1	262.2	Sd	11 22.4	22.0
544430 2014 UW <sub>224</sub>	6.8	X	19.26293	187.90829	257.29059	2.95476	0.4010283	0.00241037	55.09	33.0	77.2	Sd	1 29.9	22.4
544977 2014 WZ <sub>535</sub>	6.3	X	234.55400	48.21109	221.49555	19.68726	0.0786719	0.00382037	40.53	37.3	43.7	Tn	1 31.2	22.6