# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56001 1998 $SR_{146}$ | 15.5 | $X$ | 170.79295 | 17.83568 | 16.65356 | 5.51582 | 0.1759555 | 0.29581765 | 2.2307625 | 20 | 4 5.8 | 18.8 |
| 56002 1998 $SJ_{147}$ | 15.9 | $X$ | 300.60837 | 262.56836 | 171.36972 | 3.73911 | 0.1541292 | 0.27037456 | 2.3686024 | 20 | 11 19.2 | 17.8 |
| 56003 1998 $SB_{156}$ | 16.6 | $X$ | 22.88604 | 19.64091 | 44.28764 | 2.85863 | 0.2066778 | 0.28033210 | 2.3121757 | 20 | — | — |
| 56004 1998 $SO_{161}$ | 16.3 | $X$ | 161.96306 | 33.43103 | 24.76026 | 7.69584 | 0.1067311 | 0.29779198 | 2.2208917 | 20 | 4 23.9 | 19.2 |
| 56005 1998 $SK_{169}$ | 14.8 | $X$ | 267.70009 | 200.42479 | 153.35197 | 10.02826 | 0.1671479 | 0.21381563 | 2.7697660 | 20 | 5 24.5 | 18.9 |
| 56006 1998 $TJ_{13}$ | 15.2 | $X$ | 218.66894 | 342.14733 | 41.03758 | 3.29573 | 0.1228754 | 0.30007064 | 2.2096342 | 20 | 5 8.9 | 18.3 |
| 56007 1998 $TP_{14}$ | 16.4 | $X$ | 127.23983 | 100.30145 | 37.36537 | 1.09073 | 0.0433089 | 0.30393427 | 2.1908683 | 20 | 6 28.5 | 19.1 |
| 56008 1998 $TL_{20}$ | 16.5 | $X$ | 113.16163 | 62.28301 | 28.01637 | 6.47564 | 0.1039832 | 0.29425105 | 2.2386732 | 20 | 4 10.1 | 19.3 |
| 56009 1998 $TZ_{33}$ | 16.3 | $X$ | 46.56194 | 326.88131 | 86.77858 | 3.70822 | 0.2092088 | 0.28122303 | 2.3072897 | 20 | — | — |
| 56010 1998 $UJ_{8}$ | 15.4 | $X$ | 97.20401 | 211.17811 | 202.60862 | 3.73560 | 0.1548079 | 0.28666105 | 2.2780168 | 20 | 2 2.9 | 17.8 |
| 56011 1998 $UJ_{16}$ | 14.6 | $X$ | 72.77545 | 330.40210 | 101.41738 | 6.13886 | 0.1591577 | 0.28039257 | 2.3118432 | 20 | 1 22.2 | 16.5 |
| 56012 1998 $UE_{19}$ | 15.9 | $X$ | 169.16056 | 256.73725 | 160.58411 | 3.50315 | 0.1497334 | 0.29706982 | 2.2244895 | 20 | 5 4.5 | 19.1 |
| 56013 1998 $UB_{21}$ | 15.0 | $X$ | 344.80926 | 259.51141 | 227.21317 | 21.58130 | 0.2701974 | 0.27858664 | 2.3218234 | 20 | — | — |
| 56014 1998 $UO_{25}$ | 16.3 | $X$ | 37.62367 | 263.84691 | 149.10386 | 3.48785 | 0.1733001 | 0.28004947 | 2.3137311 | 20 | — | — |
| 56015 1998 $UH_{26}$ | 16.0 | $X$ | 66.63058 | 352.21438 | 143.96242 | 4.49274 | 0.0693652 | 0.29371570 | 2.2413927 | 20 | 4 3.1 | 18.3 |
| 56016 1998 $UO_{36}$ | 15.9 | $X$ | 199.82827 | 29.65875 | 0.90846 | 6.00760 | 0.1498325 | 0.29921173 | 2.2138608 | 20 | 4 26.3 | 19.2 |
| 56017 1998 $VC_{4}$ | 15.9 | $X$ | 287.74530 | 256.53874 | 156.93001 | 1.58746 | 0.1803357 | 0.26457815 | 2.4030717 | 20 | 9 15.8 | 18.2 |
| 56018 1998 $VH_{4}$ | 16.0 | $X$ | 317.80820 | 95.39166 | 38.65419 | 3.76784 | 0.1584350 | 0.27767244 | 2.3269169 | 20 | — | — |
| 56019 1998 $VS_{4}$ | 16.1 | $X$ | 325.06580 | 173.72131 | 150.16138 | 5.62209 | 0.1788597 | 0.30740069 | 2.1743669 | 20 | 7 15.7 | 17.5 |
| 56020 1998 $VW_{10}$ | 16.5 | $X$ | 58.32617 | 65.31118 | 12.80932 | 0.97914 | 0.1780015 | 0.28530243 | 2.2852431 | 20 | 1 1.8 | 18.2 |
| 56021 1998 $VD_{16}$ | 16.0 | $X$ | 14.80193 | 341.06082 | 65.14163 | 7.10824 | 0.1794123 | 0.27675394 | 2.3320624 | 20 | — | — |
| 56022 1998 $VL_{23}$ | 15.8 | $X$ | 19.64540 | 186.04265 | 223.81977 | 3.41097 | 0.2146229 | 0.27724429 | 2.3293119 | 20 | — | — |
| 56023 1998 $VX_{28}$ | 15.6 | $X$ | 153.10045 | 112.46877 | 268.31904 | 5.77944 | 0.1287682 | 0.29074215 | 2.2566492 | 20 | 2 23.9 | 18.8 |
| 56024 1998 $VA_{30}$ | 15.5 | $X$ | 264.71015 | 25.42771 | 43.63095 | 6.18855 | 0.1704613 | 0.26358156 | 2.4091252 | 20 | 9 4.6 | 18.4 |
| 56025 1998 $VW_{30}$ | 15.8 | $X$ | 169.98147 | 8.73176 | 0.16326 | 1.70266 | 0.1265203 | 0.29137421 | 2.2533846 | 20 | 2 29.5 | 19.0 |
| 56026 1998 $VN_{52}$ | 14.5 | $X$ | 297.96626 | 240.21347 | 151.55521 | 7.61947 | 0.1711722 | 0.26430099 | 2.4047514 | 20 | 9 3.9 | 16.7 |
| 56027 1998 $WG_{1}$ | 15.1 | $X$ | 51.92906 | 218.20154 | 203.45086 | 25.07489 | 0.2414022 | 0.28141065 | 2.3062641 | 20 | — | — |
| 56028 1998 $WA_{14}$ | 15.7 | $X$ | 321.03697 | 95.17442 | 17.59220 | 0.43385 | 0.1980515 | 0.27476424 | 2.3433073 | 20 | — | — |
| 56029 1998 $WZ_{15}$ | 15.7 | $X$ | 327.35168 | 337.98289 | 135.81849 | 3.06091 | 0.1708118 | 0.27583751 | 2.3372249 | 20 | — | — |
| 56030 1998 $WH_{16}$ | 16.0 | $X$ | 37.72961 | 12.36968 | 71.96749 | 6.71742 | 0.0732098 | 0.28232179 | 2.3012994 | 20 | — | — |
| 56031 1998 $WO_{18}$ | 15.1 | $X$ | 75.15784 | 322.38077 | 32.70903 | 5.13036 | 0.2398846 | 0.27869255 | 2.3212352 | 20 | — | — |
| 56032 1998 $WX_{18}$ | 16.0 | $X$ | 152.12323 | 6.51470 | 60.31082 | 6.25376 | 0.0875104 | 0.29482195 | 2.2357823 | 20 | 4 25.3 | 18.9 |
| 56033 1998 $WF_{19}$ | 15.4 | $X$ | 38.78466 | 203.74465 | 291.20835 | 5.06851 | 0.1091858 | 0.28775304 | 2.2722499 | 20 | 2 13.1 | 17.4 |
| 56034 1998 $WS_{19}$ | 14.5 | $X$ | 37.92881 | 75.10210 | 14.17114 | 11.76321 | 0.2495181 | 0.23131472 | 2.6282532 | 20 | — | — |
| 56035 1998 $WV_{20}$ | 15.4 | $X$ | 140.68823 | 85.65824 | 88.18705 | 2.58125 | 0.0596477 | 0.30686543 | 2.1768946 | 20 | 9 10.4 | 18.0 |
| 56036 1998 $WH_{31}$ | 15.0 | $X$ | 129.88732 | 232.63763 | 125.35623 | 24.85134 | 0.2303508 | 0.28492521 | 2.2872596 | 20 | 1 15.6 | 18.1 |
| 56037 1998 $WF_{32}$ | 15.8 | $X$ | 135.38649 | 127.31153 | 251.24029 | 6.09974 | 0.1401329 | 0.28788367 | 2.2715625 | 20 | 2 2.9 | 18.8 |
| 56038 1998 $XC_{3}$ | 15.3 | $X$ | 106.73194 | 22.95128 | 57.71162 | 4.23445 | 0.2001307 | 0.24349170 | 2.5398804 | 20 | 4 7.1 | 18.8 |
| 56039 1998 $XO_{3}$ | 15.2 | $X$ | 24.13083 | 108.76749 | 267.14792 | 7.66228 | 0.2354152 | 0.27311491 | 2.3527319 | 20 | — | — |
| 56040 1998 $XP_{3}$ | 16.2 | $X$ | 12.74164 | 48.12564 | 358.07335 | 2.65562 | 0.1550299 | 0.27387715 | 2.3483646 | 20 | — | — |
| 56041 Luciendumont | 15.2 | $X$ | 119.49154 | 358.38712 | 13.70201 | 7.66104 | 0.2164961 | 0.28348675 | 2.2949904 | 20 | 1 22.1 | 18.2 |
| 56042 1998 $XW_{10}$ | 14.3 | $X$ | 197.32600 | 6.47026 | 307.74693 | 6.43108 | 0.1298700 | 0.27947118 | 2.3169217 | 20 | 1 20.2 | 17.8 |
| 56043 1998 $XQ_{11}$ | 15.4 | $X$ | 247.58134 | 51.83563 | 260.03174 | 5.64146 | 0.2115152 | 0.29277863 | 2.2461726 | 20 | 2 26.0 | 19.1 |
| 56044 1998 $XU_{17}$ | 15.5 | $X$ | 312.80868 | 270.68398 | 139.86085 | 3.14441 | 0.1715983 | 0.26450874 | 2.4034921 | 20 | 11 6.6 | 17.5 |
| 56045 1998 $XD_{21}$ | 14.7 | $X$ | 55.28648 | 177.31860 | 117.08000 | 3.29458 | 0.1189423 | 0.30698234 | 2.1763419 | 20 | 11 17.2 | 17.3 |
| 56046 1998 $XC_{26}$ | 14.2 | $X$ | 193.02182 | 138.87524 | 340.89224 | 11.99403 | 0.1188315 | 0.25318317 | 2.4746445 | 20 | 8 21.1 | 17.8 |
| 56047 1998 $XK_{36}$ | 16.1 | $X$ | 84.41320 | 118.27628 | 317.91623 | 1.30013 | 0.0387917 | 0.28579706 | 2.2826056 | 20 | 1 30.0 | 18.7 |
| 56048 1998 $XV_{39}$ | 15.2 | $X$ | 251.14444 | 117.31919 | 17.39031 | 7.98536 | 0.0787013 | 0.26725108 | 2.3870219 | 20 | 11 26.2 | 18.2 |
| 56049 1998 $XA_{44}$ | 14.9 | $X$ | 118.64962 | 350.61750 | 45.07692 | 4.53849 | 0.2514052 | 0.24096041 | 2.5576371 | 20 | 3 1.3 | 18.7 |
| 56050 1998 $XG_{45}$ | 15.3 | $X$ | 281.38594 | 193.35629 | 330.49284 | 4.11396 | 0.1682529 | 0.27260117 | 2.3556870 | 20 | — | — |
| 56051 1998 $XF_{50}$ | 15.3 | $X$ | 147.15951 | 167.73388 | 15.69326 | 3.21808 | 0.1231078 | 0.25777443 | 2.4451724 | 20 | 9 24.5 | 19.0 |
| 56052 1998 $XN_{50}$ | 15.2 | $X$ | 144.09125 | 275.82862 | 94.70099 | 4.92136 | 0.1823418 | 0.28561740 | 2.2835627 | 20 | 2 11.4 | 18.4 |
| 56053 1998 $XG_{52}$ | 16.0 | $X$ | 347.49035 | 62.93995 | 23.13628 | 4.43863 | 0.1393108 | 0.27306171 | 2.3530375 | 20 | — | — |
| 56054 1998 $XR_{52}$ | 15.6 | $X$ | 318.06051 | 49.59186 | 83.81772 | 6.47281 | 0.1232699 | 0.27379119 | 2.3488561 | 20 | — | — |
| 56055 1998 $XB_{54}$ | 15.0 | $X$ | 298.35124 | 104.19692 | 33.59773 | 6.77402 | 0.0697781 | 0.27241748 | 2.3567458 | 20 | — | — |
| 56056 1998 $XP_{58}$ | 14.6 | $X$ | 343.97010 | 55.23497 | 98.30228 | 6.03303 | 0.1712196 | 0.27995002 | 2.3142790 | 20 | — | — |
| 56057 1998 $XZ_{59}$ | 15.7 | $X$ | 88.31573 | 300.14697 | 96.11503 | 3.47851 | 0.1590071 | 0.28202975 | 2.3028877 | 20 | — | — |
| 56058 1998 $XL_{62}$ | 14.8 | $X$ | 83.77887 | 122.44896 | 10.32598 | 21.17473 | 0.1178032 | 0.29141571 | 2.2531706 | 20 | 4 23.7 | 17.6 |
| 56059 1998 $XE_{64}$ | 15.3 | $X$ | 88.42910 | 53.01060 | 5.41932 | 4.28103 | 0.1371111 | 0.28564167 | 2.2834333 | 20 | 1 26.6 | 17.6 |
| 56060 1998 $XT_{70}$ | 15.4 | $X$ | 18.95176 | 90.12149 | 59.62016 | 6.60903 | 0.1367273 | 0.28486589 | 2.2875772 | 20 | 1 31.9 | 17.5 |
| 56061 1998 $XY_{90}$ | 15.6 | $X$ | 267.45099 | 340.96745 | 122.79764 | 9.05745 | 0.1790645 | 0.26555774 | 2.3971584 | 20 | 10 29.4 | 18.3 |
| 56062 1998 $XD_{91}$ | 15.0 | $X$ | 81.45821 | 270.90290 | 168.41564 | 4.10987 | 0.2361534 | 0.23937992 | 2.5688825 | 20 | 3 7.5 | 17.9 |
| 56063 1998 $XM_{93}$ | 14.0 | $X$ | 166.47422 | 76.92800 | 134.26038 | 8.40316 | 0.1650331 | 0.26336457 | 2.4104483 | 20 | 11 18.7 | 17.9 |
| 56064 1998 $XW_{93}$ | 15.2 | $X$ | 31.05464 | 215.48429 | 209.59073 | 6.86517 | 0.1603378 | 0.27686178 | 2.3314569 | 20 | — | — |
| 56065 1998 $XB_{97}$ | 16.1 | $X$ | 244.37633 | 176.60001 | 298.17842 | 5.45386 | 0.0774042 | 0.26121884 | 2.4236304 | 20 | 10 17.9 | 19.3 |
| 56066 1998 $YA$ | 15.4 | $X$ | 309.37738 | 132.67108 | 277.00332 | 0.57237 | 0.1688021 | 0.26415616 | 2.4056303 | 20 | 10 26.6 | 17.4 |
| 56067 1998 $YH_{2}$ | 14.1 | $X$ | 275.27294 | 307.77443 | 310.06232 | 12.61544 | 0.1404527 | 0.23420219 | 2.6066061 | 20 | 1 31.8 | 18.0 |
| 56068 1998 $YQ_{2}$ | 15.4 | $X$ | 319.06079 | 300.95598 | 93.89950 | 3.25427 | 0.2168309 | 0.26239257 | 2.4163974 | 20 | 10 25.7 | 17.0 |
| 56069 1998 $YL_{5}$ | 15.3 | $X$ | 67.99794 | 76.80012 | 69.71175 | 6.63254 | 0.1442957 | 0.29196525 | 2.2503424 | 20 | 5 3.4 | 17.5 |
| 56070 1998 $YQ_{5}$ | 14.9 | $X$ | 61.29658 | 131.43644 | 311.66032 | 2.56977 | 0.1125056 | 0.28118472 | 2.3074993 | 20 | 1 11.6 | 17.1 |
| 56071 1998 $YF_{6}$ | 14.9 | $X$ | 97.11590 | 318.81452 | 151.43661 | 25.13017 | 0.2149700 | 0.29032449 | 2.2588129 | 20 | 5 11.4 | 18.6 |
| 56072 1998 $YK_{8}$ | 15.0 | $X$ | 327.14517 | 79.44011 | 129.61677 | 5.40465 | 0.1347408 | 0.28179211 | 2.3041823 | 20 | 1 26.4 | 17.5 |
| 56073 1998 $YO_{10}$ | 15.8 | $X$ | 52.54712 | 331.06046 | 84.90387 | 3.12921 | 0.2117120 | 0.27927723 | 2.3179943 | 20 | — | — |
| 56074 1998 $YG_{18}$ | 15.9 | $X$ | 261.83850 | 307.53801 | 171.01842 | 2.63113 | 0.1484991 | 0.26798290 | 2.3826742 | 20 | 11 12.3 | 18.4 |
| 56075 1998 $YV_{21}$ | 13.9 | $X$ | 235.84055 | 280.99164 | 296.95690 | 12.09872 | 0.1244559 | 0.22520128 | 2.6756059 | 20 | — | — |
| 56076 1998 $YV_{29}$ | 14.5 | $X$ | 43.10130 | 136.52195 | 10.52407 | 12.62704 | 0.1156641 | 0.23793431 | 2.5792771 | 20 | 3 21.9 | 17.4 |
| 56077 1998 $YD_{32}$ | 14.8 | $X$ | 251.20267 | 337.23572 | 111.41743 | 26.00349 | 0.2436371 | 0.25926079 | 2.4358179 | 20 | 9 4.4 | 18.5 |
| 56078 1999 $AT$ | 15.3 | $X$ | 107.66647 | 16.27264 | 75.89349 | 5.73341 | 0.1581009 | 0.24221590 | 2.5487914 | 20 | 4 18.4 | 18.9 |
| 56079 1999 $AS_{2}$ | 14.1 | $X$ | 8.56048 | 207.88997 | 346.47120 | 14.93897 | 0.0360969 | 0.23846053 | 2.5754812 | 20 | 3 23.8 | 17.3 |
| 56080 1999 $AN_{3}$ | 14.7 | $X$ | 83.48013 | 101.76579 | 308.83784 | 3.33937 | 0.1501846 | 0.27995585 | 2.3142469 | 20 | 1 8.9 | 16.9 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56081 1999 $AU_8$ | 15.2 | X | 129.01618 | 21.45047 | 266.45148 | 6.52140 | 0.0580231 | 0.26905694 | 2.3763291 | 20 | — | — |
| 56082 1999 $AK_9$ | 16.2 | X | 296.32749 | 306.30088 | 153.31885 | 2.47981 | 0.1839978 | 0.26731454 | 2.3866441 | 20 | 12 16.2 | 18.1 |
| 56083 1999 $AQ_{16}$ | 15.6 | X | 79.22261 | 68.03193 | 192.42805 | 2.21546 | 0.1638976 | 0.25721349 | 2.4487262 | 20 | 10 26.4 | 19.2 |
| 56084 1999 $AN_{19}$ | 15.1 | X | 186.38543 | 182.80588 | 133.80831 | 7.31399 | 0.1676893 | 0.27767923 | 2.3268789 | 20 | 1 14.0 | 18.6 |
| 56085 1999 $AV_{19}$ | 15.3 | X | 340.63867 | 47.95047 | 323.12414 | 3.19146 | 0.2304960 | 0.26132480 | 2.4229752 | 20 | 11 9.3 | 17.0 |
| 56086 1999 $AA_{21}$ | 13.3 | X | 318.30790 | 35.02329 | 333.10140 | 23.71232 | 0.2068575 | 0.25900513 | 2.4374206 | 20 | 9 1.6 | 15.1 |
| 56087 1999 $AH_{22}$ | 15.4 | X | 290.70730 | 211.07490 | 179.86364 | 2.23829 | 0.2235864 | 0.25984027 | 2.4321951 | 20 | 8 7.9 | 18.0 |
| 56088 Wuheng | 13.9 | X | 23.76973 | 83.32078 | 42.76213 | 13.27129 | 0.1566354 | 0.23261947 | 2.6184162 | 20 | 1 19.5 | 16.8 |
| 56089 1999 $AY_{25}$ | 15.9 | X | 212.20170 | 298.45227 | 218.49138 | 1.33965 | 0.1621012 | 0.26163599 | 2.4210535 | 20 | 10 24.5 | 19.3 |
| 56090 1999 $BE$ | 14.8 | X | 193.73635 | 209.87717 | 103.96226 | 7.82071 | 0.1328724 | 0.27965258 | 2.3159197 | 20 | 1 16.2 | 18.2 |
| 56091 1999 $BJ$ | 15.1 | X | 190.49992 | 118.72967 | 353.41638 | 3.29634 | 0.1324561 | 0.25355839 | 2.4722026 | 20 | 8 6.7 | 18.9 |
| 56092 1999 $BK$ | 14.8 | X | 84.85283 | 111.19248 | 312.22821 | 28.11648 | 0.2366969 | 0.23636425 | 2.5906865 | 20 | 2 14.2 | 18.0 |
| 56093 1999 $BM_5$ | 15.1 | X | 95.63647 | 263.65931 | 104.06365 | 1.36490 | 0.2235294 | 0.27610164 | 2.3357341 | 20 | — | — |
| 56094 1999 $BW_5$ | 15.4 | X | 244.97286 | 163.53518 | 308.84956 | 5.49141 | 0.0785272 | 0.26016588 | 2.4301654 | 20 | 10 15.0 | 18.6 |
| 56095 1999 $BL_6$ | 14.3 | X | 247.28171 | 341.58880 | 158.03259 | 9.66126 | 0.0954134 | 0.21390428 | 2.7690007 | 20 | 11 16.7 | 18.2 |
| 56096 1999 $BA_9$ | 14.2 | X | 353.79015 | 301.26048 | 319.67814 | 12.71152 | 0.1393384 | 0.24432105 | 2.5341294 | 20 | 6 3.0 | 17.0 |
| 56097 1999 $BC_{12}$ | 15.0 | X | 271.74749 | 79.75889 | 99.47105 | 6.94253 | 0.0737546 | 0.27119609 | 2.3638166 | 20 | — | — |
| 56098 1999 $BE_{13}$ | 15.4 | X | 129.19211 | 120.10449 | 282.75723 | 2.69910 | 0.1516016 | 0.23786613 | 2.5797700 | 20 | 3 6.3 | 19.1 |
| 56099 1999 $BL_{13}$ | 14.4 | X | 128.50734 | 249.22925 | 163.31997 | 14.58573 | 0.1057105 | 0.23517056 | 2.5994457 | 20 | 3 14.9 | 18.0 |
| 56100 Luisapolli | 14.9 | X | 239.62149 | 100.56146 | 70.54623 | 3.98236 | 0.1309643 | 0.26694552 | 2.3888431 | 20 | 12 22.8 | 17.6 |
| 56101 1999 $BW_{14}$ | 15.9 | X | 161.01003 | 232.97148 | 339.47871 | 1.59584 | 0.1419954 | 0.26084058 | 2.4259729 | 20 | 11 12.8 | 19.6 |
| 56102 1999 $BD_{15}$ | 15.6 | X | 261.05765 | 312.91597 | 201.72921 | 1.98840 | 0.1325287 | 0.26695530 | 2.3887847 | 20 | — | — |
| 56103 1999 $BU_{19}$ | 14.2 | X | 10.36656 | 48.98666 | 312.07502 | 9.03062 | 0.1105035 | 0.21985050 | 2.7188448 | 20 | 11 20.3 | 17.7 |
| 56104 1999 $BA_{20}$ | 15.0 | X | 247.87938 | 45.08033 | 45.46058 | 5.98598 | 0.1790523 | 0.26068500 | 2.4269380 | 20 | 9 9.3 | 18.2 |
| 56105 1999 $BB_{20}$ | 14.9 | X | 181.71126 | 125.90275 | 29.79775 | 7.03758 | 0.0595556 | 0.25935522 | 2.4352266 | 20 | 9 29.9 | 18.1 |
| 56106 1999 $BG_{24}$ | 14.8 | X | 71.42588 | 148.22902 | 290.99942 | 6.41208 | 0.1519720 | 0.28271578 | 2.2991608 | 20 | 1 27.8 | 16.8 |
| 56107 1999 $BT_{25}$ | 14.9 | X | 22.08068 | 195.97687 | 231.11719 | 3.63477 | 0.2076383 | 0.27498669 | 2.3420434 | 20 | — | — |
| 56108 1999 $BN_{26}$ | 14.9 | X | 233.82826 | 98.55299 | 315.88910 | 6.98679 | 0.0551811 | 0.25254367 | 2.4788204 | 20 | 7 17.8 | 18.2 |
| 56109 1999 $BB_{32}$ | 15.9 | X | 314.91265 | 75.75875 | 314.02426 | 5.80195 | 0.1748645 | 0.26195752 | 2.4190721 | 20 | 10 2.7 | 18.0 |
| 56110 1999 $CO_1$ | 15.7 | X | 194.88370 | 145.76827 | 356.36156 | 8.11328 | 0.1720656 | 0.25604620 | 2.4561628 | 20 | 9 16.2 | 19.6 |
| 56111 1999 $CO_2$ | 13.8 | X | 309.44185 | 44.33137 | 104.41886 | 22.57888 | 0.0315235 | 0.22381998 | 2.6866029 | 20 | — | — |
| 56112 1999 $CK_5$ | 14.4 | X | 79.06015 | 274.84804 | 11.30563 | 12.68693 | 0.2022402 | 0.25770911 | 2.4455856 | 20 | 11 27.4 | 18.4 |
| 56113 1999 $CQ_5$ | 14.7 | X | 274.82493 | 87.69682 | 21.60518 | 6.61670 | 0.1236282 | 0.26178448 | 2.4201379 | 20 | 11 20.3 | 17.2 |
| 56114 1999 $CA_6$ | 14.6 | X | 271.62470 | 50.36348 | 124.56448 | 24.56282 | 0.2220467 | 0.26959047 | 2.3731928 | 20 | — | — |
| 56115 1999 $CN_7$ | 14.4 | X | 358.22430 | 323.17419 | 146.62736 | 29.98922 | 0.1799075 | 0.22761225 | 2.6566783 | 20 | — | — |
| 56116 1999 $CZ_7$ | 13.7 | X | 285.65407 | 263.27932 | 345.55865 | 21.32943 | 0.2820145 | 0.27887519 | 2.3202216 | 20 | 1 17.7 | 17.8 |
| 56117 1999 $CC_9$ | 13.8 | X | 283.98104 | 100.10729 | 208.26817 | 12.98575 | 0.1801839 | 0.23823919 | 2.5770761 | 20 | 4 8.6 | 17.4 |
| 56118 1999 $CF_{14}$ | 14.8 | X | 11.82790 | 50.62723 | 175.53237 | 18.96059 | 0.2017019 | 0.23735905 | 2.5834428 | 20 | 5 25.5 | 17.5 |
| 56119 1999 $CZ_{18}$ | 14.4 | X | 161.74769 | 45.14185 | 358.47342 | 7.83239 | 0.2464305 | 0.24485215 | 2.5304636 | 20 | 4 12.8 | 18.7 |
| 56120 1999 $CL_{19}$ | 15.2 | X | 253.67498 | 112.18825 | 113.06699 | 7.86335 | 0.0632621 | 0.27489531 | 2.3425624 | 20 | — | — |
| 56121 1999 $CB_{20}$ | 14.8 | X | 359.42131 | 103.22081 | 108.19973 | 11.68654 | 0.0742532 | 0.24055313 | 2.5605232 | 20 | 4 11.3 | 18.0 |
| 56122 1999 $CS_{20}$ | 14.8 | X | 140.73728 | 245.34242 | 354.99904 | 6.05992 | 0.0970912 | 0.26196045 | 2.4190540 | 20 | 11 28.1 | 18.4 |
| 56123 1999 $CR_{23}$ | 15.0 | X | 112.08571 | 315.67076 | 326.72740 | 6.22781 | 0.1245293 | 0.26341529 | 2.4101388 | 20 | 12 23.7 | 18.7 |
| 56124 1999 $CH_{24}$ | 14.8 | X | 186.51738 | 314.69101 | 126.05299 | 16.09411 | 0.1149290 | 0.20292225 | 2.8680251 | 20 | 6 21.8 | 19.4 |
| 56125 1999 $CC_{25}$ | 15.4 | X | 252.86630 | 150.68333 | 61.21361 | 6.07451 | 0.2062950 | 0.27059761 | 2.3673006 | 20 | — | — |
| 56126 1999 $CT_{31}$ | 15.1 | X | 172.43713 | 240.98777 | 50.67252 | 5.86003 | 0.0451198 | 0.27275464 | 2.3548032 | 20 | — | — |
| 56127 1999 $CC_{34}$ | 15.4 | X | 29.03045 | 231.87240 | 138.66619 | 2.91298 | 0.1005221 | 0.26520868 | 2.3992614 | 20 | — | — |
| 56128 1999 $CX_{37}$ | 15.0 | X | 28.69287 | 178.17393 | 328.67553 | 3.27716 | 0.0587377 | 0.23531832 | 2.5983574 | 20 | 2 22.4 | 17.9 |
| 56129 1999 $CH_{43}$ | 14.9 | X | 86.10623 | 61.55093 | 347.24410 | 10.01163 | 0.0799930 | 0.23076405 | 2.6324327 | 20 | 1 13.7 | 18.3 |
| 56130 1999 $CM_{45}$ | 14.8 | X | 303.68223 | 10.83749 | 26.98144 | 3.42065 | 0.1746680 | 0.25847929 | 2.4407252 | 20 | 9 24.2 | 16.9 |
| 56131 1999 $CY_{48}$ | 14.2 | X | 20.44919 | 310.34407 | 112.54528 | 5.89668 | 0.0927089 | 0.27041642 | 2.3683580 | 20 | — | — |
| 56132 1999 $CO_{49}$ | 13.8 | X | 267.51826 | 263.14589 | 19.03525 | 11.39902 | 0.1747689 | 0.23459662 | 2.6036837 | 20 | 2 23.9 | 17.9 |
| 56133 1999 $CX_{51}$ | 15.3 | X | 106.19407 | 72.44038 | 353.92826 | 13.89949 | 0.1076285 | 0.23576655 | 2.5950631 | 20 | 3 6.3 | 18.7 |
| 56134 1999 $CJ_{53}$ | 14.9 | X | 329.74219 | 31.69832 | 67.25926 | 5.35732 | 0.1063800 | 0.22165394 | 2.7040771 | 20 | — | — |
| 56135 1999 $CJ_{55}$ | 15.6 | X | 67.44133 | 72.27012 | 61.79011 | 4.98326 | 0.1647988 | 0.23850189 | 2.5751834 | 20 | 4 20.5 | 18.6 |
| 56136 1999 $CK_{55}$ | 14.8 | X | 106.47916 | 221.14592 | 60.10223 | 5.89589 | 0.0534016 | 0.26072813 | 2.4266704 | 20 | 12 12.5 | 18.1 |
| 56137 1999 $CW_{55}$ | 13.9 | X | 243.87810 | 111.59965 | 49.23128 | 9.97786 | 0.0430590 | 0.26367073 | 2.4085820 | 20 | 12 27.2 | 16.9 |
| 56138 1999 $CY_{56}$ | 14.7 | X | 45.33394 | 95.54302 | 346.09607 | 7.77693 | 0.1660532 | 0.22987813 | 2.6391918 | 20 | — | — |
| 56139 1999 $CV_{58}$ | 15.2 | X | 301.14244 | 159.16250 | 5.57457 | 13.03902 | 0.1229336 | 0.22462009 | 2.6802192 | 20 | — | — |
| 56140 1999 $CN_{62}$ | 14.9 | X | 8.74970 | 274.97890 | 144.98116 | 5.44761 | 0.0461863 | 0.26960401 | 2.3731134 | 20 | — | — |
| 56141 1999 $CR_{76}$ | 14.7 | X | 269.41361 | 63.97566 | 180.75181 | 5.14440 | 0.0444828 | 0.23128787 | 2.6284566 | 20 | 1 19.3 | 18.4 |
| 56142 1999 $CZ_{77}$ | 14.3 | X | 269.14090 | 177.33549 | 253.88055 | 7.27653 | 0.2035387 | 0.21218930 | 2.7839006 | 20 | 8 25.5 | 18.2 |
| 56143 1999 $CO_{82}$ | 14.6 | X | 197.01071 | 117.77480 | 72.41590 | 12.16328 | 0.1388004 | 0.26347964 | 2.4097464 | 20 | 11 23.5 | 18.0 |
| 56144 1999 $CB_{83}$ | 14.2 | X | 123.88414 | 165.37319 | 31.66681 | 8.60359 | 0.0380266 | 0.25624235 | 2.4549092 | 20 | 9 16.1 | 17.5 |
| 56145 1999 $CN_{84}$ | 15.1 | X | 329.17668 | 132.19193 | 6.25691 | 5.00740 | 0.1403721 | 0.27446388 | 2.3450166 | 20 | — | — |
| 56146 1999 $CR_{85}$ | 14.8 | X | 261.55068 | 11.12213 | 89.55071 | 7.93698 | 0.1479897 | 0.26235596 | 2.4166222 | 20 | 10 19.5 | 17.6 |
| 56147 1999 $CV_{85}$ | 15.4 | X | 247.03365 | 103.17673 | 76.46004 | 3.37898 | 0.1327877 | 0.26783332 | 2.3835612 | 20 | — | — |
| 56148 1999 $CP_{93}$ | 15.4 | X | 236.09131 | 277.25367 | 147.09848 | 5.69668 | 0.1638033 | 0.25355175 | 2.4722458 | 20 | 7 18.8 | 19.1 |
| 56149 1999 $CP_{98}$ | 15.2 | X | 70.18429 | 304.43295 | 138.95318 | 13.94378 | 0.1922103 | 0.23410495 | 2.6073279 | 20 | 2 18.2 | 18.0 |
| 56150 1999 $CT_{103}$ | 15.1 | X | 183.60147 | 293.53481 | 236.60990 | 3.19035 | 0.1917064 | 0.25821641 | 2.4423814 | 20 | 10 8.7 | 18.9 |
| 56151 1999 $CX_{104}$ | 14.7 | X | 113.65062 | 272.48293 | 155.31751 | 12.32232 | 0.2419276 | 0.24008292 | 2.5638653 | 20 | 4 5.3 | 18.6 |
| 56152 1999 $CK_{106}$ | 14.4 | X | 206.50178 | 112.34472 | 283.63012 | 11.38008 | 0.1757400 | 0.24745668 | 2.5126766 | 20 | 5 9.6 | 18.7 |
| 56153 1999 $CT_{114}$ | 14.8 | X | 209.40131 | 48.27394 | 284.49888 | 4.42350 | 0.1621278 | 0.23544892 | 2.5973965 | 20 | 2 25.8 | 19.1 |
| 56154 1999 $CU_{119}$ | 13.7 | X | 307.72669 | 227.89824 | 43.24069 | 13.53223 | 0.1292185 | 0.24012451 | 2.5635692 | 20 | 4 4.3 | 16.9 |
| 56155 1999 $CY_{119}$ | 14.4 | X | 184.64882 | 215.35103 | 28.08378 | 12.33574 | 0.1370317 | 0.26666991 | 2.3904888 | 20 | — | — |
| 56156 1999 $CG_{123}$ | 15.3 | X | 317.75410 | 2.87062 | 38.00050 | 12.47876 | 0.1457116 | 0.26200146 | 2.4188016 | 20 | 10 31.3 | 17.3 |
| 56157 1999 $CG_{135}$ | 14.8 | X | 272.64672 | 149.03418 | 308.94417 | 1.77227 | 0.1494380 | 0.26075217 | 2.4265212 | 20 | 10 27.9 | 17.5 |
| 56158 1999 $CG_{138}$ | 15.5 | X | 347.43821 | 301.63274 | 320.67807 | 2.93459 | 0.2073739 | 0.23968234 | 2.5667212 | 20 | 5 18.4 | 17.7 |
| 56159 1999 $CK_{147}$ | 14.8 | X | 275.93456 | 294.24528 | 344.69545 | 11.87886 | 0.1277421 | 0.23375718 | 2.6099132 | 20 | 3 1.1 | 18.6 |
| 56160 1999 $CY_{150}$ | 14.2 | X | 114.52731 | 59.71025 | 339.85791 | 8.32631 | 0.0999363 | 0.23187042 | 2.6240523 | 20 | 2 10.6 | 17.8 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56161 1999 $CG_{158}$ | 14.6 | X | 331.27834 | 284.08774 | 312.52209 | 23.30033 | 0.2591110 | 0.23582668 | 2.5946220 | 20 | 2 20.3 | 17.8 |
| 56162 1999 $DX_{2}$ | 14.1 | X | 44.93284 | 261.15395 | 152.84087 | 22.06689 | 0.0306048 | 0.22562889 | 2.6722243 | 20 | — | — |
| 56163 1999 $DE_{3}$ | 15.9 | X | 41.72897 | 198.11417 | 345.87036 | 0.66158 | 0.0584697 | 0.23823302 | 2.5771207 | 20 | 5 3.3 | 18.8 |
| 56164 1999 $DW_{7}$ | 14.4 | X | 261.50461 | 249.45386 | 359.02123 | 14.25676 | 0.0677483 | 0.22859751 | 2.6490392 | 20 | 1 17.8 | 18.4 |
| 56165 1999 $EZ_{2}$ | 14.9 | X | 293.60549 | 239.76193 | 354.94788 | 10.09969 | 0.2321396 | 0.22857595 | 2.6492058 | 20 | 1 15.5 | 19.0 |
| 56166 1999 $ER_{6}$ | 16.1 | X | 87.64954 | 231.90801 | 185.39201 | 3.94442 | 0.2068078 | 0.23185093 | 2.6241994 | 20 | 2 11.4 | 19.2 |
| 56167 1999 $EU_{11}$ | 14.9 | X | 264.69280 | 244.90062 | 21.13182 | 25.59705 | 0.1455824 | 0.23219228 | 2.6216268 | 20 | 2 13.0 | 19.4 |
| 56168 1999 $FS_{5}$ | 14.8 | X | 324.88175 | 329.97717 | 247.60463 | 2.27346 | 0.0334734 | 0.23113519 | 2.6296140 | 20 | 2 25.7 | 18.2 |
| 56169 1999 $FU_{5}$ | 14.8 | X | 88.03041 | 264.43004 | 314.58699 | 5.17601 | 0.0967755 | 0.25254566 | 2.4788074 | 20 | 9 1.8 | 18.1 |
| 56170 1999 $FK_{6}$ | 14.7 | X | 312.63149 | 145.85033 | 204.16380 | 2.09986 | 0.1205318 | 0.19824207 | 2.9129889 | 20 | 7 27.1 | 18.2 |
| 56171 1999 $FR_{6}$ | 15.3 | X | 120.99261 | 279.19917 | 196.72566 | 12.56041 | 0.2514184 | 0.24122184 | 2.5557888 | 20 | 6 10.5 | 19.7 |
| 56172 1999 $FD_{7}$ | 14.4 | X | 127.67429 | 179.16794 | 190.91292 | 3.99261 | 0.1050801 | 0.22402642 | 2.6849522 | 20 | 1 19.9 | 18.2 |
| 56173 1999 $FV_{9}$ | 14.5 | X | 84.31902 | 315.48417 | 178.61472 | 13.24215 | 0.0920396 | 0.23805200 | 2.5784269 | 20 | 5 5.2 | 18.0 |
| 56174 1999 $FQ_{13}$ | 15.3 | X | 184.13669 | 235.74615 | 170.35143 | 2.24723 | 0.0578479 | 0.24040374 | 2.5615838 | 20 | 5 5.1 | 18.8 |
| 56175 1999 $FY_{24}$ | 14.5 | X | 262.34435 | 239.05782 | 19.71578 | 12.92666 | 0.1324620 | 0.22724193 | 2.6595638 | 20 | 1 25.6 | 18.8 |
| 56176 1999 $FK_{25}$ | 14.2 | X | 11.57895 | 6.59672 | 56.25065 | 7.91796 | 0.0377206 | 0.21827155 | 2.7319409 | 20 | — | — |
| 56177 1999 $FU_{25}$ | 15.1 | X | 114.55112 | 328.15871 | 191.71756 | 5.04969 | 0.1038981 | 0.24399404 | 2.5363932 | 20 | 7 16.2 | 18.8 |
| 56178 1999 $FQ_{26}$ | 14.9 | X | 199.41341 | 236.85037 | 33.16151 | 5.77178 | 0.2070744 | 0.21906820 | 2.7253136 | 20 | — | — |
| 56179 1999 $FS_{26}$ | 15.3 | X | 309.41325 | 220.64771 | 41.61200 | 5.28739 | 0.2105414 | 0.23252394 | 2.6191333 | 20 | 3 11.0 | 18.7 |
| 56180 1999 $FJ_{29}$ | 15.3 | X | 258.32078 | 139.06207 | 37.01223 | 7.92622 | 0.1812032 | 0.21839143 | 2.7309410 | 20 | — | — |
| 56181 1999 $FU_{29}$ | 14.6 | X | 347.52042 | 30.80139 | 135.54532 | 6.48286 | 0.1297402 | 0.22850292 | 2.6497702 | 20 | 1 10.6 | 17.8 |
| 56182 1999 $FE_{31}$ | 14.1 | X | 192.57495 | 271.26241 | 44.51850 | 10.08691 | 0.1550994 | 0.22446243 | 2.6814741 | 20 | 1 27.6 | 18.6 |
| 56183 1999 $FF_{34}$ | 14.7 | X | 105.05257 | 307.86654 | 140.30331 | 3.70723 | 0.2031416 | 0.23562925 | 2.5960711 | 20 | 4 15.8 | 18.3 |
| 56184 1999 $FB_{35}$ | 14.4 | X | 181.02720 | 106.20809 | 168.71415 | 15.03470 | 0.1343147 | 0.21826222 | 2.7320187 | 20 | — | — |
| 56185 1999 $FJ_{35}$ | 14.4 | X | 327.97649 | 233.21477 | 36.83355 | 14.79260 | 0.1341034 | 0.23637002 | 2.5906443 | 20 | 4 29.2 | 17.3 |
| 56186 1999 $FW_{36}$ | 14.5 | X | 291.78446 | 198.47852 | 328.21054 | 8.37195 | 0.0966139 | 0.22113899 | 2.7082734 | 20 | — | — |
| 56187 1999 $FR_{39}$ | 15.8 | X | 206.65097 | 115.98208 | 12.41571 | 3.35286 | 0.2452433 | 0.25623114 | 2.4549809 | 20 | 9 4.9 | 19.8 |
| 56188 1999 $FA_{40}$ | 15.1 | X | 352.80233 | 253.75012 | 329.40927 | 14.19655 | 0.0757250 | 0.23758404 | 2.5818116 | 20 | 4 2.8 | 18.4 |
| 56189 1999 $FS_{44}$ | 14.4 | X | 111.96884 | 155.53329 | 306.99115 | 3.26573 | 0.2040794 | 0.24077068 | 2.5589805 | 20 | 5 9.2 | 18.3 |
| 56190 1999 $FQ_{47}$ | 13.3 | X | 330.27367 | 108.49951 | 342.78993 | 16.01721 | 0.1081008 | 0.17344135 | 3.1844490 | 20 | — | — |
| 56191 1999 $FP_{49}$ | 13.9 | X | 50.47191 | 330.55984 | 31.53649 | 5.56619 | 0.0673311 | 0.21744603 | 2.7388509 | 20 | — | — |
| 56192 1999 $FD_{59}$ | 15.0 | X | 206.81175 | 236.19365 | 38.08312 | 4.23376 | 0.1856572 | 0.26935888 | 2.3745529 | 20 | — | — |
| 56193 1999 $GN_{1}$ | 14.8 | X | 275.24241 | 43.37537 | 181.42770 | 12.65927 | 0.1186877 | 0.22342654 | 2.6897559 | 20 | — | — |
| 56194 1999 $GV_{5}$ | 14.7 | X | 283.62928 | 311.36382 | 229.37764 | 10.58674 | 0.0870083 | 0.21957443 | 2.7211232 | 20 | — | — |
| 56195 1999 $GX_{6}$ | 13.9 | X | 29.30911 | 271.81297 | 207.07203 | 25.68909 | 0.1153020 | 0.22781372 | 2.6551117 | 20 | 1 12.2 | 17.6 |
| 56196 1999 $GF_{7}$ | 14.2 | X | 108.45014 | 105.25665 | 181.28234 | 5.55253 | 0.1214293 | 0.25811986 | 2.4429904 | 20 | 12 23.7 | 18.0 |
| 56197 1999 $GF_{8}$ | 14.1 | X | 51.73706 | 147.95198 | 213.05620 | 6.01582 | 0.1408302 | 0.21368555 | 2.7708900 | 20 | — | — |
| 56198 1999 $GB_{9}$ | 14.3 | X | 260.64277 | 48.18716 | 196.66648 | 12.59788 | 0.1378443 | 0.22318245 | 2.6917168 | 20 | 1 1.8 | 18.8 |
| 56199 1999 $GG_{11}$ | 14.7 | X | 284.90768 | 105.54032 | 186.72125 | 13.56274 | 0.1813044 | 0.23417352 | 2.6068189 | 20 | 3 20.1 | 18.5 |
| 56200 1999 $GU_{16}$ | 13.6 | X | 301.54830 | 135.29032 | 42.25512 | 13.67414 | 0.1214488 | 0.22473793 | 2.6792822 | 20 | — | — |
| 56201 1999 $GD_{17}$ | 14.7 | X | 139.00198 | 199.66583 | 55.96213 | 11.65491 | 0.2009169 | 0.25718220 | 2.4489248 | 20 | 12 13.1 | 18.9 |
| 56202 1999 $GA_{19}$ | 13.6 | X | 334.95867 | 217.11955 | 58.99255 | 15.77253 | 0.0679970 | 0.23907496 | 2.5710666 | 20 | 5 26.8 | 16.6 |
| 56203 1999 $GU_{20}$ | 13.9 | X | 321.21999 | 219.74461 | 47.05567 | 15.28295 | 0.0582092 | 0.23535306 | 2.5981017 | 20 | 4 26.4 | 17.1 |
| 56204 1999 $GQ_{22}$ | 15.0 | X | 359.82650 | 201.93639 | 328.06732 | 5.54256 | 0.2899249 | 0.23214377 | 2.6219920 | 20 | 1 15.4 | 17.1 |
| 56205 1999 $GX_{23}$ | 14.1 | X | 214.93714 | 33.28562 | 19.67539 | 14.07023 | 0.0624315 | 0.24463494 | 2.5319613 | 20 | 6 18.3 | 18.0 |
| 56206 1999 $GU_{34}$ | 15.2 | X | 306.91533 | 303.13214 | 313.77030 | 3.27062 | 0.1868851 | 0.23197283 | 2.6232799 | 20 | 2 29.9 | 18.7 |
| 56207 1999 $GU_{35}$ | 14.0 | X | 224.74566 | 134.42813 | 230.05093 | 5.40355 | 0.0725861 | 0.23653790 | 2.5894184 | 20 | 4 26.0 | 17.7 |
| 56208 1999 $GY_{35}$ | 13.7 | X | 272.25897 | 323.46371 | 354.71064 | 9.43924 | 0.0784751 | 0.18966059 | 3.0002076 | 20 | 4 21.4 | 18.0 |
| 56209 1999 $GB_{37}$ | 14.3 | X | 104.83288 | 72.72865 | 63.95187 | 13.87700 | 0.1253705 | 0.24102533 | 2.5571778 | 20 | 6 5.9 | 17.9 |
| 56210 1999 $GX_{41}$ | 15.1 | X | 193.54488 | 67.49369 | 169.90781 | 12.70321 | 0.1733473 | 0.21539906 | 2.7561753 | 20 | — | — |
| 56211 1999 $GG_{43}$ | 14.4 | X | 118.99733 | 316.91243 | 94.94000 | 12.66096 | 0.1967668 | 0.23265922 | 2.6181179 | 20 | 3 20.3 | 18.5 |
| 56212 1999 $GJ_{45}$ | 14.2 | X | 197.96196 | 284.37283 | 147.80240 | 13.85603 | 0.1541532 | 0.24372005 | 2.5382938 | 20 | 6 21.4 | 18.4 |
| 56213 1999 $GW_{50}$ | 14.3 | X | 97.25623 | 249.72115 | 187.11080 | 11.55040 | 0.0461307 | 0.22972726 | 2.6403471 | 20 | 2 24.8 | 17.9 |
| 56214 1999 $GC_{61}$ | 15.6 | X | 7.24318 | 156.69961 | 6.52564 | 2.57387 | 0.0682452 | 0.22987670 | 2.6392027 | 20 | 2 13.3 | 18.6 |
| 56215 1999 $HH$ | 14.0 | X | 278.60960 | 258.40972 | 35.38343 | 15.55257 | 0.2340693 | 0.22922660 | 2.6441903 | 20 | 3 16.8 | 18.2 |
| 56216 1999 $HJ_{2}$ | 14.8 | X | 318.39509 | 216.13430 | 54.99418 | 9.79162 | 0.1598233 | 0.23515786 | 2.5995393 | 20 | 4 14.5 | 17.8 |
| 56217 1999 $HH_{3}$ | 14.2 | X | 114.85278 | 337.42320 | 172.93224 | 13.23031 | 0.0991167 | 0.24124062 | 2.5556562 | 20 | 7 3.3 | 18.1 |
| 56218 1999 $HP_{4}$ | 14.4 | X | 340.39595 | 229.26916 | 35.87102 | 10.60167 | 0.0202604 | 0.23866985 | 2.5739751 | 20 | 5 22.0 | 17.6 |
| 56219 1999 $HP_{6}$ | 14.4 | X | 292.67560 | 145.41204 | 207.11858 | 2.29035 | 0.1157298 | 0.24537233 | 2.5268860 | 20 | 7 2.5 | 17.3 |
| 56220 1999 $HC_{11}$ | 13.5 | X | 289.61976 | 285.74653 | 29.15780 | 9.87172 | 0.0949423 | 0.19013749 | 2.9951888 | 20 | 5 8.7 | 17.7 |
| 56221 1999 $JK_{7}$ | 14.2 | X | 316.64637 | 218.85754 | 89.90351 | 11.78835 | 0.0901601 | 0.19183225 | 2.9775219 | 20 | 6 11.2 | 17.8 |
| 56222 1999 $JF_{9}$ | 14.5 | X | 195.97950 | 262.05610 | 142.54427 | 10.30061 | 0.0109348 | 0.18929331 | 3.0040872 | 20 | 5 21.7 | 18.9 |
| 56223 1999 $JP_{10}$ | 14.9 | X | 253.00567 | 53.79619 | 165.60601 | 12.16485 | 0.1025602 | 0.21949308 | 2.7217955 | 20 | — | — |
| 56224 1999 $JE_{12}$ | 14.1 | X | 4.26797 | 97.80884 | 190.10149 | 29.39718 | 0.2767363 | 0.23736443 | 2.5834038 | 20 | 8 18.5 | 16.8 |
| 56225 1999 $JL_{19}$ | 15.2 | X | 310.59754 | 232.85668 | 13.66960 | 5.28771 | 0.2187440 | 0.22976635 | 2.6400477 | 20 | 2 19.6 | 18.7 |
| 56226 1999 $JQ_{23}$ | 14.4 | X | 83.67693 | 135.19695 | 199.52014 | 3.53603 | 0.2059815 | 0.20980310 | 2.8049693 | 20 | — | — |
| 56227 1999 $JT_{23}$ | 14.2 | X | 43.81246 | 184.15116 | 220.64130 | 4.65756 | 0.0660105 | 0.21693441 | 2.7431555 | 20 | — | — |
| 56228 1999 $JX_{24}$ | 14.7 | X | 253.83383 | 260.79153 | 3.67597 | 7.29024 | 0.2096063 | 0.22350131 | 2.6891560 | 20 | 1 16.7 | 19.2 |
| 56229 1999 $JY_{27}$ | 15.4 | X | 202.50346 | 116.40647 | 120.94470 | 1.32273 | 0.2305503 | 0.21456729 | 2.7632936 | 20 | — | — |
| 56230 1999 $JJ_{28}$ | 15.4 | X | 310.66189 | 203.67690 | 42.05779 | 3.27152 | 0.2391074 | 0.22915586 | 2.6447344 | 20 | 2 15.3 | 18.8 |
| 56231 1999 $JZ_{30}$ | 14.3 | X | 43.71556 | 237.72815 | 240.46549 | 7.24151 | 0.0655182 | 0.22675960 | 2.6633337 | 20 | 2 5.5 | 17.7 |
| 56232 1999 $JM_{31}$ | 15.2 | X | 84.76422 | 291.38832 | 46.01926 | 2.93348 | 0.2024106 | 0.30344991 | 2.1931990 | 20 | — | — |
| 56233 1999 $JK_{42}$ | 14.1 | X | 312.85845 | 226.35139 | 227.34727 | 16.61750 | 0.1131174 | 0.21145508 | 2.7903411 | 20 | 12 18.9 | 17.5 |
| 56234 1999 $JL_{42}$ | 14.4 | X | 82.44414 | 228.88721 | 68.67672 | 3.11104 | 0.0138946 | 0.20667436 | 2.8332070 | 20 | 11 19.4 | 18.2 |
| 56235 1999 $JX_{43}$ | 14.4 | X | 273.31010 | 249.89884 | 32.25901 | 13.77780 | 0.1842650 | 0.22725935 | 2.6594278 | 20 | 3 2.5 | 18.6 |
| 56236 1999 $JP_{44}$ | 15.0 | X | 293.11497 | 315.05182 | 235.46899 | 12.03684 | 0.0672306 | 0.22070105 | 2.7118549 | 20 | — | — |
| 56237 1999 $JB_{45}$ | 14.7 | X | 336.72823 | 261.80920 | 214.59695 | 2.66743 | 0.0363747 | 0.21663806 | 2.7456565 | 20 | — | — |
| 56238 1999 $JA_{46}$ | 14.9 | X | 26.95787 | 98.60915 | 127.25783 | 4.37739 | 0.1570045 | 0.23699076 | 2.5861186 | 20 | 6 20.1 | 17.4 |
| 56239 1999 $JO_{46}$ | 14.4 | X | 313.79318 | 247.64338 | 94.65792 | 3.51634 | 0.0695057 | 0.19447527 | 2.9504830 | 20 | 7 24.9 | 18.1 |
| 56240 1999 $JV_{51}$ | 14.2 | X | 296.60397 | 35.14718 | 233.09496 | 13.03591 | 0.1134532 | 0.22937368 | 2.6430598 | 20 | 3 8.9 | 18.1 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56241 1999 $JU_{53}$ | 14.0 | X | 54.77752 | 164.99206 | 64.71524 | 15.61296 | 0.0959308 | 0.24042829 | 2.5614094 | 20 | 8 7.9 | 17.5 |
| 56242 1999 $JZ_{55}$ | 15.1 | X | 168.06646 | 234.13495 | 42.63185 | 4.70672 | 0.2072549 | 0.21286941 | 2.7779678 | 20 | — | — |
| 56243 1999 $JZ_{60}$ | 13.8 | X | 312.38151 | 66.68853 | 85.08927 | 13.18393 | 0.0980735 | 0.17070326 | 3.2184110 | 20 | — | — |
| 56244 1999 $JH_{62}$ | 14.8 | X | 73.71151 | 103.21344 | 94.77378 | 4.68409 | 0.1560724 | 0.23926638 | 2.5696951 | 20 | 7 26.1 | 18.2 |
| 56245 1999 $JZ_{69}$ | 14.6 | X | 265.41514 | 130.13332 | 72.65450 | 9.96278 | 0.0842099 | 0.21982069 | 2.7190905 | 20 | — | — |
| 56246 1999 $JK_{72}$ | 15.7 | X | 71.63399 | 7.37844 | 127.87568 | 6.16419 | 0.2320348 | 0.23534961 | 2.5981271 | 20 | 5 11.0 | 18.9 |
| 56247 1999 $JZ_{72}$ | 15.7 | X | 43.81448 | 67.04783 | 95.23787 | 5.02507 | 0.2178802 | 0.23427071 | 2.6060979 | 20 | 4 28.7 | 18.2 |
| 56248 1999 $JQ_{74}$ | 15.0 | X | 67.22586 | 82.60181 | 109.43958 | 5.98213 | 0.2418632 | 0.23945925 | 2.5683151 | 20 | 7 22.3 | 18.2 |
| 56249 1999 $JS_{74}$ | 13.9 | X | 324.16166 | 86.99222 | 153.25760 | 11.48200 | 0.2013508 | 0.23008712 | 2.6375934 | 20 | 3 3.2 | 16.8 |
| 56250 1999 $JE_{76}$ | 14.7 | X | 28.05630 | 282.15215 | 269.75409 | 6.94941 | 0.0407626 | 0.23376539 | 2.6098521 | 20 | 4 19.7 | 18.1 |
| 56251 1999 $JR_{77}$ | 13.8 | X | 299.67529 | 230.59174 | 106.66667 | 10.26409 | 0.1426511 | 0.23737550 | 2.5833234 | 20 | 6 17.7 | 16.9 |
| 56252 1999 $JF_{78}$ | 14.5 | X | 3.75991 | 127.11935 | 33.71705 | 11.41812 | 0.1173672 | 0.22889734 | 2.6467254 | 20 | 2 5.6 | 17.7 |
| 56253 1999 $JH_{79}$ | 14.4 | X | 291.76610 | 125.64985 | 142.17655 | 17.33493 | 0.1940487 | 0.22871645 | 2.6481208 | 20 | 2 26.8 | 18.1 |
| 56254 1999 $JO_{81}$ | 14.2 | X | 17.39779 | 142.75760 | 58.79251 | 14.47014 | 0.1151639 | 0.23542477 | 2.5975741 | 20 | 4 26.1 | 17.0 |
| 56255 1999 $JV_{81}$ | 14.6 | X | 142.03148 | 182.41309 | 81.45403 | 9.53115 | 0.1877020 | 0.21007785 | 2.8025231 | 20 | 12 18.6 | 19.2 |
| 56256 1999 $JO_{82}$ | 14.4 | X | 329.18529 | 58.63917 | 171.55114 | 10.75473 | 0.0978031 | 0.23099016 | 2.6307146 | 20 | 3 12.2 | 17.3 |
| 56257 1999 $JZ_{82}$ | 14.5 | X | 277.66163 | 59.59238 | 159.32178 | 14.51028 | 0.2081985 | 0.22291150 | 2.6938975 | 20 | — | — |
| 56258 1999 $JH_{83}$ | 14.4 | X | 7.65227 | 88.71350 | 159.54904 | 12.24388 | 0.1403331 | 0.23680528 | 2.5874688 | 20 | 6 14.9 | 17.3 |
| 56259 1999 $JY_{86}$ | 15.1 | X | 305.66848 | 155.06304 | 81.32105 | 12.65808 | 0.1376475 | 0.22891928 | 2.6465563 | 20 | 2 14.8 | 18.8 |
| 56260 1999 $JL_{87}$ | 14.5 | X | 343.51543 | 50.43399 | 75.02396 | 14.27736 | 0.1527636 | 0.22232188 | 2.6986584 | 20 | — | — |
| 56261 1999 $JT_{87}$ | 15.0 | X | 326.82066 | 69.93371 | 81.40012 | 12.41302 | 0.1441569 | 0.22334833 | 2.6903838 | 20 | — | — |
| 56262 1999 $JE_{89}$ | 13.9 | X | 208.11287 | 228.33765 | 100.11959 | 15.20657 | 0.2079792 | 0.22558191 | 2.6725953 | 20 | 2 26.3 | 18.7 |
| 56263 1999 $JF_{95}$ | 14.2 | X | 246.35520 | 69.27688 | 77.13880 | 18.15881 | 0.0797935 | 0.20954037 | 2.8073135 | 20 | 11 24.8 | 18.1 |
| 56264 1999 $JV_{95}$ | 14.4 | X | 259.64519 | 225.77922 | 124.64879 | 11.73325 | 0.1241174 | 0.18834615 | 3.0141501 | 20 | 5 18.1 | 19.0 |
| 56265 1999 $JD_{96}$ | 14.5 | X | 279.40633 | 147.19120 | 160.49185 | 16.59254 | 0.0855811 | 0.18569508 | 3.0427700 | 20 | 4 23.8 | 19.0 |
| 56266 1999 $JJ_{97}$ | 14.0 | X | 283.99493 | 175.14332 | 126.34000 | 12.13977 | 0.0804556 | 0.18543136 | 3.0456543 | 20 | 4 23.6 | 18.5 |
| 56267 1999 $JW_{97}$ | 14.4 | X | 258.58415 | 171.04711 | 138.31613 | 16.70449 | 0.2225402 | 0.18175384 | 3.0865997 | 20 | 3 17.7 | 19.5 |
| 56268 1999 $JN_{98}$ | 14.8 | X | 293.57250 | 39.63262 | 172.73183 | 14.07408 | 0.1007920 | 0.22279250 | 2.6948566 | 20 | 1 2.1 | 18.8 |
| 56269 1999 $JB_{100}$ | 14.7 | X | 203.94798 | 39.29538 | 162.13681 | 8.16179 | 0.1586429 | 0.21006489 | 2.8026384 | 20 | 12 2.9 | 19.1 |
| 56270 1999 $JD_{100}$ | 14.3 | X | 285.30259 | 191.19144 | 131.76561 | 11.87696 | 0.1142700 | 0.18667524 | 3.0321096 | 20 | 5 16.3 | 18.7 |
| 56271 1999 $JK_{102}$ | 14.8 | X | 236.72563 | 198.83011 | 174.59114 | 6.80878 | 0.1544374 | 0.28336506 | 2.2956474 | 20 | 5 15.2 | 18.1 |
| 56272 1999 $JS_{103}$ | 14.2 | X | 262.12285 | 242.37726 | 82.59438 | 13.47332 | 0.1870833 | 0.18467565 | 3.0539573 | 20 | 4 14.8 | 19.1 |
| 56273 1999 $JZ_{103}$ | 14.5 | X | 131.04640 | 23.06494 | 93.35487 | 16.98250 | 0.1317364 | 0.24048795 | 2.5609858 | 20 | 6 11.6 | 18.3 |
| 56274 1999 $JM_{104}$ | 14.4 | X | 119.42380 | 147.35181 | 166.02463 | 15.92461 | 0.1518794 | 0.21347269 | 2.7727316 | 20 | — | — |
| 56275 1999 $JK_{117}$ | 14.7 | X | 301.79047 | 107.19707 | 184.96624 | 1.76530 | 0.1562767 | 0.18579197 | 3.0417120 | 20 | 4 18.7 | 18.8 |
| 56276 1999 $JY_{123}$ | 14.4 | X | 322.30396 | 70.73444 | 156.26348 | 3.43773 | 0.1202532 | 0.22725725 | 2.6594442 | 20 | 2 23.9 | 17.6 |
| 56277 1999 $JU_{129}$ | 15.4 | X | 210.69962 | 351.32307 | 199.67065 | 11.64409 | 0.2273796 | 0.21101755 | 2.7941969 | 20 | 11 20.3 | 19.9 |
| 56278 1999 $KB$ | 14.0 | X | 293.66025 | 166.58746 | 164.23130 | 11.49084 | 0.1406744 | 0.19029667 | 2.9935183 | 20 | 5 31.8 | 18.2 |
| 56279 1999 $KD_{1}$ | 15.0 | X | 212.43635 | 349.98731 | 213.54400 | 9.09694 | 0.1481563 | 0.21248707 | 2.7812992 | 20 | 12 14.4 | 19.2 |
| 56280 Asemo | 14.1 | X | 350.06573 | 131.47372 | 201.77228 | 9.10976 | 0.1942142 | 0.24093274 | 2.5578329 | 20 | 9 20.4 | 16.3 |
| 56281 1999 $KQ_{7}$ | 14.6 | X | 252.73134 | 195.95463 | 38.35921 | 14.03398 | 0.1530364 | 0.22275215 | 2.6951821 | 20 | — | — |
| 56282 1999 $KU_{13}$ | 14.4 | X | 351.36136 | 294.14637 | 236.49387 | 12.60904 | 0.1278386 | 0.22508820 | 2.6765019 | 20 | 1 19.9 | 17.8 |
| 56283 1999 $LU_{1}$ | 13.4 | X | 283.84674 | 43.81915 | 87.38317 | 24.37881 | 0.2173868 | 0.26994526 | 2.3711130 | 20 | — | — |
| 56284 1999 $LA_{2}$ | 14.0 | X | 180.96513 | 98.93790 | 178.48527 | 8.19644 | 0.1417407 | 0.21319228 | 2.7751624 | 20 | — | — |
| 56285 1999 $LJ_{3}$ | 15.3 | X | 162.87147 | 76.25784 | 116.63269 | 3.12754 | 0.0094672 | 0.20336959 | 2.8638177 | 20 | 10 18.6 | 19.2 |
| 56286 1999 $LG_{9}$ | 13.3 | X | 160.20625 | 168.69682 | 221.91386 | 27.20433 | 0.1464591 | 0.17904551 | 3.1176481 | 20 | 3 22.8 | 18.6 |
| 56287 1999 $LM_{10}$ | 14.3 | X | 16.97767 | 175.65896 | 122.71795 | 14.97507 | 0.1073838 | 0.19546755 | 2.9404893 | 20 | 9 8.9 | 18.1 |
| 56288 1999 $LS_{11}$ | 14.7 | X | 243.42388 | 163.93730 | 85.14635 | 14.27373 | 0.1425933 | 0.21985874 | 2.7187768 | 20 | — | — |
| 56289 1999 $LM_{26}$ | 14.5 | X | 7.82192 | 347.93577 | 264.02657 | 23.30865 | 0.1797581 | 0.28203355 | 2.3028671 | 20 | 6 23.5 | 16.0 |
| 56290 1999 $LX_{32}$ | 14.4 | X | 38.11846 | 131.37911 | 94.89169 | 16.33942 | 0.0019435 | 0.19116897 | 2.9844051 | 20 | 6 19.7 | 18.6 |
| 56291 1999 $NG_{3}$ | 15.0 | X | 206.24351 | 203.73298 | 165.12969 | 13.37184 | 0.2056274 | 0.22325710 | 2.6911167 | 20 | 4 11.0 | 19.6 |
| 56292 1999 $NK_{40}$ | 14.7 | X | 73.12616 | 148.99567 | 114.94488 | 6.24860 | 0.0781869 | 0.28799551 | 2.2709744 | 20 | 10 21.9 | 17.6 |
| 56293 1999 $NH_{44}$ | 14.7 | X | 357.02221 | 71.50216 | 167.95275 | 7.94900 | 0.1746779 | 0.23238233 | 2.6201972 | 20 | 5 10.5 | 17.3 |
| 56294 1999 $NF_{47}$ | 13.9 | X | 3.19936 | 143.55692 | 140.67662 | 11.50213 | 0.1335047 | 0.18888008 | 3.0084672 | 20 | 7 24.1 | 17.4 |
| 56295 1999 $NB_{54}$ | 14.9 | X | 75.94217 | 325.16150 | 225.72043 | 9.28084 | 0.0610213 | 0.27823325 | 2.3237890 | 20 | 7 4.0 | 17.8 |
| 56296 1999 $RU_{39}$ | 14.6 | X | 239.45834 | 106.10579 | 265.22655 | 6.38533 | 0.2440451 | 0.27209690 | 2.3585965 | 20 | 5 4.5 | 18.4 |
| 56297 1999 $RT_{42}$ | 13.3 | X | 218.06135 | 0.72506 | 308.44531 | 18.17856 | 0.1078418 | 0.16986197 | 3.2290290 | 20 | 2 12.1 | 18.4 |
| 56298 1999 $RO_{46}$ | 13.8 | X | 285.19229 | 132.33385 | 144.05359 | 17.01431 | 0.2171060 | 0.17787173 | 3.1313486 | 20 | 3 3.6 | 18.4 |
| 56299 1999 $RT_{47}$ | 13.6 | X | 202.37474 | 1.51580 | 337.76260 | 6.84595 | 0.0667857 | 0.17197023 | 3.2025841 | 20 | 3 5.8 | 18.4 |
| 56300 1999 $RB_{60}$ | 14.6 | X | 112.17284 | 316.32849 | 327.77522 | 14.98456 | 0.2263450 | 0.20140477 | 2.8824130 | 20 | 12 18.6 | 19.8 |
| 56301 1999 $RP_{60}$ | 14.0 | X | 83.37742 | 263.47577 | 313.05176 | 12.88717 | 0.1488553 | 0.18847712 | 3.0127537 | 20 | 8 22.8 | 18.4 |
| 56302 1999 $RW_{69}$ | 15.6 | X | 107.74475 | 332.58087 | 157.38081 | 2.30469 | 0.0263245 | 0.22343988 | 2.6896488 | 20 | 5 19.3 | 19.3 |
| 56303 1999 $RW_{98}$ | 13.6 | X | 236.72504 | 211.15671 | 180.41600 | 24.79308 | 0.2093397 | 0.17545924 | 3.1599865 | 20 | 6 3.3 | 19.1 |
| 56304 1999 $RB_{119}$ | 13.4 | X | 347.75250 | 17.42115 | 290.93503 | 16.21974 | 0.1834739 | 0.18628363 | 3.0363577 | 20 | 7 27.3 | 16.6 |
| 56305 1999 $RX_{119}$ | 14.5 | X | 43.64012 | 144.19670 | 148.25384 | 14.92616 | 0.1783303 | 0.19288984 | 2.9666284 | 20 | 10 21.2 | 18.7 |
| 56306 1999 $RL_{125}$ | 13.4 | X | 268.28149 | 356.24397 | 332.49795 | 15.91983 | 0.0958332 | 0.17691792 | 3.1425931 | 20 | 4 23.5 | 18.2 |
| 56307 1999 $RY_{125}$ | 13.5 | X | 318.91269 | 311.60435 | 323.74922 | 15.96250 | 0.2022148 | 0.17984151 | 3.1084419 | 20 | 4 6.4 | 17.7 |
| 56308 1999 $RH_{132}$ | 15.0 | X | 50.52199 | 52.11558 | 258.45678 | 4.34988 | 0.1748032 | 0.28941176 | 2.2635596 | 20 | 12 5.6 | 18.1 |
| 56309 1999 $RW_{140}$ | 15.8 | X | 220.42776 | 357.19365 | 240.90916 | 1.59026 | 0.0824278 | 0.30230329 | 2.1987413 | 20 | — | — |
| 56310 1999 $RE_{151}$ | 14.9 | X | 153.88502 | 338.60401 | 34.43578 | 3.99809 | 0.0425925 | 0.21479991 | 2.7612982 | 20 | 2 19.5 | 18.9 |
| 56311 1999 $RA_{221}$ | 16.4 | X | 181.29307 | 268.13474 | 57.08102 | 5.55668 | 0.1683154 | 0.30640299 | 2.1790844 | 20 | 1 17.7 | 19.6 |
| 56312 1999 $RM_{224}$ | 13.4 | X | 222.78276 | 284.45921 | 18.05562 | 10.82227 | 0.0975724 | 0.16823914 | 3.2497605 | 20 | 2 16.7 | 18.5 |
| 56313 1999 $SV_{14}$ | 13.6 | X | 312.44664 | 301.28023 | 311.18592 | 25.00977 | 0.2659194 | 0.17568432 | 3.1572869 | 20 | 2 19.9 | 18.1 |
| 56314 1999 $TZ_{97}$ | 13.2 | X | 291.54383 | 90.30296 | 53.66894 | 12.29913 | 0.1336727 | 0.19723459 | 2.9229003 | 20 | — | — |
| 56315 1999 $TH_{121}$ | 15.5 | X | 311.43265 | 256.35848 | 48.92538 | 4.39776 | 0.2153398 | 0.22602171 | 2.6691273 | 20 | 5 9.3 | 18.6 |
| 56316 1999 $TA_{227}$ | 15.6 | X | 26.50219 | 172.08022 | 126.06335 | 1.77563 | 0.1902728 | 0.28585680 | 2.2822876 | 20 | 10 21.0 | 17.9 |
| 56317 1999 $TJ_{232}$ | 13.6 | X | 314.93898 | 186.71236 | 95.79891 | 10.68531 | 0.1977329 | 0.17641426 | 3.1485718 | 20 | 4 24.4 | 17.7 |
| 56318 1999 $UR_{3}$ | 15.4 | X | 309.40172 | 22.79455 | 89.21537 | 26.89034 | 0.0691909 | 0.38573668 | 1.8689977 | 20 | — | — |
| 56319 1999 $UM_{10}$ | 15.7 | X | 242.09814 | 35.02305 | 12.63126 | 20.53575 | 0.0999970 | 0.36625738 | 1.9346918 | 20 | 7 29.9 | 18.3 |
| 56320 1999 $VB_{49}$ | 16.0 | X | 69.70325 | 323.59669 | 13.91276 | 6.90053 | 0.1272656 | 0.28957898 | 2.2626881 | 20 | — | — |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56321 1999 $VB_{53}$ | 14.4 | $X$ | 160.39716 | 253.68375 | 253.05809 | 22.25437 | 0.0487192 | 0.36544872 | 1.9375448 | 20 | 8 19.4 | 17.3 |
| 56322 1999 $VH_{68}$ | 16.0 | $X$ | 136.03647 | 87.58516 | 71.09216 | 3.02589 | 0.1476532 | 0.26933543 | 2.3746908 | 20 | 8 14.4 | 19.6 |
| 56323 1999 $VE_{82}$ | 13.2 | $X$ | 323.73183 | 235.96285 | 28.43868 | 18.08522 | 0.1282874 | 0.17289155 | 3.1911964 | 20 | 4 19.2 | 17.3 |
| 56324 1999 $VY_{175}$ | 13.0 | $X$ | 45.19989 | 265.93353 | 65.98358 | 10.75619 | 0.1249220 | 0.19137623 | 2.9822500 | 20 | 11 28.2 | 16.9 |
| 56325 1999 $VT_{179}$ | 13.0 | $X$ | 319.48840 | 192.70231 | 103.14871 | 17.08130 | 0.2127056 | 0.17415574 | 3.1757345 | 20 | 5 18.2 | 17.0 |
| 56326 1999 $VV_{203}$ | 12.2 | $X$ | 150.37931 | 10.50629 | 25.12460 | 21.82423 | 0.0323133 | 0.16893333 | 3.2408517 | 20 | 3 23.4 | 17.1 |
| 56327 1999 $VH_{215}$ | 13.7 | $X$ | 9.78673 | 6.75943 | 306.68061 | 20.04501 | 0.1373689 | 0.18597529 | 3.0397128 | 20 | 9 4.7 | 17.7 |
| 56328 1999 $WE$ | 16.0 | $X$ | 178.61932 | 201.87141 | 234.51115 | 19.28077 | 0.0898515 | 0.36139230 | 1.9520163 | 20 | 6 7.7 | 18.4 |
| 56329 Tarxien | 16.3 | $X$ | 172.55336 | 282.69234 | 254.21906 | 5.81883 | 0.0459292 | 0.27696586 | 2.3308727 | 20 | 10 16.9 | 19.5 |
| 56330 1999 $XS_{12}$ | 15.1 | $X$ | 189.74536 | 247.00197 | 216.52767 | 11.01209 | 0.1159816 | 0.26862661 | 2.3788663 | 20 | 7 22.9 | 18.8 |
| 56331 1999 $XD_{33}$ | 14.5 | $X$ | 47.33277 | 257.17316 | 110.37814 | 10.59474 | 0.1062146 | 0.28211942 | 2.3023997 | 20 | — | — |
| 56332 1999 $XR_{34}$ | 15.6 | $X$ | 94.50675 | 173.67605 | 232.66630 | 1.34058 | 0.1148027 | 0.29400659 | 2.2399140 | 20 | 1 12.0 | 17.6 |
| 56333 1999 $XU_{100}$ | 15.2 | $X$ | 212.92918 | 10.81923 | 71.72280 | 3.39796 | 0.1342466 | 0.26799512 | 2.3826018 | 20 | 7 22.7 | 18.6 |
| 56334 1999 $XN_{101}$ | 15.7 | $X$ | 38.90509 | 285.41901 | 278.51031 | 16.90604 | 0.0616012 | 0.35577697 | 1.9725022 | 20 | 5 26.2 | 17.6 |
| 56335 1999 $XO_{111}$ | 13.8 | $X$ | 220.03012 | 218.04685 | 28.49396 | 13.22562 | 0.1327711 | 0.23790303 | 2.5795032 | 20 | — | — |
| 56336 1999 $XL_{126}$ | 15.4 | $X$ | 75.80349 | 339.07164 | 284.72956 | 5.75349 | 0.1297818 | 0.27795629 | 2.3253324 | 20 | 10 23.7 | 18.7 |
| 56337 1999 $XG_{136}$ | 15.2 | $X$ | 185.24641 | 349.28973 | 74.97346 | 23.99782 | 0.0930025 | 0.35678293 | 1.9687928 | 20 | 5 30.8 | 17.7 |
| 56338 1999 $XS_{162}$ | 15.5 | $X$ | 71.90648 | 78.04538 | 9.00497 | 18.53713 | 0.0630799 | 0.39926337 | 1.8265423 | 20 | 1 5.9 | 17.4 |
| 56339 1999 $XV_{169}$ | 15.8 | $X$ | 195.54488 | 327.49867 | 61.47474 | 4.72359 | 0.1811171 | 0.30909005 | 2.1664368 | 20 | 4 22.4 | 19.0 |
| 56340 1999 $XE_{176}$ | 14.6 | $X$ | 200.67056 | 152.43221 | 63.92877 | 7.31342 | 0.0308395 | 0.28145801 | 2.3060053 | 20 | — | — |
| 56341 1999 $XS_{221}$ | 13.6 | $X$ | 185.19374 | 244.58962 | 49.11241 | 10.65876 | 0.0555843 | 0.15043656 | 3.5013360 | 20 | — | — |
| 56342 1999 $XW_{238}$ | 16.2 | $X$ | 142.70616 | 229.39908 | 54.65609 | 8.17057 | 0.1463827 | 0.29047012 | 2.2580579 | 20 | — | — |
| 56343 1999 $YG$ | 15.2 | $X$ | 196.00269 | 280.86655 | 109.64656 | 24.42974 | 0.1431188 | 0.35927426 | 1.9596807 | 20 | 5 5.0 | 18.6 |
| 56344 1999 $YV_{17}$ | 16.0 | $X$ | 245.30697 | 73.58951 | 334.88463 | 20.04040 | 0.0866193 | 0.36742007 | 1.9306081 | 20 | 8 4.1 | 18.0 |
| 56345 2000 $AN_{41}$ | 15.4 | $X$ | 181.97650 | 22.78936 | 24.97077 | 4.67176 | 0.2484470 | 0.25973781 | 2.4328347 | 20 | 5 4.4 | 19.6 |
| 56346 2000 $AK_{64}$ | 15.4 | $X$ | 229.75303 | 139.37345 | 103.74934 | 7.69027 | 0.0657042 | 0.28705062 | 2.2759553 | 20 | — | — |
| 56347 2000 $AU_{64}$ | 14.9 | $X$ | 331.82256 | 74.94140 | 100.86866 | 9.09908 | 0.1319271 | 0.24293650 | 2.5437487 | 20 | — | — |
| 56348 2000 $AH_{69}$ | 15.7 | $X$ | 158.40361 | 286.63791 | 109.91076 | 5.71951 | 0.1561493 | 0.30619460 | 2.1800730 | 20 | 3 28.5 | 18.8 |
| 56349 2000 $AZ_{90}$ | 15.2 | $X$ | 338.94680 | 211.19231 | 140.66730 | 6.12188 | 0.2512659 | 0.27320188 | 2.3522326 | 20 | 10 14.7 | 16.5 |
| 56350 2000 $AB_{92}$ | 14.5 | $X$ | 129.24500 | 274.48714 | 262.64281 | 6.68729 | 0.1173939 | 0.21537074 | 2.7564170 | 20 | 8 21.0 | 18.8 |
| 56351 2000 $AN_{93}$ | 15.3 | $X$ | 120.22602 | 99.15640 | 122.26466 | 23.89827 | 0.0532805 | 0.36494733 | 1.9393190 | 20 | 11 11.9 | 18.2 |
| 56352 2000 $AR_{93}$ | 15.7 | $X$ | 72.19480 | 142.61281 | 134.14649 | 25.03953 | 0.0574934 | 0.36883508 | 1.9256672 | 20 | 11 27.9 | 18.6 |
| 56353 2000 $AB_{103}$ | 14.5 | $X$ | 143.58462 | 47.19447 | 109.92685 | 8.60119 | 0.2111463 | 0.22032409 | 2.7149473 | 20 | 8 18.8 | 19.2 |
| 56354 2000 $AF_{129}$ | 15.4 | $X$ | 143.79498 | 239.47637 | 135.39972 | 5.43247 | 0.1749210 | 0.29734832 | 2.2231003 | 20 | 2 13.4 | 18.3 |
| 56355 2000 $AX_{130}$ | 12.3 | $X$ | 264.47299 | 257.48462 | 186.78158 | 2.53363 | 0.0373334 | 0.08106557 | 5.2874356 | 20 | 9 15.6 | 19.3 |
| 56356 2000 $AY_{138}$ | 14.3 | $X$ | 53.41057 | 283.14211 | 78.70855 | 12.12409 | 0.1945404 | 0.24365274 | 2.5387612 | 20 | — | — |
| 56357 2000 $AS_{143}$ | 15.9 | $X$ | 103.13994 | 259.06176 | 269.76631 | 4.49605 | 0.1158960 | 0.30780055 | 2.1724833 | 20 | 7 20.3 | 18.5 |
| 56358 2000 $AR_{201}$ | 15.8 | $X$ | 137.88226 | 76.28211 | 142.15730 | 24.53107 | 0.0742095 | 0.36915686 | 1.9245480 | 20 | 11 27.1 | 18.8 |
| 56359 2000 $AZ_{228}$ | 14.5 | $X$ | 314.57050 | 221.23886 | 154.98718 | 14.44099 | 0.2144373 | 0.22942061 | 2.6426994 | 20 | 9 1.9 | 16.7 |
| 56360 2000 $AP_{239}$ | 15.0 | $X$ | 246.02464 | 353.96182 | 122.77910 | 23.99250 | 0.0593288 | 0.36874404 | 1.9259842 | 20 | 12 3.8 | 17.3 |
| 56361 2000 $CW_{1}$ | 14.9 | $X$ | 280.26439 | 328.92771 | 306.46188 | 2.96749 | 0.1820871 | 0.29404355 | 2.2397263 | 20 | 2 16.1 | 18.0 |
| 56362 2000 $CG_{56}$ | 15.6 | $X$ | 314.59643 | 175.69416 | 70.25486 | 3.54909 | 0.0840903 | 0.29672580 | 2.2262085 | 20 | 3 8.2 | 18.0 |
| 56363 2000 $CP_{93}$ | 15.6 | $X$ | 157.16363 | 257.59600 | 215.43255 | 1.77436 | 0.0354394 | 0.21221443 | 2.7836809 | 20 | 6 28.9 | 19.6 |
| 56364 2000 $CU_{116}$ | 15.7 | $X$ | 290.37305 | 3.84512 | 95.12650 | 7.04630 | 0.0570047 | 0.27583311 | 2.3372497 | 20 | 12 13.8 | 18.2 |
| 56365 2000 $DG_{54}$ | 16.0 | $X$ | 311.44342 | 119.46584 | 174.35738 | 2.83739 | 0.1650617 | 0.30142251 | 2.2030225 | 20 | 4 28.4 | 18.1 |
| 56366 2000 $DO_{69}$ | 16.2 | $X$ | 115.59619 | 168.73149 | 341.21118 | 4.76482 | 0.0189892 | 0.30551393 | 2.1833098 | 20 | 6 27.5 | 18.8 |
| 56367 2000 $EF$ | 15.0 | $X$ | 166.04842 | 179.36648 | 77.78357 | 13.07916 | 0.1650220 | 0.22626838 | 2.6671870 | 20 | — | — |
| 56368 2000 $EU_{5}$ | 16.2 | $X$ | 233.56931 | 230.67377 | 163.91896 | 1.33305 | 0.1391355 | 0.30589749 | 2.1814844 | 20 | 6 9.9 | 19.2 |
| 56369 2000 $EW_{6}$ | 15.5 | $X$ | 275.87137 | 301.63020 | 16.90492 | 5.72194 | 0.1781054 | 0.29750122 | 2.2223385 | 20 | 4 9.6 | 18.5 |
| 56370 2000 $EV_{7}$ | 15.0 | $X$ | 178.50376 | 317.92722 | 3.90110 | 7.18985 | 0.1404836 | 0.28621803 | 2.2803668 | 20 | 1 11.9 | 18.5 |
| 56371 2000 $EC_{15}$ | 14.6 | $X$ | 265.07762 | 307.38059 | 355.05835 | 10.20075 | 0.1936758 | 0.29153601 | 2.2525507 | 20 | 3 7.0 | 17.8 |
| 56372 2000 $EX_{19}$ | 15.3 | $X$ | 249.27571 | 192.63093 | 86.14714 | 6.26466 | 0.2082698 | 0.28699852 | 2.2762307 | 20 | 1 21.9 | 19.1 |
| 56373 2000 $EF_{20}$ | 15.3 | $X$ | 240.81473 | 93.08325 | 140.08211 | 1.86067 | 0.0998003 | 0.27933420 | 2.3176791 | 20 | — | — |
| 56374 2000 $EM_{24}$ | 16.5 | $X$ | 312.64894 | 282.03621 | 359.38796 | 4.99565 | 0.1918835 | 0.29682385 | 2.2257182 | 20 | 4 4.8 | 18.7 |
| 56375 2000 $EJ_{25}$ | 15.9 | $X$ | 137.60845 | 182.74286 | 169.50050 | 0.94075 | 0.1534170 | 0.28477684 | 2.2880540 | 20 | 1 6.3 | 18.8 |
| 56376 2000 $EE_{33}$ | 15.2 | $X$ | 324.82377 | 266.30784 | 135.54898 | 7.50293 | 0.1184942 | 0.27279031 | 2.3545979 | 20 | 11 21.6 | 17.5 |
| 56377 2000 $EU_{35}$ | 15.9 | $X$ | 42.26858 | 124.09577 | 36.60385 | 6.60808 | 0.0586087 | 0.29558802 | 2.2319176 | 20 | 3 29.4 | 18.2 |
| 56378 2000 $ED_{37}$ | 15.6 | $X$ | 321.91007 | 140.48743 | 354.74625 | 6.02278 | 0.0210196 | 0.28176427 | 2.3043340 | 20 | — | — |
| 56379 2000 $EU_{42}$ | 15.5 | $X$ | 185.39579 | 325.68412 | 10.87618 | 5.71823 | 0.1939078 | 0.28828112 | 2.2694742 | 20 | 2 9.2 | 19.1 |
| 56380 2000 $EJ_{43}$ | 15.7 | $X$ | 282.26171 | 95.43923 | 178.43442 | 6.21167 | 0.1332505 | 0.29233665 | 2.2484361 | 20 | 2 21.9 | 18.5 |
| 56381 2000 $EN_{43}$ | 16.1 | $X$ | 16.85633 | 342.18087 | 169.51607 | 5.85253 | 0.0488099 | 0.29096338 | 2.2555052 | 20 | 1 31.5 | 18.7 |
| 56382 2000 $ES_{43}$ | 15.7 | $X$ | 340.90878 | 4.91967 | 164.87397 | 6.09830 | 0.0381732 | 0.28807064 | 2.2705795 | 20 | 1 5.3 | 18.4 |
| 56383 2000 $EJ_{47}$ | 15.2 | $X$ | 309.97589 | 268.33484 | 10.95284 | 5.31702 | 0.1779945 | 0.29582947 | 2.2307030 | 20 | 3 31.8 | 17.7 |
| 56384 2000 $EX_{47}$ | 15.5 | $X$ | 115.05832 | 34.14675 | 2.00433 | 7.05033 | 0.1149847 | 0.28857616 | 2.2679271 | 20 | 2 1.4 | 18.2 |
| 56385 2000 $EN_{48}$ | 15.8 | $X$ | 290.46022 | 284.21513 | 19.22553 | 3.70214 | 0.1647728 | 0.29644493 | 2.2276145 | 20 | 4 9.5 | 18.5 |
| 56386 2000 $EG_{54}$ | 15.8 | $X$ | 248.89018 | 276.95183 | 74.77098 | 4.96850 | 0.1259690 | 0.29822821 | 2.2187255 | 20 | 5 1.5 | 18.6 |
| 56387 2000 $EA_{64}$ | 15.8 | $X$ | 278.43597 | 319.04450 | 16.29977 | 3.52953 | 0.1825144 | 0.30126369 | 2.2037967 | 20 | 5 5.2 | 18.4 |
| 56388 2000 $EN_{69}$ | 15.1 | $X$ | 277.64973 | 304.42806 | 5.06463 | 3.70679 | 0.2170005 | 0.29534630 | 2.2331353 | 20 | 3 25.5 | 18.0 |
| 56389 2000 $EB_{87}$ | 15.9 | $X$ | 231.63840 | 70.16435 | 213.73127 | 4.15076 | 0.1383668 | 0.28772761 | 2.2723838 | 20 | 1 13.2 | 19.3 |
| 56390 2000 $EH_{91}$ | 15.2 | $X$ | 215.99165 | 54.14223 | 219.99638 | 5.03531 | 0.1481739 | 0.28379082 | 2.2933508 | 20 | — | — |
| 56391 2000 $ET_{97}$ | 15.5 | $X$ | 316.45688 | 260.08789 | 354.04324 | 3.77610 | 0.1128609 | 0.29322024 | 2.2439168 | 20 | 3 16.3 | 17.8 |
| 56392 2000 $ET_{106}$ | 15.7 | $X$ | 325.52206 | 249.37152 | 356.71672 | 4.61774 | 0.1397139 | 0.29322332 | 2.2439011 | 20 | 3 14.8 | 17.8 |
| 56393 2000 $ER_{120}$ | 15.8 | $X$ | 283.65173 | 203.53145 | 96.65498 | 7.92612 | 0.1333988 | 0.29966533 | 2.2116262 | 20 | 4 5.1 | 18.6 |
| 56394 2000 $EB_{126}$ | 15.4 | $X$ | 39.77864 | 99.77451 | 136.87348 | 6.66878 | 0.0818582 | 0.25663430 | 2.4524091 | 20 | 7 19.1 | 18.3 |
| 56395 2000 $EV_{126}$ | 15.9 | $X$ | 348.62516 | 132.00929 | 141.38275 | 6.75341 | 0.1920143 | 0.30155412 | 2.2023814 | 20 | 6 14.0 | 17.2 |
| 56396 2000 $EX_{129}$ | 14.5 | $X$ | 184.36022 | 274.91886 | 9.58431 | 9.27782 | 0.2204472 | 0.28028757 | 2.3124205 | 20 | — | — |
| 56397 2000 $EN_{134}$ | 15.6 | $X$ | 172.53189 | 338.11580 | 83.14171 | 6.78429 | 0.1566862 | 0.30109472 | 2.2046211 | 20 | 5 13.5 | 18.8 |
| 56398 2000 $EW_{134}$ | 16.2 | $X$ | 344.94550 | 178.70135 | 51.27246 | 6.58906 | 0.1192019 | 0.29572087 | 2.2312491 | 20 | 3 31.0 | 18.3 |
| 56399 2000 $EU_{135}$ | 15.0 | $X$ | 160.51324 | 164.74634 | 149.60534 | 11.79329 | 0.2055889 | 0.28056017 | 2.3109225 | 20 | — | — |
| 56400 2000 $EF_{140}$ | 13.5 | $X$ | 268.16533 | 107.27800 | 87.46900 | 11.44558 | 0.0436173 | 0.18509301 | 3.0493647 | 20 | — | — |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56401 2000 $EN_{155}$ | 15.0 | $X$ | 192.65868 | 341.85495 | 312.95881 | 8.53048 | 0.0677881 | 0.28453162 | 2.2893684 | 20 | — | — |
| 56402 2000 $ET_{157}$ | 15.0 | $X$ | 107.71871 | 69.30219 | 262.43796 | 5.25667 | 0.1378390 | 0.27763019 | 2.3271529 | 20 | — | — |
| 56403 2000 $FL$ | 15.6 | $X$ | 67.92875 | 22.11804 | 72.15117 | 6.90553 | 0.1175905 | 0.29070517 | 2.2568405 | 20 | 2 10.6 | 17.8 |
| 56404 2000 $FC_{12}$ | 14.1 | $X$ | 229.18325 | 67.40593 | 48.36806 | 11.45098 | 0.1667364 | 0.27028072 | 2.3691506 | 20 | 9 26.2 | 17.5 |
| 56405 2000 $FH_{17}$ | 16.1 | $X$ | 123.87978 | 34.29551 | 66.28408 | 5.57030 | 0.0915312 | 0.30016220 | 2.2091848 | 20 | 5 7.2 | 18.8 |
| 56406 2000 $FZ_{20}$ | 15.1 | $X$ | 74.98820 | 290.83446 | 37.56351 | 14.30361 | 0.1797360 | 0.27244995 | 2.3565585 | 20 | — | — |
| 56407 2000 $FA_{22}$ | 16.3 | $X$ | 343.44284 | 205.90517 | 56.52486 | 7.98510 | 0.1098486 | 0.29990161 | 2.2104643 | 20 | 5 17.5 | 18.1 |
| 56408 2000 $FH_{22}$ | 16.0 | $X$ | 350.77858 | 190.64024 | 102.25911 | 5.91524 | 0.1069679 | 0.30514819 | 2.1850541 | 20 | 7 25.8 | 17.7 |
| 56409 2000 $FQ_{29}$ | 16.5 | $X$ | 339.50497 | 221.19118 | 4.96625 | 4.46721 | 0.1806892 | 0.29344766 | 2.2427573 | 20 | 3 3.3 | 18.3 |
| 56410 2000 $FZ_{34}$ | 16.3 | $X$ | 57.52870 | 186.00614 | 64.02822 | 2.45317 | 0.1452731 | 0.30716700 | 2.1754696 | 20 | 9 22.9 | 18.8 |
| 56411 2000 $FE_{35}$ | 15.4 | $X$ | 298.24549 | 211.66128 | 130.78587 | 3.83837 | 0.1369120 | 0.30407587 | 2.1901881 | 20 | 6 26.1 | 17.4 |
| 56412 2000 $FM_{40}$ | 15.5 | $X$ | 346.54108 | 110.51687 | 67.86851 | 7.12545 | 0.0284860 | 0.28933074 | 2.2639822 | 20 | 1 29.0 | 18.2 |
| 56413 2000 $FU_{40}$ | 16.5 | $X$ | 118.17518 | 21.59566 | 142.83594 | 6.04449 | 0.0737115 | 0.30542477 | 2.1837347 | 20 | 7 28.5 | 19.3 |
| 56414 2000 $FK_{42}$ | 15.4 | $X$ | 273.67389 | 201.27047 | 168.83850 | 6.76266 | 0.1247818 | 0.30512148 | 2.1851816 | 20 | 6 29.9 | 18.0 |
| 56415 2000 $FR_{46}$ | 15.4 | $X$ | 145.97594 | 240.19619 | 79.17684 | 7.17297 | 0.1234228 | 0.27960825 | 2.3161645 | 20 | — | — |
| 56416 2000 $FS_{55}$ | 15.9 | $X$ | 233.57340 | 229.67543 | 102.09877 | 5.26515 | 0.0759737 | 0.29377981 | 2.2410665 | 20 | 3 23.4 | 18.9 |
| 56417 2000 $FO_{58}$ | 15.3 | $X$ | 357.77056 | 324.60232 | 82.59816 | 7.56528 | 0.0898295 | 0.27777478 | 2.3263453 | 20 | — | — |
| 56418 2000 $FL_{59}$ | 16.0 | $X$ | 216.39942 | 186.91203 | 41.96776 | 8.51921 | 0.0820392 | 0.27841218 | 2.3227933 | 20 | — | — |
| 56419 2000 $FM_{59}$ | 16.0 | $X$ | 165.71122 | 271.89371 | 138.66288 | 6.63675 | 0.0659779 | 0.29777360 | 2.2209831 | 20 | 4 19.0 | 19.0 |
| 56420 2000 $FX_{60}$ | 15.6 | $X$ | 172.40666 | 174.57564 | 105.57844 | 7.36773 | 0.1032237 | 0.27810351 | 2.3245117 | 20 | — | — |
| 56421 2000 $GV_{2}$ | 15.5 | $X$ | 328.58644 | 217.74090 | 77.29019 | 7.03689 | 0.2152193 | 0.30150545 | 2.2026184 | 20 | 5 26.9 | 16.9 |
| 56422 Mnajdra | 15.0 | $X$ | 61.85954 | 251.44488 | 72.94446 | 3.12551 | 0.2071495 | 0.26702768 | 2.3883531 | 20 | — | — |
| 56423 2000 $GW_{3}$ | 15.4 | $X$ | 199.06504 | 168.12268 | 98.17920 | 2.12464 | 0.1468210 | 0.27857244 | 2.3219023 | 20 | — | — |
| 56424 2000 $GG_{5}$ | 15.4 | $X$ | 357.58865 | 44.75038 | 247.11512 | 4.60075 | 0.1262806 | 0.30435534 | 2.1888471 | 20 | 8 6.0 | 17.2 |
| 56425 2000 $GZ_{7}$ | 14.5 | $X$ | 115.31894 | 155.93252 | 131.47036 | 7.64943 | 0.1799666 | 0.26848844 | 2.3796823 | 20 | — | — |
| 56426 2000 $GW_{24}$ | 16.0 | $X$ | 210.60518 | 291.05942 | 5.57892 | 5.75450 | 0.2483894 | 0.28303223 | 2.2974467 | 20 | 1 13.3 | 20.0 |
| 56427 2000 $GO_{27}$ | 15.3 | $X$ | 235.69660 | 183.96861 | 168.11407 | 2.36005 | 0.0748977 | 0.19967233 | 2.8990617 | 20 | 4 25.2 | 19.5 |
| 56428 2000 $GT_{27}$ | 16.7 | $X$ | 305.34986 | 140.59862 | 149.85413 | 1.04182 | 0.1229176 | 0.29699347 | 2.2248707 | 20 | 4 20.3 | 19.1 |
| 56429 2000 $GY_{27}$ | 16.4 | $X$ | 71.45157 | 103.22257 | 39.73515 | 1.59790 | 0.0929746 | 0.29701492 | 2.2247636 | 20 | 4 22.9 | 18.5 |
| 56430 2000 $GP_{29}$ | 15.4 | $X$ | 337.07165 | 135.22353 | 218.44814 | 1.86576 | 0.1942331 | 0.26131644 | 2.4230268 | 20 | 9 29.6 | 17.0 |
| 56431 2000 $GX_{33}$ | 15.4 | $X$ | 58.91163 | 130.41628 | 228.15468 | 1.59338 | 0.2488738 | 0.27263018 | 2.3555198 | 20 | — | — |
| 56432 2000 $GY_{33}$ | 15.7 | $X$ | 86.98922 | 68.55107 | 242.37061 | 1.11514 | 0.2221265 | 0.26835844 | 2.3804508 | 20 | — | — |
| 56433 2000 $GR_{34}$ | 14.3 | $X$ | 47.36366 | 248.10717 | 105.18563 | 11.09449 | 0.2741488 | 0.26602203 | 2.3943685 | 20 | — | — |
| 56434 2000 $GN_{38}$ | 15.8 | $X$ | 130.54303 | 161.78303 | 156.83088 | 2.79928 | 0.1734161 | 0.27616143 | 2.3353969 | 20 | — | — |
| 56435 2000 $GQ_{38}$ | 15.0 | $X$ | 68.77591 | 180.19154 | 160.02460 | 2.39757 | 0.2172576 | 0.27075803 | 2.3663655 | 20 | — | — |
| 56436 2000 $GZ_{46}$ | 14.8 | $X$ | 246.84232 | 131.43835 | 206.28143 | 5.11301 | 0.2078115 | 0.29412359 | 2.2393199 | 20 | 3 31.7 | 18.3 |
| 56437 2000 $GT_{48}$ | 15.4 | $X$ | 123.77924 | 284.87390 | 22.89434 | 7.02143 | 0.1244153 | 0.27372561 | 2.3492312 | 20 | — | — |
| 56438 2000 $GV_{49}$ | 15.4 | $X$ | 220.74851 | 137.07626 | 196.13503 | 6.37570 | 0.1432632 | 0.29059120 | 2.2574306 | 20 | 3 3.9 | 18.7 |
| 56439 2000 $GD_{52}$ | 14.7 | $X$ | 307.24647 | 315.53875 | 38.36601 | 6.61756 | 0.1723020 | 0.30520607 | 2.1847778 | 20 | 7 31.4 | 16.4 |
| 56440 2000 $GY_{52}$ | 15.9 | $X$ | 267.94578 | 37.04063 | 9.64992 | 4.51241 | 0.0699981 | 0.30891707 | 2.1672455 | 20 | 8 29.3 | 18.0 |
| 56441 2000 $GW_{54}$ | 15.9 | $X$ | 70.11356 | 295.71271 | 208.07283 | 4.47764 | 0.0761188 | 0.29584512 | 2.2306244 | 20 | 4 19.2 | 18.3 |
| 56442 2000 $GP_{66}$ | 14.5 | $X$ | 35.19720 | 12.42570 | 13.21338 | 5.89230 | 0.0318785 | 0.22445328 | 2.6815470 | 20 | — | — |
| 56443 2000 $GX_{67}$ | 15.3 | $X$ | 138.23556 | 201.25937 | 169.97614 | 2.90590 | 0.0851688 | 0.28516977 | 2.2859518 | 20 | 1 22.2 | 18.0 |
| 56444 2000 $GB_{68}$ | 15.2 | $X$ | 110.34381 | 170.95885 | 113.33426 | 1.54429 | 0.2046876 | 0.26712535 | 2.3877708 | 20 | 12 26.7 | 19.2 |
| 56445 2000 $GN_{71}$ | 15.5 | $X$ | 48.47807 | 227.12503 | 191.35026 | 5.46389 | 0.1295995 | 0.28048353 | 2.3113434 | 20 | — | — |
| 56446 2000 $GF_{74}$ | 15.6 | $X$ | 113.23174 | 69.34520 | 33.85121 | 4.18850 | 0.0850934 | 0.29552560 | 2.2322319 | 20 | 4 25.1 | 18.2 |
| 56447 2000 $GR_{76}$ | 15.9 | $X$ | 308.85159 | 119.42645 | 25.19212 | 5.60989 | 0.0861018 | 0.27843451 | 2.3226691 | 20 | — | — |
| 56448 2000 $GY_{76}$ | 15.8 | $X$ | 255.89372 | 178.19706 | 41.52629 | 3.57121 | 0.1414254 | 0.28009270 | 2.3134930 | 20 | — | — |
| 56449 2000 $GS_{78}$ | 16.4 | $X$ | 140.95879 | 62.98418 | 47.90106 | 2.07168 | 0.1127496 | 0.30096127 | 2.2052727 | 20 | 6 13.2 | 19.3 |
| 56450 2000 $GU_{80}$ | 14.8 | $X$ | 282.79349 | 180.96300 | 112.17372 | 13.31147 | 0.2110296 | 0.24129572 | 2.5552671 | 20 | 3 20.8 | 18.7 |
| 56451 2000 $GN_{81}$ | 14.8 | $X$ | 348.22476 | 320.85799 | 32.34881 | 3.41524 | 0.1851078 | 0.26007953 | 2.4307032 | 20 | 10 24.6 | 16.8 |
| 56452 2000 $GU_{86}$ | 15.2 | $X$ | 58.67110 | 170.05385 | 155.41979 | 2.89184 | 0.1696451 | 0.26804933 | 2.3822805 | 20 | 12 28.1 | 18.5 |
| 56453 2000 $GG_{87}$ | 15.5 | $X$ | 101.05194 | 268.07106 | 60.05090 | 7.78551 | 0.1283520 | 0.27425776 | 2.3461914 | 20 | — | — |
| 56454 2000 $GM_{87}$ | 15.3 | $X$ | 244.00194 | 271.39784 | 114.64318 | 7.18041 | 0.1563881 | 0.30355089 | 2.1927126 | 20 | 6 8.9 | 18.3 |
| 56455 2000 $GW_{87}$ | 15.3 | $X$ | 331.67854 | 182.98146 | 104.98897 | 6.77402 | 0.1813708 | 0.29894554 | 2.2151748 | 20 | 5 28.5 | 16.9 |
| 56456 2000 $GE_{89}$ | 14.8 | $X$ | 88.33517 | 216.54569 | 63.76636 | 6.43114 | 0.1007983 | 0.26570144 | 2.3962940 | 20 | 11 25.6 | 18.2 |
| 56457 2000 $GE_{95}$ | 15.1 | $X$ | 4.10992 | 24.40737 | 249.52901 | 4.90252 | 0.1775836 | 0.30075807 | 2.2062659 | 20 | 7 25.6 | 16.6 |
| 56458 2000 $GA_{96}$ | 15.6 | $X$ | 77.21319 | 135.83246 | 22.78300 | 7.73620 | 0.0158870 | 0.29685307 | 2.2255722 | 20 | 5 10.8 | 18.3 |
| 56459 2000 $GD_{96}$ | 15.8 | $X$ | 270.26381 | 42.55463 | 217.14948 | 2.49712 | 0.1228597 | 0.28637362 | 2.2795408 | 20 | 1 23.0 | 18.8 |
| 56460 2000 $GE_{96}$ | 15.2 | $X$ | 302.33001 | 281.14140 | 3.71480 | 3.38009 | 0.2109386 | 0.29257924 | 2.2471930 | 20 | 3 23.3 | 17.6 |
| 56461 2000 $GX_{96}$ | 13.9 | $X$ | 24.02870 | 46.67455 | 225.32872 | 12.66123 | 0.1288817 | 0.25275821 | 2.4774175 | 20 | 8 15.3 | 17.0 |
| 56462 2000 $GN_{97}$ | 15.2 | $X$ | 56.93102 | 185.57139 | 158.15671 | 2.57896 | 0.2380531 | 0.27094800 | 2.3652593 | 20 | — | — |
| 56463 2000 $GD_{98}$ | 15.0 | $X$ | 337.33567 | 9.84393 | 331.00243 | 5.90933 | 0.1300779 | 0.25992141 | 2.4316889 | 20 | 9 6.5 | 17.3 |
| 56464 2000 $GE_{98}$ | 15.9 | $X$ | 29.57604 | 9.11056 | 239.56338 | 4.72028 | 0.0903277 | 0.30356840 | 2.1926283 | 20 | 7 24.6 | 18.0 |
| 56465 2000 $GS_{98}$ | 15.7 | $X$ | 166.93773 | 193.62833 | 232.52410 | 4.95054 | 0.0927571 | 0.29954058 | 2.2122402 | 20 | 5 10.6 | 18.8 |
| 56466 2000 $GZ_{99}$ | 16.0 | $X$ | 49.49983 | 13.79615 | 216.76123 | 3.76917 | 0.1823659 | 0.30311607 | 2.1948090 | 20 | 8 15.7 | 18.4 |
| 56467 2000 $GP_{103}$ | 16.1 | $X$ | 357.79248 | 200.87449 | 52.76780 | 4.61546 | 0.1051450 | 0.29923466 | 2.2137477 | 20 | 6 1.5 | 17.7 |
| 56468 2000 $GO_{104}$ | 14.9 | $X$ | 41.54778 | 182.69423 | 115.09138 | 3.53692 | 0.2038170 | 0.25999703 | 2.4312174 | 20 | 11 7.6 | 18.0 |
| 56469 2000 $GN_{105}$ | 15.9 | $X$ | 226.77838 | 202.83570 | 73.47335 | 3.45028 | 0.1526507 | 0.28347309 | 2.2950641 | 20 | — | — |
| 56470 2000 $GH_{106}$ | 16.0 | $X$ | 126.58210 | 317.01051 | 223.64631 | 5.59965 | 0.0418765 | 0.30774615 | 2.1727394 | 20 | 8 27.8 | 18.8 |
| 56471 2000 $GX_{106}$ | 15.1 | $X$ | 216.17422 | 263.60792 | 44.35488 | 12.98162 | 0.2294342 | 0.28372571 | 2.2937016 | 20 | 2 3.2 | 19.2 |
| 56472 2000 $GB_{108}$ | 15.8 | $X$ | 308.92212 | 78.73767 | 160.53677 | 6.39520 | 0.1212411 | 0.29007985 | 2.2600828 | 20 | 2 11.5 | 18.3 |
| 56473 2000 $GY_{108}$ | 15.2 | $X$ | 270.57979 | 222.67583 | 63.00733 | 7.89870 | 0.1647113 | 0.28927097 | 2.2642940 | 20 | 2 26.2 | 18.5 |
| 56474 2000 $GA_{109}$ | 16.1 | $X$ | 243.39318 | 179.84088 | 114.08633 | 2.19357 | 0.1471855 | 0.28736878 | 2.2742751 | 20 | 2 7.0 | 19.5 |
| 56475 2000 $GN_{109}$ | 16.2 | $X$ | 329.61417 | 125.80169 | 102.43427 | 4.27057 | 0.1228462 | 0.29167379 | 2.2518413 | 20 | 2 28.9 | 18.6 |
| 56476 2000 $GU_{110}$ | 14.9 | $X$ | 150.08784 | 358.72082 | 336.28105 | 5.58705 | 0.1840115 | 0.28179447 | 2.3041694 | 20 | 1 3.3 | 18.1 |
| 56477 2000 $GM_{111}$ | 15.7 | $X$ | 140.01220 | 309.26518 | 343.48964 | 6.67653 | 0.1989419 | 0.27378416 | 2.3488963 | 20 | — | — |
| 56478 2000 $GS_{111}$ | 16.1 | $X$ | 151.81712 | 66.13255 | 23.00220 | 6.07258 | 0.0795681 | 0.30079662 | 2.2060774 | 20 | 5 22.7 | 18.9 |
| 56479 2000 $GT_{114}$ | 14.0 | $X$ | 192.92021 | 278.62391 | 7.59015 | 11.38343 | 0.2375508 | 0.22923732 | 2.6441079 | 20 | — | — |
| 56480 2000 $GU_{114}$ | 16.0 | $X$ | 269.76725 | 203.52655 | 359.79723 | 4.45065 | 0.0847550 | 0.28118028 | 2.3075236 | 20 | — | — |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56481 2000 $GW_{114}$ | 14.6 | X | 239.44020 | 174.85156 | 136.17038 | 4.09029 | 0.1667282 | 0.28713371 | 2.2755162 | 20 | 2 24.0 | 17.9 |
| 56482 2000 $GY_{115}$ | 15.4 | X | 228.87058 | 193.44303 | 177.79702 | 9.40930 | 0.1443073 | 0.29921211 | 2.2138589 | 20 | 5 4.7 | 18.6 |
| 56483 2000 $GY_{121}$ | 16.1 | X | 302.17851 | 124.40525 | 100.12784 | 7.58268 | 0.0520599 | 0.28650395 | 2.2788495 | 20 | 1 26.1 | 18.8 |
| 56484 2000 $GH_{124}$ | 14.6 | X | 181.16920 | 183.67641 | 155.33764 | 7.95824 | 0.1447064 | 0.28409485 | 2.2917143 | 20 | 2 3.4 | 18.0 |
| 56485 2000 $GL_{125}$ | 14.7 | X | 153.25701 | 275.12976 | 140.04293 | 8.23461 | 0.0271972 | 0.24397624 | 2.5365165 | 20 | 4 10.2 | 18.2 |
| 56486 2000 $GF_{126}$ | 14.5 | X | 145.53309 | 163.72608 | 145.52169 | 7.36341 | 0.1305529 | 0.27371914 | 2.3492682 | 20 | — | — |
| 56487 2000 $GR_{126}$ | 15.0 | X | 289.63254 | 154.04979 | 113.65736 | 9.17767 | 0.1335925 | 0.28762344 | 2.2729324 | 20 | 2 27.2 | 18.0 |
| 56488 2000 $GQ_{131}$ | 15.2 | X | 45.82438 | 200.06985 | 127.94801 | 6.74636 | 0.1524866 | 0.26346780 | 2.4098186 | 20 | 12 14.9 | 18.5 |
| 56489 2000 $GT_{131}$ | 15.1 | X | 68.12601 | 165.17461 | 148.44426 | 7.25016 | 0.2780145 | 0.26268107 | 2.4146278 | 20 | 12 30.8 | 19.1 |
| 56490 2000 $GD_{133}$ | 14.8 | X | 0.38317 | 261.46862 | 48.13046 | 8.37454 | 0.2139356 | 0.25537168 | 2.4604860 | 20 | 9 19.8 | 16.9 |
| 56491 2000 $GS_{133}$ | 15.9 | X | 194.00145 | 161.39302 | 96.43196 | 5.34817 | 0.1818730 | 0.27528575 | 2.3403468 | 20 | — | — |
| 56492 2000 $GH_{134}$ | 15.3 | X | 122.47654 | 130.50924 | 139.66234 | 10.68648 | 0.2508477 | 0.26414225 | 2.4057148 | 20 | 12 20.1 | 19.6 |
| 56493 2000 $GU_{134}$ | 14.8 | X | 183.95584 | 176.27520 | 138.10456 | 7.06838 | 0.1982182 | 0.28211476 | 2.3024251 | 20 | 1 10.2 | 18.5 |
| 56494 2000 $GA_{136}$ | 15.1 | X | 204.84927 | 138.32620 | 138.59625 | 7.45196 | 0.1077495 | 0.27986611 | 2.3147415 | 20 | — | — |
| 56495 2000 $GW_{137}$ | 14.9 | X | 27.58352 | 323.86547 | 46.89698 | 5.31676 | 0.1001533 | 0.27084594 | 2.3658534 | 20 | — | — |
| 56496 2000 $GE_{138}$ | 16.1 | X | 353.75983 | 178.38205 | 36.70860 | 6.72482 | 0.0889780 | 0.29422402 | 2.2388103 | 20 | 3 27.1 | 18.2 |
| 56497 2000 $GD_{140}$ | 15.4 | X | 154.89431 | 286.64783 | 92.67720 | 6.19647 | 0.1526792 | 0.28944549 | 2.2633837 | 20 | 3 3.2 | 18.7 |
| 56498 2000 $GU_{140}$ | 15.9 | X | 258.07700 | 147.06147 | 147.34952 | 8.61140 | 0.1555375 | 0.28866573 | 2.2674579 | 20 | 2 21.5 | 18.9 |
| 56499 2000 $GM_{143}$ | 15.7 | X | 175.53010 | 144.52392 | 143.18738 | 6.61375 | 0.1692755 | 0.27691497 | 2.3311583 | 20 | — | — |
| 56500 2000 $GV_{143}$ | 14.9 | X | 79.84146 | 217.78336 | 116.49125 | 9.48703 | 0.2676506 | 0.26922983 | 2.3753117 | 20 | — | — |
| 56501 2000 $GG_{153}$ | 15.9 | X | 94.11732 | 135.67971 | 304.31579 | 4.29391 | 0.0462672 | 0.29099263 | 2.2553540 | 20 | 2 17.7 | 18.5 |
| 56502 2000 $GY_{158}$ | 15.1 | X | 227.76857 | 226.13700 | 127.17984 | 3.60095 | 0.1861093 | 0.24728205 | 2.5138594 | 20 | 4 9.1 | 19.2 |
| 56503 2000 $GR_{159}$ | 15.0 | X | 109.69965 | 48.81033 | 302.68444 | 5.57809 | 0.1588710 | 0.27916065 | 2.3186396 | 20 | — | — |
| 56504 2000 $GT_{166}$ | 15.6 | X | 341.89198 | 343.56803 | 40.00780 | 7.02331 | 0.1204757 | 0.26548019 | 2.3976253 | 20 | 11 20.5 | 17.9 |
| 56505 2000 $GV_{171}$ | 16.4 | X | 175.65665 | 305.08834 | 123.85543 | 4.45108 | 0.0326525 | 0.30102985 | 2.2049378 | 20 | 5 25.0 | 19.0 |
| 56506 2000 $GH_{174}$ | 15.3 | X | 331.09463 | 307.09431 | 22.39304 | 6.79448 | 0.1269387 | 0.25763683 | 2.4460430 | 20 | 8 10.5 | 17.7 |
| 56507 2000 $GU_{178}$ | 16.0 | X | 299.75148 | 52.70793 | 39.77715 | 6.94777 | 0.0815063 | 0.27191711 | 2.3596361 | 20 | 12 16.9 | 18.6 |
| 56508 2000 $HG_{6}$ | 15.6 | X | 8.44725 | 12.36784 | 35.51229 | 5.69181 | 0.1298778 | 0.27246974 | 2.3564444 | 20 | — | — |
| 56509 2000 $HB_{7}$ | 15.5 | X | 194.44689 | 148.70052 | 46.92517 | 7.57890 | 0.0628467 | 0.26824777 | 2.3811055 | 20 | 12 5.7 | 18.7 |
| 56510 2000 $HT_{8}$ | 14.9 | X | 149.82214 | 142.66810 | 53.88681 | 6.36871 | 0.0360547 | 0.26289088 | 2.4133429 | 20 | 10 17.2 | 18.2 |
| 56511 2000 $HE_{11}$ | 15.4 | X | 150.24387 | 123.58338 | 186.24917 | 1.63476 | 0.2199768 | 0.27427990 | 2.3460651 | 20 | — | — |
| 56512 2000 $HH_{11}$ | 15.6 | X | 277.23917 | 83.59688 | 48.84111 | 7.40730 | 0.0919539 | 0.27237774 | 2.3569750 | 20 | — | — |
| 56513 2000 $HY_{12}$ | 15.0 | X | 189.52763 | 318.50999 | 33.32642 | 4.03661 | 0.2307182 | 0.23631457 | 2.5910496 | 20 | 3 6.7 | 19.4 |
| 56514 2000 $HM_{18}$ | 14.9 | X | 87.33607 | 344.02265 | 36.33180 | 14.43100 | 0.1976958 | 0.23091461 | 2.6312884 | 20 | — | — |
| 56515 2000 $HD_{20}$ | 15.5 | X | 14.35577 | 296.63368 | 121.87290 | 7.43985 | 0.0923472 | 0.27321745 | 2.3521432 | 20 | — | — |
| 56516 2000 $HE_{20}$ | 15.3 | X | 24.76068 | 191.07351 | 123.46662 | 7.07817 | 0.1394750 | 0.25825722 | 2.4421241 | 20 | 10 29.5 | 18.2 |
| 56517 2000 $HU_{20}$ | 15.9 | X | 258.43760 | 154.19035 | 155.42351 | 5.42286 | 0.2107561 | 0.28987113 | 2.2611675 | 20 | 3 7.8 | 19.3 |
| 56518 2000 $HZ_{20}$ | 14.3 | X | 113.30525 | 280.07045 | 56.61171 | 13.33324 | 0.2717819 | 0.22338289 | 2.6901063 | 20 | — | — |
| 56519 2000 $HB_{21}$ | 15.3 | X | 237.70381 | 170.50981 | 127.74882 | 3.34593 | 0.1469858 | 0.28633047 | 2.2797698 | 20 | 2 6.9 | 18.7 |
| 56520 2000 $HO_{21}$ | 15.9 | X | 311.11538 | 180.22427 | 95.74322 | 5.07018 | 0.1442752 | 0.29399635 | 2.2399660 | 20 | 4 6.9 | 18.3 |
| 56521 2000 $HE_{22}$ | 16.4 | X | 234.22097 | 305.37403 | 18.05173 | 0.41505 | 0.2295571 | 0.28884225 | 2.2665340 | 20 | 3 2.4 | 19.9 |
| 56522 2000 $HT_{24}$ | 15.2 | X | 7.30899 | 88.45733 | 226.99894 | 5.09721 | 0.1185740 | 0.25760081 | 2.4462710 | 20 | 9 22.9 | 17.8 |
| 56523 2000 $HX_{25}$ | 15.4 | X | 359.00950 | 239.51331 | 72.15963 | 1.63478 | 0.2016922 | 0.25433377 | 2.4671754 | 20 | 9 13.8 | 17.3 |
| 56524 2000 $HT_{27}$ | 16.2 | X | 264.31079 | 274.57260 | 350.89401 | 1.92396 | 0.1654764 | 0.28633498 | 2.2797459 | 20 | 1 21.6 | 19.7 |
| 56525 2000 $HY_{31}$ | 15.4 | X | 167.40704 | 233.69312 | 54.27700 | 3.69261 | 0.1089981 | 0.27572231 | 2.3378758 | 20 | — | — |
| 56526 2000 $HP_{35}$ | 15.2 | X | 21.42725 | 237.88500 | 118.29090 | 7.88929 | 0.1393431 | 0.26675510 | 2.3899798 | 20 | 12 19.7 | 18.1 |
| 56527 2000 $HF_{36}$ | 15.0 | X | 36.54241 | 223.93034 | 78.69069 | 13.36266 | 0.2377512 | 0.25865682 | 2.4396083 | 20 | 11 14.3 | 18.2 |
| 56528 2000 $HF_{44}$ | 16.3 | X | 41.50674 | 133.04121 | 118.27241 | 3.82137 | 0.1605990 | 0.30594307 | 2.1812677 | 20 | 9 3.7 | 18.5 |
| 56529 2000 $HY_{44}$ | 15.8 | X | 118.14440 | 207.56904 | 115.82815 | 2.97314 | 0.1113744 | 0.27482321 | 2.3429721 | 20 | — | — |
| 56530 2000 $HK_{45}$ | 15.3 | X | 121.10145 | 172.75101 | 172.66304 | 4.63391 | 0.1698424 | 0.27815678 | 2.3242149 | 20 | — | — |
| 56531 2000 $HF_{48}$ | 15.3 | X | 14.71166 | 5.28031 | 49.86870 | 8.06427 | 0.0991110 | 0.27388236 | 2.3483348 | 20 | — | — |
| 56532 2000 $HB_{50}$ | 15.8 | X | 90.70950 | 67.47007 | 305.44933 | 0.48558 | 0.1041432 | 0.27688399 | 2.3313322 | 20 | — | — |
| 56533 2000 $HY_{50}$ | 15.9 | X | 295.75318 | 202.27991 | 52.62245 | 4.61945 | 0.1246652 | 0.28884396 | 2.2665250 | 20 | 2 18.2 | 18.8 |
| 56534 2000 $HH_{52}$ | 15.7 | X | 228.14810 | 91.80943 | 47.57199 | 5.41230 | 0.1760296 | 0.26719751 | 2.3873409 | 20 | 10 20.1 | 18.8 |
| 56535 2000 $HT_{52}$ | 15.5 | X | 115.90363 | 244.62400 | 55.59696 | 4.22448 | 0.2087430 | 0.26812874 | 2.3818101 | 20 | — | — |
| 56536 2000 $HO_{53}$ | 14.8 | X | 43.59286 | 160.68178 | 217.76779 | 5.36787 | 0.1271215 | 0.27026981 | 2.3692144 | 20 | — | — |
| 56537 2000 $HQ_{53}$ | 14.6 | X | 162.52196 | 323.72561 | 66.95351 | 5.82927 | 0.2292724 | 0.23881948 | 2.5728999 | 20 | 4 1.8 | 18.9 |
| 56538 2000 $HF_{54}$ | 15.1 | X | 22.75537 | 14.93312 | 228.80733 | 6.41197 | 0.0926810 | 0.29897777 | 2.2150156 | 20 | 7 4.3 | 17.2 |
| 56539 2000 $HT_{58}$ | 15.9 | X | 265.94645 | 296.64337 | 3.26192 | 6.36413 | 0.1852228 | 0.29005967 | 2.2601876 | 20 | 3 5.8 | 19.1 |
| 56540 2000 $HC_{61}$ | 16.3 | X | 82.81669 | 11.93325 | 66.54811 | 2.68371 | 0.1028561 | 0.28780406 | 2.2719814 | 20 | 2 9.5 | 18.7 |
| 56541 2000 $HR_{61}$ | 16.1 | X | 97.60709 | 144.88995 | 151.84190 | 2.70714 | 0.1314267 | 0.26701468 | 2.3884306 | 20 | 12 27.9 | 19.6 |
| 56542 2000 $HJ_{63}$ | 15.5 | X | 340.36671 | 205.57237 | 162.47416 | 1.38547 | 0.2010982 | 0.26258811 | 2.4151977 | 20 | 11 2.8 | 17.3 |
| 56543 2000 $HT_{64}$ | 15.2 | X | 353.15420 | 302.69689 | 7.59391 | 6.20615 | 0.1279205 | 0.25537477 | 2.4604661 | 20 | 8 24.3 | 17.5 |
| 56544 2000 $HB_{65}$ | 16.0 | X | 326.70454 | 66.95424 | 53.65219 | 7.35597 | 0.0473219 | 0.27785955 | 2.3258721 | 20 | — | — |
| 56545 2000 $HK_{65}$ | 15.5 | X | 318.15830 | 11.58399 | 26.57811 | 2.94034 | 0.1983582 | 0.26676235 | 2.3899365 | 20 | 10 28.8 | 16.9 |
| 56546 2000 $HF_{66}$ | 15.8 | X | 265.32047 | 340.21900 | 244.17564 | 3.44096 | 0.1044867 | 0.28111815 | 2.3078635 | 20 | — | — |
| 56547 2000 $HQ_{69}$ | 16.3 | X | 299.02710 | 92.69282 | 45.96408 | 5.24558 | 0.0941770 | 0.27730693 | 2.3289611 | 20 | — | — |
| 56548 2000 $HZ_{74}$ | 15.7 | X | 69.35122 | 254.10534 | 168.02751 | 6.36076 | 0.0445623 | 0.28271913 | 2.2991426 | 20 | — | — |
| 56549 2000 $HZ_{75}$ | 16.4 | X | 317.71006 | 87.07561 | 101.65435 | 4.96266 | 0.0763050 | 0.28452689 | 2.2893938 | 20 | — | — |
| 56550 2000 $HZ_{77}$ | 15.2 | X | 219.26178 | 114.39429 | 246.68505 | 5.12496 | 0.1805755 | 0.29575677 | 2.2310686 | 20 | 4 5.4 | 18.7 |
| 56551 2000 $HJ_{78}$ | 16.3 | X | 77.64879 | 221.93537 | 349.97943 | 4.85142 | 0.0532440 | 0.30497214 | 2.1858949 | 20 | 8 10.8 | 18.7 |
| 56552 2000 $HL_{78}$ | 15.3 | X | 142.48106 | 1.99078 | 328.67117 | 6.62680 | 0.1351949 | 0.27903220 | 2.3193511 | 20 | — | — |
| 56553 2000 $HL_{79}$ | 15.9 | X | 338.75239 | 255.43187 | 346.44073 | 7.25057 | 0.0498749 | 0.29464580 | 2.2366732 | 20 | 4 9.7 | 18.4 |
| 56554 2000 $HF_{85}$ | 15.6 | X | 287.89990 | 75.53359 | 190.56516 | 6.42711 | 0.1164536 | 0.28874539 | 2.2670409 | 20 | 2 20.5 | 18.7 |
| 56555 2000 $HL_{85}$ | 16.0 | X | 239.90134 | 250.70452 | 301.25932 | 3.21853 | 0.0165900 | 0.27519161 | 2.3408806 | 20 | — | — |
| 56556 2000 $HF_{88}$ | 16.0 | X | 99.63106 | 161.13747 | 141.92419 | 4.03674 | 0.2061172 | 0.26680652 | 2.3896727 | 20 | — | — |
| 56557 2000 $HX_{91}$ | 15.3 | X | 50.77660 | 237.30736 | 175.17046 | 6.87789 | 0.0915261 | 0.27950289 | 2.3167465 | 20 | — | — |
| 56558 2000 $HK_{100}$ | 14.9 | X | 302.57722 | 159.99511 | 145.67627 | 2.84713 | 0.0182425 | 0.19993045 | 2.8965660 | 20 | 5 27.3 | 18.8 |
| 56559 2000 $JN_{3}$ | 15.6 | X | 106.60411 | 325.79125 | 196.12918 | 25.69974 | 0.2292829 | 0.30701431 | 2.1761908 | 20 | 7 22.2 | 19.5 |
| 56560 2000 $JW_{6}$ | 14.9 | X | 305.97979 | 249.84028 | 128.58332 | 12.61662 | 0.2798927 | 0.25679176 | 2.4514065 | 20 | 8 10.6 | 16.6 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56561 Jaimenomen | 15.4 | *X* | 152.51578 | 246.97683 | 69.03042 | 7.36663 | 0.1260685 | 0.27628127 | 2.3347215 | 20 | — | — |
| 56562 2000 $JN_{7}$ | 15.4 | *X* | 239.82688 | 200.86368 | 160.58168 | 13.14413 | 0.2055180 | 0.24478216 | 2.5309460 | 20 | 5 1.2 | 19.6 |
| 56563 2000 $JS_{8}$ | 15.1 | *X* | 253.06263 | 48.39408 | 243.89879 | 5.53838 | 0.1700033 | 0.28567308 | 2.2832660 | 20 | 2 10.4 | 18.8 |
| 56564 2000 $JY_{10}$ | 15.7 | *X* | 237.89341 | 334.11218 | 274.60115 | 6.34256 | 0.1047838 | 0.28141498 | 2.3062404 | 20 | — | — |
| 56565 2000 $JY_{12}$ | 14.2 | *X* | 258.65113 | 84.24527 | 260.93605 | 11.38204 | 0.2361619 | 0.24275124 | 2.5450428 | 20 | 4 18.5 | 18.4 |
| 56566 2000 $JE_{14}$ | 15.5 | *X* | 64.80233 | 217.30264 | 78.86549 | 3.53395 | 0.0886445 | 0.26245203 | 2.4160324 | 20 | 11 17.5 | 18.5 |
| 56567 2000 $JQ_{14}$ | 15.7 | *X* | 176.78027 | 152.28763 | 72.20084 | 3.65871 | 0.0890782 | 0.26890250 | 2.3772389 | 20 | 12 20.1 | 18.9 |
| 56568 2000 $JN_{15}$ | 15.6 | *X* | 355.87172 | 57.25160 | 85.31529 | 2.94996 | 0.0691009 | 0.28253812 | 2.3001245 | 20 | — | — |
| 56569 2000 $JL_{17}$ | 15.4 | *X* | 312.93502 | 124.62872 | 155.43748 | 4.10964 | 0.1201869 | 0.29397581 | 2.2400703 | 20 | 4 18.9 | 17.7 |
| 56570 2000 $JA_{21}$ | 15.0 | *X* | 24.02316 | 86.81979 | 279.94923 | 3.22281 | 0.1306969 | 0.26871920 | 2.3783198 | 20 | — | — |
| 56571 2000 $JD_{22}$ | 15.0 | *X* | 218.16250 | 154.01971 | 258.21741 | 3.69790 | 0.1043079 | 0.30102744 | 2.2049496 | 20 | 6 19.9 | 18.0 |
| 56572 2000 $JZ_{23}$ | 14.2 | *X* | 297.63850 | 349.50016 | 251.95773 | 12.61308 | 0.0966479 | 0.23951345 | 2.5679276 | 20 | 2 5.9 | 17.9 |
| 56573 2000 $JD_{24}$ | 15.2 | *X* | 260.01384 | 325.63309 | 319.25742 | 4.90428 | 0.2305718 | 0.28690795 | 2.2767097 | 20 | 2 5.6 | 18.8 |
| 56574 2000 $JK_{24}$ | 14.7 | *X* | 73.91935 | 38.96294 | 256.93426 | 10.53575 | 0.2533754 | 0.26239266 | 2.4163969 | 20 | 12 12.6 | 18.6 |
| 56575 2000 $JX_{24}$ | 15.8 | *X* | 232.23636 | 323.59978 | 286.20844 | 4.48341 | 0.1469082 | 0.28000504 | 2.3139758 | 20 | — | — |
| 56576 2000 $JB_{25}$ | 15.3 | *X* | 38.36527 | 358.72026 | 303.97291 | 6.32506 | 0.1267941 | 0.25993559 | 2.4316005 | 20 | 10 24.6 | 18.4 |
| 56577 2000 $JE_{26}$ | 15.9 | *X* | 290.58708 | 335.67246 | 261.17034 | 6.20043 | 0.0666234 | 0.28700132 | 2.2762159 | 20 | 1 22.9 | 18.7 |
| 56578 2000 $JJ_{26}$ | 14.5 | *X* | 161.82154 | 325.74299 | 12.53166 | 9.04290 | 0.1650246 | 0.28082609 | 2.3094634 | 20 | 1 19.6 | 18.0 |
| 56579 2000 $JB_{27}$ | 14.9 | *X* | 157.47693 | 359.38558 | 16.13160 | 9.92961 | 0.1184248 | 0.28658718 | 2.2784082 | 20 | 2 28.1 | 18.1 |
| 56580 2000 $JG_{27}$ | 15.1 | *X* | 219.00397 | 28.88483 | 269.58802 | 5.95954 | 0.1360970 | 0.28347615 | 2.2950476 | 20 | 1 19.8 | 18.6 |
| 56581 2000 $JT_{27}$ | 16.2 | *X* | 34.02640 | 269.24014 | 294.30942 | 2.45365 | 0.0774003 | 0.29680784 | 2.2257983 | 20 | 5 19.4 | 18.4 |
| 56582 2000 $JW_{27}$ | 15.6 | *X* | 315.00018 | 149.92325 | 359.32568 | 4.91077 | 0.0940465 | 0.27950105 | 2.3167567 | 20 | — | — |
| 56583 2000 $JH_{28}$ | 14.6 | *X* | 273.01562 | 285.14685 | 35.42823 | 12.62694 | 0.1786413 | 0.24385226 | 2.5373762 | 20 | 4 14.0 | 18.1 |
| 56584 2000 $JQ_{29}$ | 15.7 | *X* | 215.85781 | 307.85910 | 244.19398 | 5.53873 | 0.0580125 | 0.27071600 | 2.3666104 | 20 | 12 30.2 | 18.6 |
| 56585 2000 $JZ_{29}$ | 15.0 | *X* | 96.40392 | 90.88941 | 302.25034 | 5.07464 | 0.1273506 | 0.28075593 | 2.3098481 | 20 | 1 1.8 | 17.5 |
| 56586 2000 $JK_{31}$ | 15.1 | *X* | 121.60763 | 265.38468 | 327.37451 | 1.37243 | 0.1617781 | 0.26249616 | 2.4157616 | 20 | 11 1.5 | 18.9 |
| 56587 2000 $JL_{31}$ | 15.1 | *X* | 212.51193 | 248.69871 | 40.66267 | 8.89020 | 0.1136136 | 0.28122667 | 2.3072698 | 20 | 1 3.6 | 18.6 |
| 56588 2000 $JS_{32}$ | 16.2 | *X* | 287.18996 | 329.30508 | 267.72561 | 4.64029 | 0.1238874 | 0.28545158 | 2.2844470 | 20 | 1 12.9 | 19.1 |
| 56589 2000 $JH_{33}$ | 14.1 | *X* | 57.63419 | 322.87215 | 38.58333 | 12.76266 | 0.1887235 | 0.21881046 | 2.7274534 | 20 | — | — |
| 56590 2000 $JY_{35}$ | 15.7 | *X* | 291.83497 | 191.96003 | 59.40185 | 0.42529 | 0.0462499 | 0.28774749 | 2.2722792 | 20 | 2 18.0 | 18.4 |
| 56591 2000 $JP_{37}$ | 14.7 | *X* | 6.01120 | 105.53687 | 257.11938 | 4.33326 | 0.1807591 | 0.26055878 | 2.4277217 | 20 | 12 10.2 | 17.2 |
| 56592 2000 $JF_{38}$ | 13.9 | *X* | 68.99335 | 133.50799 | 233.10314 | 9.26385 | 0.2507145 | 0.22091856 | 2.7100746 | 20 | — | — |
| 56593 2000 $JS_{38}$ | 14.1 | *X* | 316.22764 | 306.63512 | 49.53616 | 15.74534 | 0.1587955 | 0.20445335 | 2.8536885 | 20 | 8 16.2 | 17.7 |
| 56594 2000 $JL_{40}$ | 15.0 | *X* | 283.27196 | 344.78403 | 313.78539 | 3.23261 | 0.1874871 | 0.29057426 | 2.2575184 | 20 | 3 20.1 | 18.1 |
| 56595 2000 $JX_{40}$ | 15.4 | *X* | 325.30326 | 272.32752 | 118.67266 | 2.04850 | 0.1899959 | 0.26181180 | 2.4199696 | 20 | 11 3.2 | 17.2 |
| 56596 2000 $JG_{43}$ | 15.9 | *X* | 37.00175 | 47.86508 | 57.17389 | 9.21239 | 0.1166203 | 0.28474452 | 2.2882271 | 20 | — | — |
| 56597 2000 $JO_{44}$ | 15.9 | *X* | 195.93603 | 190.45120 | 59.34469 | 7.37549 | 0.0695770 | 0.27457812 | 2.3443661 | 20 | — | — |
| 56598 2000 $JY_{46}$ | 15.5 | *X* | 158.84555 | 280.26318 | 343.52452 | 6.90624 | 0.1828466 | 0.27087655 | 2.3656752 | 20 | — | — |
| 56599 2000 $JW_{48}$ | 15.3 | *X* | 237.06217 | 311.91290 | 295.66983 | 6.40033 | 0.0833045 | 0.27991589 | 2.3144671 | 20 | — | — |
| 56600 2000 $JK_{50}$ | 15.0 | *X* | 45.53233 | 290.01681 | 23.88524 | 9.44051 | 0.2243453 | 0.25977790 | 2.4325844 | 20 | 12 2.7 | 18.5 |
| 56601 2000 $JS_{50}$ | 15.4 | *X* | 74.34861 | 267.96648 | 49.23489 | 2.87255 | 0.2156172 | 0.26425303 | 2.4050424 | 20 | — | — |
| 56602 2000 $JQ_{51}$ | 15.4 | *X* | 15.08830 | 290.12035 | 320.52087 | 3.06093 | 0.0854970 | 0.29862369 | 2.2167662 | 20 | 7 1.5 | 17.3 |
| 56603 2000 $JZ_{52}$ | 15.0 | *X* | 358.46638 | 193.63999 | 244.53541 | 6.36430 | 0.0772590 | 0.27311250 | 2.3527457 | 20 | — | — |
| 56604 2000 $JN_{56}$ | 15.3 | *X* | 248.49072 | 356.24924 | 219.76422 | 6.05094 | 0.0536769 | 0.27681479 | 2.3317207 | 20 | — | — |
| 56605 2000 $JG_{57}$ | 14.9 | *X* | 216.74018 | 138.28978 | 177.19983 | 4.16867 | 0.1616774 | 0.23393769 | 2.6085705 | 20 | 2 12.6 | 19.1 |
| 56606 2000 $JF_{58}$ | 14.4 | *X* | 316.12918 | 222.55002 | 97.93618 | 7.17345 | 0.2187497 | 0.29644248 | 2.2276267 | 20 | 6 10.7 | 15.9 |
| 56607 2000 $JL_{58}$ | 15.1 | *X* | 356.31105 | 187.10110 | 108.43047 | 4.35024 | 0.1756119 | 0.29962180 | 2.2118404 | 20 | 8 17.4 | 16.5 |
| 56608 2000 $JS_{58}$ | 13.9 | *X* | 107.85327 | 235.87687 | 74.05621 | 15.15305 | 0.3054376 | 0.21593767 | 2.7515903 | 20 | — | — |
| 56609 2000 $JA_{60}$ | 15.1 | *X* | 141.54239 | 326.15286 | 7.26043 | 6.47642 | 0.1341380 | 0.27791036 | 2.3255886 | 20 | — | — |
| 56610 2000 $JZ_{60}$ | 14.8 | *X* | 46.54223 | 67.09116 | 267.47336 | 5.60587 | 0.1115167 | 0.26459967 | 2.4029414 | 20 | 12 18.4 | 17.8 |
| 56611 2000 $JH_{61}$ | 15.3 | *X* | 67.00177 | 50.47085 | 59.52650 | 6.38063 | 0.1011816 | 0.28748474 | 2.2736635 | 20 | 3 2.9 | 17.7 |
| 56612 2000 $JY_{61}$ | 14.5 | *X* | 147.02192 | 344.57043 | 254.06114 | 6.41576 | 0.1722859 | 0.26519461 | 2.3993462 | 20 | 12 2.2 | 18.3 |
| 56613 2000 $JX_{62}$ | 14.2 | *X* | 213.18331 | 47.60956 | 295.80378 | 6.56648 | 0.2001970 | 0.23949242 | 2.5680779 | 20 | 3 10.6 | 18.7 |
| 56614 2000 $JQ_{63}$ | 15.5 | *X* | 109.08009 | 175.63177 | 5.75652 | 4.26046 | 0.0407444 | 0.30314865 | 2.1946518 | 20 | 8 8.5 | 18.2 |
| 56615 2000 $JL_{69}$ | 14.8 | *X* | 242.29143 | 201.63919 | 109.72400 | 22.87474 | 0.0149570 | 0.23942651 | 2.5685492 | 20 | 3 24.5 | 18.8 |
| 56616 2000 $JM_{70}$ | 14.6 | *X* | 11.62542 | 354.83381 | 299.55488 | 11.43739 | 0.1697650 | 0.25728970 | 2.4482426 | 20 | 9 2.4 | 17.1 |
| 56617 2000 $JZ_{72}$ | 15.6 | *X* | 228.05397 | 22.58770 | 123.46051 | 7.14878 | 0.0580008 | 0.26572422 | 2.3961571 | 20 | 11 16.6 | 18.8 |
| 56618 2000 $JC_{73}$ | 14.9 | *X* | 283.12889 | 237.54600 | 80.18220 | 15.94708 | 0.1491646 | 0.24435221 | 2.5339140 | 20 | 5 1.5 | 18.5 |
| 56619 2000 $JE_{73}$ | 15.6 | *X* | 353.16083 | 329.94689 | 136.29601 | 7.04455 | 0.0694521 | 0.27680155 | 2.3317950 | 20 | — | — |
| 56620 2000 $JL_{73}$ | 15.6 | *X* | 223.03776 | 4.72170 | 267.51860 | 5.29790 | 0.0832844 | 0.28448537 | 2.2896165 | 20 | — | — |
| 56621 2000 $JB_{74}$ | 16.1 | *X* | 291.09709 | 16.34603 | 204.81670 | 7.51935 | 0.0982136 | 0.28424931 | 2.2908840 | 20 | — | — |
| 56622 2000 $JR_{75}$ | 15.3 | *X* | 176.28918 | 190.39274 | 100.24355 | 6.38541 | 0.1412462 | 0.27561838 | 2.3384635 | 20 | — | — |
| 56623 2000 $JC_{76}$ | 16.5 | *X* | 7.03060 | 111.21214 | 120.14957 | 2.64719 | 0.1053474 | 0.29565994 | 2.2315557 | 20 | 5 15.8 | 18.3 |
| 56624 2000 $JQ_{76}$ | 16.4 | *X* | 325.56894 | 297.18163 | 356.31552 | 5.27354 | 0.1614890 | 0.29751707 | 2.2222596 | 20 | 5 23.8 | 18.2 |
| 56625 2000 $JW_{77}$ | 15.2 | *X* | 357.07386 | 328.12013 | 272.66803 | 6.19440 | 0.0952780 | 0.29574585 | 2.2311235 | 20 | 5 8.5 | 17.3 |
| 56626 2000 $JH_{78}$ | 15.3 | *X* | 293.92256 | 285.82058 | 329.29785 | 4.33243 | 0.1617217 | 0.28778745 | 2.2720688 | 20 | 2 9.2 | 18.3 |
| 56627 2000 $JF_{84}$ | 15.4 | *X* | 163.24925 | 205.16440 | 74.31347 | 8.83051 | 0.0689876 | 0.27396348 | 2.3478712 | 20 | — | — |
| 56628 2000 $JG_{84}$ | 15.9 | *X* | 328.39966 | 36.89737 | 110.87926 | 7.11149 | 0.1065738 | 0.28083655 | 2.3094060 | 20 | — | — |
| 56629 2000 $KV$ | 15.8 | *X* | 69.09151 | 126.98877 | 165.07470 | 1.19881 | 0.1629467 | 0.26064788 | 2.4271684 | 20 | 11 25.3 | 19.4 |
| 56630 2000 $KP_{2}$ | 14.1 | *X* | 156.61379 | 162.68721 | 200.86165 | 28.41164 | 0.1149540 | 0.23225942 | 2.6211215 | 20 | 2 7.8 | 18.6 |
| 56631 2000 $KV_{2}$ | 14.4 | *X* | 272.82017 | 179.23228 | 127.92494 | 31.11549 | 0.1433312 | 0.23876361 | 2.5733012 | 20 | 4 10.8 | 18.7 |
| 56632 2000 $KE_{7}$ | 16.1 | *X* | 295.76953 | 355.76933 | 140.39374 | 3.29081 | 0.1122315 | 0.27336011 | 2.3513248 | 20 | — | — |
| 56633 2000 $KY_{8}$ | 16.5 | *X* | 27.23229 | 111.27347 | 265.89768 | 0.56345 | 0.0534856 | 0.26953627 | 2.3735109 | 20 | — | — |
| 56634 2000 $KZ_{11}$ | 15.0 | *X* | 161.56862 | 154.14770 | 220.62869 | 8.91858 | 0.1851920 | 0.23665955 | 2.5885309 | 20 | 3 4.7 | 19.3 |
| 56635 2000 $KR_{12}$ | 15.7 | *X* | 342.53418 | 330.83344 | 56.55924 | 2.33361 | 0.1921747 | 0.26295683 | 2.4129394 | 20 | 12 6.1 | 17.8 |
| 56636 2000 $KA_{14}$ | 15.1 | *X* | 352.76913 | 62.12459 | 63.53641 | 13.65077 | 0.1142563 | 0.23157937 | 2.6262504 | 20 | — | — |
| 56637 2000 $KG_{14}$ | 14.9 | *X* | 227.08968 | 178.38496 | 238.51708 | 5.18909 | 0.0528637 | 0.20304774 | 2.8668432 | 20 | 7 8.4 | 19.1 |
| 56638 2000 $KN_{15}$ | 15.5 | *X* | 175.89865 | 157.66368 | 86.63168 | 3.44683 | 0.1521230 | 0.27066027 | 2.3669352 | 20 | — | — |
| 56639 2000 $KE_{19}$ | 15.6 | *X* | 314.38090 | 242.45129 | 247.71808 | 5.70833 | 0.0808839 | 0.27498933 | 2.3420284 | 20 | — | — |
| 56640 2000 $KZ_{19}$ | 15.0 | *X* | 259.51073 | 51.96812 | 298.61396 | 1.17897 | 0.1689266 | 0.24462183 | 2.5320517 | 20 | 5 6.9 | 18.7 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56641 2000 $KN_{27}$ | 14.8 | $X$ | 65.36461 | 349.90139 | 77.84045 | 3.19729 | 0.1113567 | 0.27972479 | 2.3155211 | 20 | — | — |
| 56642 2000 $KU_{29}$ | 15.2 | $X$ | 276.87780 | 345.97788 | 244.20623 | 6.17469 | 0.0675955 | 0.28180597 | 2.3041067 | 20 | — | — |
| 56643 2000 $KY_{29}$ | 15.2 | $X$ | 233.35385 | 49.20992 | 245.74885 | 5.20704 | 0.1429074 | 0.28294327 | 2.2979283 | 20 | 1 28.4 | 18.8 |
| 56644 2000 $KL_{30}$ | 14.6 | $X$ | 46.78005 | 197.84598 | 245.66373 | 6.22177 | 0.0750267 | 0.27916119 | 2.3186366 | 20 | — | — |
| 56645 2000 $KV_{32}$ | 14.7 | $X$ | 163.59222 | 237.63414 | 77.96569 | 7.17754 | 0.1604906 | 0.27511441 | 2.3413185 | 20 | — | — |
| 56646 2000 $KW_{32}$ | 15.1 | $X$ | 337.19258 | 156.52253 | 78.88006 | 7.03327 | 0.0610184 | 0.29026023 | 2.2591463 | 20 | 4 3.7 | 17.6 |
| 56647 2000 $KG_{34}$ | 15.5 | $X$ | 342.62300 | 235.95142 | 157.23750 | 6.72629 | 0.1367066 | 0.26402742 | 2.4064123 | 20 | 12 9.1 | 18.0 |
| 56648 2000 $KH_{34}$ | 15.0 | $X$ | 169.36196 | 260.62169 | 93.90750 | 10.47780 | 0.0844835 | 0.23472482 | 2.6027355 | 20 | 2 16.5 | 18.9 |
| 56649 2000 $KD_{42}$ | 15.2 | $X$ | 250.78585 | 69.61695 | 140.43278 | 5.57885 | 0.1432727 | 0.27593877 | 2.3366530 | 20 | — | — |
| 56650 2000 $KE_{42}$ | 15.1 | $X$ | 339.84359 | 187.81599 | 147.94725 | 15.31991 | 0.1458361 | 0.25341689 | 2.4731228 | 20 | 9 5.3 | 17.3 |
| 56651 2000 $KH_{46}$ | 16.3 | $X$ | 334.33849 | 103.22168 | 161.03323 | 5.28922 | 0.1364456 | 0.29428613 | 2.2384953 | 20 | 5 1.1 | 18.2 |
| 56652 2000 $KJ_{48}$ | 15.1 | $X$ | 324.35400 | 41.60206 | 205.99381 | 4.75715 | 0.1139877 | 0.29023063 | 2.2592999 | 20 | 3 18.3 | 17.5 |
| 56653 2000 $KS_{48}$ | 15.9 | $X$ | 211.86102 | 40.05962 | 239.30619 | 6.04455 | 0.1245339 | 0.27830839 | 2.3233707 | 20 | — | — |
| 56654 2000 $KU_{50}$ | 14.7 | $X$ | 199.04736 | 223.91080 | 64.31283 | 6.68375 | 0.1287205 | 0.27736916 | 2.3286127 | 20 | — | — |
| 56655 2000 $KZ_{51}$ | 16.3 | $X$ | 268.72040 | 182.90781 | 22.56753 | 5.99139 | 0.0957214 | 0.27974209 | 2.3154256 | 20 | — | — |
| 56656 2000 $KW_{52}$ | 15.6 | $X$ | 219.02202 | 325.23769 | 189.21377 | 4.14773 | 0.0973381 | 0.26695902 | 2.3887626 | 20 | 11 8.8 | 18.6 |
| 56657 2000 $KY_{52}$ | 16.1 | $X$ | 59.49146 | 46.63005 | 147.95761 | 5.11818 | 0.0983526 | 0.29888678 | 2.2154651 | 20 | 6 23.1 | 18.4 |
| 56658 2000 $KJ_{55}$ | 15.7 | $X$ | 51.70076 | 129.10129 | 90.13147 | 4.31419 | 0.0992851 | 0.29948987 | 2.2124899 | 20 | 7 19.5 | 18.0 |
| 56659 2000 $KU_{55}$ | 16.5 | $X$ | 253.15287 | 186.88533 | 98.98095 | 4.35232 | 0.1818089 | 0.28459550 | 2.2890258 | 20 | 2 4.9 | 19.9 |
| 56660 2000 $KO_{56}$ | 15.2 | $X$ | 319.57643 | 336.97761 | 215.48825 | 3.29691 | 0.0639302 | 0.28279780 | 2.2987162 | 20 | 1 3.7 | 17.9 |
| 56661 2000 $KQ_{56}$ | 14.4 | $X$ | 241.90688 | 207.51171 | 139.26129 | 1.81748 | 0.2405888 | 0.19075913 | 2.9886783 | 20 | 4 11.4 | 19.2 |
| 56662 2000 $KY_{56}$ | 14.4 | $X$ | 301.26835 | 200.85025 | 133.79955 | 3.75569 | 0.1718962 | 0.24661300 | 2.5184040 | 20 | 6 11.6 | 17.1 |
| 56663 2000 $KF_{60}$ | 15.4 | $X$ | 339.74816 | 276.65656 | 88.62911 | 7.50338 | 0.1613297 | 0.25888944 | 2.4381467 | 20 | 10 26.3 | 17.7 |
| 56664 2000 $KN_{60}$ | 16.0 | $X$ | 245.38932 | 34.16001 | 182.47845 | 6.30081 | 0.0548090 | 0.27674689 | 2.3321021 | 20 | — | — |
| 56665 2000 $KJ_{62}$ | 14.7 | $X$ | 232.83009 | 231.01737 | 76.17872 | 27.92493 | 0.1015656 | 0.23737381 | 2.5833357 | 20 | 3 5.0 | 19.2 |
| 56666 2000 $KQ_{64}$ | 15.7 | $X$ | 255.08739 | 9.15787 | 179.61507 | 4.00112 | 0.0653027 | 0.27566967 | 2.3381735 | 20 | — | — |
| 56667 2000 $KF_{67}$ | 15.0 | $X$ | 210.41560 | 87.39166 | 183.49974 | 21.81057 | 0.1823544 | 0.27437732 | 2.3455098 | 20 | — | — |
| 56668 2000 $KE_{69}$ | 15.7 | $X$ | 58.78102 | 191.59367 | 163.14911 | 7.02033 | 0.1375079 | 0.26809097 | 2.3820338 | 20 | — | — |
| 56669 2000 $KV_{71}$ | 14.0 | $X$ | 262.31964 | 224.23908 | 132.79638 | 14.22486 | 0.3068680 | 0.19678670 | 2.9273336 | 20 | 5 9.3 | 19.0 |
| 56670 2000 $KW_{74}$ | 15.3 | $X$ | 28.70839 | 252.56607 | 99.05697 | 3.92523 | 0.1317878 | 0.26409609 | 2.4059951 | 20 | 12 21.1 | 18.2 |
| 56671 2000 $KL_{75}$ | 15.8 | $X$ | 81.77249 | 187.61094 | 95.80657 | 7.02170 | 0.1230837 | 0.26228510 | 2.4170574 | 20 | 11 24.9 | 19.3 |
| 56672 2000 $KP_{76}$ | 15.8 | $X$ | 232.26523 | 77.50938 | 150.22749 | 6.98259 | 0.0628845 | 0.27621241 | 2.3351096 | 20 | — | — |
| 56673 2000 $KT_{76}$ | 15.6 | $X$ | 174.73880 | 198.46084 | 113.77558 | 5.27245 | 0.1492208 | 0.27754519 | 2.3276280 | 20 | — | — |
| 56674 2000 $KS_{77}$ | 15.4 | $X$ | 189.30105 | 33.61531 | 145.09264 | 8.54034 | 0.0418431 | 0.26366410 | 2.4086224 | 20 | 11 12.4 | 18.7 |
| 56675 2000 $KM_{78}$ | 15.8 | $X$ | 156.08414 | 87.53362 | 179.74345 | 6.43751 | 0.1323306 | 0.26963914 | 2.3729072 | 20 | — | — |
| 56676 2000 $LC$ | 16.2 | $X$ | 192.99677 | 33.19201 | 168.82621 | 2.36790 | 0.1344180 | 0.26810109 | 2.3819739 | 20 | 12 4.9 | 19.6 |
| 56677 2000 $LG_{1}$ | 14.8 | $X$ | 163.08192 | 172.37311 | 112.07058 | 7.76823 | 0.1355515 | 0.27192589 | 2.3595853 | 20 | — | — |
| 56678 Alicewessen | 14.3 | $X$ | 176.41233 | 80.42026 | 296.58589 | 8.76625 | 0.1143876 | 0.18334210 | 3.0687481 | 20 | 3 20.3 | 19.3 |
| 56679 2000 $LB_{8}$ | 15.2 | $X$ | 311.92391 | 317.78400 | 271.55592 | 5.14901 | 0.1098760 | 0.28645152 | 2.2791275 | 20 | 2 3.5 | 17.9 |
| 56680 2000 $LM_{8}$ | 13.9 | $X$ | 282.62501 | 252.44750 | 87.68245 | 12.17571 | 0.2287656 | 0.24188676 | 2.5511030 | 20 | 5 15.9 | 17.4 |
| 56681 2000 $LY_{8}$ | 15.8 | $X$ | 243.70730 | 71.74541 | 200.99797 | 2.33534 | 0.1055293 | 0.28198217 | 2.3031468 | 20 | 1 13.5 | 19.0 |
| 56682 2000 $LA_{9}$ | 15.2 | $X$ | 260.17586 | 89.08215 | 122.41510 | 4.46565 | 0.1207518 | 0.27743955 | 2.3282188 | 20 | — | — |
| 56683 2000 $LC_{9}$ | 15.5 | $X$ | 107.22135 | 123.98631 | 190.21925 | 1.98934 | 0.2235627 | 0.26664879 | 2.3906150 | 20 | — | — |
| 56684 2000 $LV_{10}$ | 15.0 | $X$ | 136.09120 | 181.54092 | 153.31602 | 12.61376 | 0.1954982 | 0.22330629 | 2.6907215 | 20 | — | — |
| 56685 2000 $LE_{11}$ | 14.3 | $X$ | 211.51143 | 259.17188 | 140.08734 | 12.65344 | 0.1835721 | 0.24351842 | 2.5396947 | 20 | 5 24.1 | 18.6 |
| 56686 2000 $LB_{12}$ | 14.2 | $X$ | 238.76184 | 79.94512 | 223.87788 | 13.45492 | 0.1263636 | 0.23234946 | 2.6204443 | 20 | 2 16.2 | 18.6 |
| 56687 2000 $LE_{12}$ | 13.8 | $X$ | 278.15910 | 66.50855 | 243.86827 | 12.57743 | 0.0466547 | 0.23751112 | 2.5823399 | 20 | 4 22.3 | 17.3 |
| 56688 2000 $LM_{12}$ | 14.4 | $X$ | 202.81600 | 108.31394 | 222.02937 | 7.10941 | 0.2411895 | 0.23163558 | 2.6258256 | 20 | 2 16.6 | 19.1 |
| 56689 2000 $LD_{14}$ | 14.1 | $X$ | 228.06361 | 42.22829 | 237.83785 | 11.72930 | 0.1076943 | 0.22871300 | 2.6481474 | 20 | 1 12.1 | 18.3 |
| 56690 2000 $LZ_{14}$ | 15.4 | $X$ | 215.51269 | 139.36203 | 134.83650 | 5.45822 | 0.0582729 | 0.27930414 | 2.3178454 | 20 | — | — |
| 56691 2000 $LW_{16}$ | 15.0 | $X$ | 313.27366 | 136.45512 | 104.94697 | 15.35954 | 0.0529165 | 0.23892613 | 2.5721341 | 20 | 3 16.9 | 18.6 |
| 56692 2000 $LK_{20}$ | 13.2 | $X$ | 222.45903 | 111.80511 | 251.68440 | 12.58607 | 0.1095638 | 0.23645034 | 2.5900576 | 20 | 4 16.8 | 17.3 |
| 56693 2000 $LY_{20}$ | 13.9 | $X$ | 314.62145 | 96.84361 | 248.14933 | 9.49196 | 0.0877289 | 0.24637645 | 2.5200158 | 20 | 7 28.9 | 17.0 |
| 56694 2000 $LC_{24}$ | 14.4 | $X$ | 162.95566 | 180.25848 | 169.31800 | 15.01543 | 0.2080860 | 0.22877231 | 2.6476897 | 20 | 2 8.3 | 18.9 |
| 56695 2000 $LG_{26}$ | 14.7 | $X$ | 321.11717 | 130.12605 | 163.34580 | 12.72755 | 0.2842417 | 0.24341048 | 2.5404454 | 20 | 4 30.4 | 17.5 |
| 56696 2000 $LQ_{26}$ | 13.8 | $X$ | 85.86486 | 189.71940 | 148.12692 | 6.76026 | 0.1294844 | 0.26250803 | 2.4156888 | 20 | — | — |
| 56697 2000 $LO_{27}$ | 14.3 | $X$ | 304.36792 | 90.59734 | 229.84577 | 2.99706 | 0.1119653 | 0.24081534 | 2.5586642 | 20 | 6 5.5 | 17.3 |
| 56698 2000 $LR_{27}$ | 14.5 | $X$ | 269.87815 | 206.52742 | 132.15587 | 14.33573 | 0.0959909 | 0.23796906 | 2.5790260 | 20 | 5 19.4 | 18.3 |
| 56699 2000 $LJ_{28}$ | 14.8 | $X$ | 198.58557 | 23.39168 | 283.36734 | 6.89724 | 0.2136056 | 0.22462661 | 2.6801673 | 20 | 1 19.8 | 19.5 |
| 56700 2000 $LL_{28}$ | 13.7 | $X$ | 266.78599 | 292.62483 | 311.59208 | 13.90103 | 0.1030990 | 0.22646291 | 2.6656594 | 20 | 1 12.9 | 17.6 |
| 56701 2000 $LM_{28}$ | 14.5 | $X$ | 123.48863 | 29.60347 | 300.14301 | 7.78346 | 0.1183825 | 0.21640302 | 2.7476442 | 20 | — | — |
| 56702 2000 $LQ_{28}$ | 13.5 | $X$ | 184.95465 | 36.73076 | 313.55428 | 15.79164 | 0.2541383 | 0.17775393 | 3.1327320 | 20 | 2 28.5 | 19.2 |
| 56703 2000 $LT_{30}$ | 13.8 | $X$ | 229.85932 | 21.70752 | 260.89301 | 9.86602 | 0.1786544 | 0.22712389 | 2.6604851 | 20 | 1 15.6 | 18.2 |
| 56704 2000 $LC_{31}$ | 15.1 | $X$ | 80.06433 | 184.96420 | 96.84016 | 9.41221 | 0.0630207 | 0.26229858 | 2.4169746 | 20 | 11 16.2 | 18.5 |
| 56705 2000 $LL_{33}$ | 14.4 | $X$ | 246.80780 | 164.06547 | 155.94961 | 15.76546 | 0.1917532 | 0.23274087 | 2.6175056 | 20 | 3 17.1 | 18.6 |
| 56706 2000 $LD_{36}$ | 15.3 | $X$ | 156.57076 | 166.06008 | 40.34370 | 7.12249 | 0.0217651 | 0.26313407 | 2.4118557 | 20 | 11 6.2 | 18.5 |
| 56707 2000 $LY_{36}$ | 14.6 | $X$ | 305.77603 | 155.20912 | 164.53190 | 15.83305 | 0.1657286 | 0.24598224 | 2.5227074 | 20 | 5 31.9 | 17.8 |
| 56708 2000 $MZ$ | 15.3 | $X$ | 103.64518 | 14.81461 | 279.52853 | 6.98355 | 0.1063527 | 0.26402968 | 2.4063985 | 20 | 12 29.4 | 18.7 |
| 56709 2000 $MY_{1}$ | 14.4 | $X$ | 29.87233 | 287.86581 | 97.85690 | 8.65525 | 0.1791502 | 0.21267928 | 2.7796232 | 20 | — | — |
| 56710 2000 $MN_{2}$ | 15.3 | $X$ | 359.39685 | 183.68976 | 94.35790 | 3.32128 | 0.1174087 | 0.24585182 | 2.5235995 | 20 | 7 13.1 | 17.7 |
| 56711 2000 $MO_{2}$ | 14.0 | $X$ | 153.24363 | 231.92544 | 104.53715 | 13.87585 | 0.1939342 | 0.22317400 | 2.6917847 | 20 | 1 16.9 | 18.2 |
| 56712 2000 $MQ_{2}$ | 16.0 | $X$ | 133.57370 | 315.58848 | 316.41013 | 2.02093 | 0.1584628 | 0.26403049 | 2.4063936 | 20 | 12 31.1 | 19.7 |
| 56713 2000 $MC_{3}$ | 14.8 | $X$ | 231.17152 | 237.83642 | 131.86702 | 3.09504 | 0.2053888 | 0.24174613 | 2.5520922 | 20 | 5 1.2 | 18.8 |
| 56714 2000 $MK_{3}$ | 14.2 | $X$ | 231.54855 | 96.97721 | 256.74491 | 9.94886 | 0.0931017 | 0.18670263 | 3.0318131 | 20 | 4 18.0 | 19.0 |
| 56715 2000 $MT_{3}$ | 15.7 | $X$ | 249.33139 | 331.63476 | 304.32723 | 1.30545 | 0.2310099 | 0.28221116 | 2.3019008 | 20 | 1 17.3 | 19.5 |
| 56716 2000 $MZ_{3}$ | 15.2 | $X$ | 313.11427 | 196.49890 | 97.75280 | 7.99502 | 0.1918118 | 0.29231932 | 2.2485249 | 20 | 4 30.7 | 17.6 |
| 56717 2000 $MS_{4}$ | 14.7 | $X$ | 205.46603 | 191.01500 | 87.80489 | 14.63878 | 0.1604480 | 0.22567549 | 2.6718564 | 20 | — | — |
| 56718 2000 $MU_{4}$ | 14.9 | $X$ | 344.70501 | 300.94522 | 350.22689 | 2.56437 | 0.1464322 | 0.24513492 | 2.5285173 | 20 | 7 3.6 | 17.2 |
| 56719 2000 $MA_{6}$ | 15.5 | $X$ | 332.22604 | 146.12149 | 91.05411 | 8.16457 | 0.0926621 | 0.29032727 | 2.2587985 | 20 | 3 25.8 | 18.0 |
| 56720 2000 $NK_{9}$ | 13.7 | $X$ | 287.08318 | 20.33483 | 323.49822 | 10.14999 | 0.1468304 | 0.19014269 | 2.9951342 | 20 | 6 4.8 | 17.9 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56721 2000 $NY_{11}$ | 15.4 | $X$ | 183.36421 | 64.45630 | 156.82757 | 5.82661 | 0.0557343 | 0.26936077 | 2.3745418 | 20 | 12 27.5 | 18.5 |
| 56722 2000 $NH_{12}$ | 14.5 | $X$ | 354.94837 | 93.48757 | 210.78849 | 14.45772 | 0.1640442 | 0.24592454 | 2.5231020 | 20 | 8 10.6 | 17.2 |
| 56723 2000 $NK_{12}$ | 15.2 | $X$ | 315.50813 | 114.31732 | 182.69280 | 14.45743 | 0.1464274 | 0.24051289 | 2.5608087 | 20 | 5 17.9 | 18.3 |
| 56724 2000 $NQ_{12}$ | 15.0 | $X$ | 169.92275 | 343.61306 | 210.36368 | 10.33883 | 0.1368287 | 0.25707477 | 2.4496070 | 20 | 10 29.9 | 18.6 |
| 56725 2000 $NY_{12}$ | 15.1 | $X$ | 303.89779 | 349.62201 | 258.78900 | 4.36675 | 0.1177574 | 0.23285482 | 2.6166516 | 20 | 2 23.9 | 18.6 |
| 56726 2000 $NA_{13}$ | 14.0 | $X$ | 156.09447 | 122.97516 | 288.02545 | 8.44987 | 0.0866469 | 0.18201656 | 3.0836289 | 20 | 4 8.8 | 18.9 |
| 56727 2000 $NU_{13}$ | 14.1 | $X$ | 146.56401 | 273.57408 | 143.68818 | 14.84714 | 0.0694429 | 0.18143254 | 3.0902427 | 20 | 4 14.1 | 18.9 |
| 56728 2000 $NZ_{13}$ | 14.5 | $X$ | 301.02267 | 28.48722 | 308.27863 | 8.70110 | 0.0731278 | 0.19196348 | 2.9761648 | 20 | 6 28.1 | 18.5 |
| 56729 2000 $NM_{14}$ | 14.5 | $X$ | 211.35484 | 270.28640 | 134.17490 | 10.02249 | 0.0295778 | 0.18940657 | 3.0028896 | 20 | 6 7.2 | 18.9 |
| 56730 2000 $NK_{15}$ | 13.7 | $X$ | 311.01663 | 36.89164 | 319.47741 | 11.19093 | 0.0714391 | 0.19576618 | 2.9374982 | 20 | 8 8.6 | 17.5 |
| 56731 2000 $NP_{16}$ | 15.3 | $X$ | 188.24530 | 287.84717 | 346.38442 | 4.61230 | 0.1258418 | 0.22004486 | 2.7172435 | 20 | — | — |
| 56732 2000 $NQ_{16}$ | 14.9 | $X$ | 176.44730 | 260.03181 | 34.51753 | 3.65560 | 0.1398534 | 0.22072511 | 2.7116578 | 20 | — | — |
| 56733 2000 $NK_{17}$ | 13.9 | $X$ | 146.98354 | 346.70940 | 39.62195 | 5.64670 | 0.2013305 | 0.17612682 | 3.1519965 | 20 | 3 16.4 | 19.0 |
| 56734 2000 $NM_{17}$ | 13.5 | $X$ | 193.85872 | 323.27858 | 334.64794 | 16.14327 | 0.1343229 | 0.17403962 | 3.1771469 | 20 | 1 14.2 | 18.8 |
| 56735 2000 $NB_{18}$ | 15.0 | $X$ | 338.40598 | 252.53695 | 26.48393 | 3.83248 | 0.1723254 | 0.24211905 | 2.5494710 | 20 | 5 28.1 | 17.4 |
| 56736 2000 $NX_{19}$ | 15.5 | $X$ | 0.38564 | 50.36379 | 204.92042 | 2.35900 | 0.1206516 | 0.24152883 | 2.5536227 | 20 | 6 9.5 | 18.2 |
| 56737 2000 $NS_{20}$ | 14.8 | $X$ | 163.42501 | 131.90151 | 143.81784 | 11.83230 | 0.1154527 | 0.21619870 | 2.7493751 | 20 | — | — |
| 56738 2000 $NV_{20}$ | 15.0 | $X$ | 52.07082 | 314.58814 | 143.07408 | 10.90202 | 0.0194599 | 0.22471277 | 2.6794822 | 20 | 1 21.7 | 18.7 |
| 56739 2000 $NG_{21}$ | 13.9 | $X$ | 205.16516 | 31.10094 | 268.68133 | 12.26108 | 0.1654398 | 0.22453438 | 2.6809013 | 20 | 1 15.2 | 18.3 |
| 56740 2000 $NC_{23}$ | 14.3 | $X$ | 183.99237 | 292.52839 | 137.61418 | 27.70655 | 0.0363218 | 0.23863175 | 2.5742490 | 20 | 6 12.0 | 18.5 |
| 56741 2000 $ND_{24}$ | 14.6 | $X$ | 247.23465 | 228.27387 | 141.03916 | 2.08376 | 0.1273471 | 0.19023797 | 2.9941341 | 20 | 5 24.2 | 19.0 |
| 56742 2000 $NB_{25}$ | 13.8 | $X$ | 251.35685 | 69.61851 | 304.13678 | 8.43727 | 0.1319976 | 0.19114229 | 2.9846829 | 20 | 6 1.6 | 18.3 |
| 56743 2000 $ND_{26}$ | 14.6 | $X$ | 214.06582 | 44.61609 | 289.21323 | 11.01944 | 0.0693412 | 0.23171292 | 2.6252413 | 20 | 3 1.4 | 18.7 |
| 56744 2000 $NN_{26}$ | 14.0 | $X$ | 273.48921 | 28.23628 | 293.93864 | 8.75334 | 0.0889739 | 0.18819326 | 3.0157824 | 20 | 4 26.3 | 18.5 |
| 56745 2000 $NU_{26}$ | 14.0 | $X$ | 203.26530 | 67.28561 | 305.86064 | 8.24410 | 0.1114089 | 0.18418012 | 3.0594326 | 20 | 4 10.7 | 19.0 |
| 56746 2000 $OO_{2}$ | 14.7 | $X$ | 188.42789 | 154.29149 | 155.89483 | 15.36445 | 0.1057757 | 0.22479241 | 2.6788493 | 20 | 1 11.8 | 19.1 |
| 56747 2000 $OD_{4}$ | 13.7 | $X$ | 201.60733 | 101.98864 | 278.08439 | 8.61696 | 0.1207548 | 0.18372133 | 3.0645238 | 20 | 4 17.9 | 18.7 |
| 56748 2000 $OF_{4}$ | 15.4 | $X$ | 280.63842 | 138.54057 | 176.45328 | 9.63976 | 0.2133520 | 0.23740536 | 2.5831068 | 20 | 4 11.1 | 19.0 |
| 56749 2000 $OJ_{4}$ | 14.1 | $X$ | 252.74707 | 30.06461 | 270.98839 | 9.33846 | 0.0877182 | 0.18189746 | 3.0849749 | 20 | 3 6.7 | 18.9 |
| 56750 2000 $OT_{4}$ | 14.5 | $X$ | 323.33485 | 305.02340 | 298.16816 | 12.45107 | 0.1635418 | 0.23480669 | 2.6021305 | 20 | 3 4.2 | 17.8 |
| 56751 2000 $OU_{4}$ | 14.2 | $X$ | 179.57487 | 174.69291 | 174.68737 | 9.29718 | 0.1002337 | 0.17723881 | 3.1387989 | 20 | 2 23.2 | 19.1 |
| 56752 2000 $OA_{5}$ | 13.6 | $X$ | 161.05384 | 77.18092 | 286.87017 | 12.69067 | 0.1919898 | 0.17547667 | 3.1597772 | 20 | 2 23.6 | 19.0 |
| 56753 2000 $OG_{6}$ | 14.6 | $X$ | 327.01134 | 76.88793 | 216.32976 | 6.31608 | 0.1585486 | 0.24294725 | 2.5436736 | 20 | 5 29.6 | 17.2 |
| 56754 2000 $OP_{10}$ | 15.5 | $X$ | 334.62174 | 44.00211 | 255.48844 | 1.13136 | 0.1738261 | 0.24500929 | 2.5293815 | 20 | 6 22.4 | 17.6 |
| 56755 2000 $OT_{12}$ | 15.7 | $X$ | 123.47760 | 318.46271 | 317.63767 | 1.82072 | 0.1605995 | 0.26298594 | 2.4127613 | 20 | 12 26.8 | 19.6 |
| 56756 2000 $OW_{14}$ | 14.0 | $X$ | 215.31727 | 322.16885 | 302.92323 | 10.52200 | 0.0260467 | 0.22300682 | 2.6931298 | 20 | — | — |
| 56757 2000 $OQ_{17}$ | 14.9 | $X$ | 296.90313 | 160.12537 | 119.68198 | 4.69918 | 0.2228853 | 0.23694289 | 2.5864669 | 20 | 3 14.9 | 18.3 |
| 56758 2000 $OU_{17}$ | 14.8 | $X$ | 217.80750 | 358.09544 | 316.95666 | 12.96683 | 0.1886788 | 0.22908139 | 2.6453076 | 20 | 2 12.9 | 19.1 |
| 56759 2000 $OU_{18}$ | 15.0 | $X$ | 183.35586 | 170.70914 | 126.23176 | 3.27470 | 0.1845670 | 0.22338769 | 2.6900678 | 20 | — | — |
| 56760 2000 $OY_{18}$ | 14.5 | $X$ | 47.38503 | 160.95060 | 317.09058 | 14.44181 | 0.0856522 | 0.22811430 | 2.6527788 | 20 | 2 13.8 | 17.5 |
| 56761 2000 $OH_{19}$ | 14.9 | $X$ | 71.14145 | 45.03973 | 260.42504 | 4.39886 | 0.1893872 | 0.25914895 | 2.4365187 | 20 | 12 15.9 | 18.7 |
| 56762 2000 $OB_{23}$ | 14.7 | $X$ | 267.42185 | 218.78193 | 100.00522 | 4.47396 | 0.1975257 | 0.23809947 | 2.5780842 | 20 | 4 4.2 | 18.5 |
| 56763 2000 $OC_{23}$ | 14.9 | $X$ | 189.00356 | 132.57821 | 98.79757 | 9.45686 | 0.2233495 | 0.26819938 | 2.3813919 | 20 | 12 28.1 | 18.3 |
| 56764 2000 $ON_{24}$ | 13.6 | $X$ | 158.25240 | 17.55303 | 315.22179 | 14.00530 | 0.1483357 | 0.17461398 | 3.1701760 | 20 | 1 20.8 | 18.7 |
| 56765 2000 $OD_{25}$ | 14.9 | $X$ | 140.71766 | 248.82264 | 48.19572 | 3.21748 | 0.1561846 | 0.21738359 | 2.7393753 | 20 | — | — |
| 56766 2000 $OK_{25}$ | 14.2 | $X$ | 66.60201 | 250.36082 | 112.29273 | 14.08856 | 0.1802010 | 0.21413607 | 2.7670022 | 20 | — | — |
| 56767 2000 $OP_{26}$ | 14.8 | $X$ | 323.91801 | 212.84145 | 84.27772 | 6.15705 | 0.1594923 | 0.24206173 | 2.5498734 | 20 | 5 29.4 | 17.5 |
| 56768 2000 $OS_{27}$ | 12.9 | $X$ | 195.53712 | 3.80427 | 320.77899 | 14.66529 | 0.2058436 | 0.17720033 | 3.1392533 | 20 | 2 11.4 | 18.1 |
| 56769 2000 $OE_{28}$ | 14.1 | $X$ | 242.18664 | 132.43212 | 154.86567 | 13.85270 | 0.1588830 | 0.22830307 | 2.6513164 | 20 | 2 2.2 | 18.3 |
| 56770 2000 $OA_{30}$ | 15.3 | $X$ | 73.15533 | 75.15806 | 192.75323 | 7.06939 | 0.1127904 | 0.25400001 | 2.4693362 | 20 | 10 23.4 | 18.6 |
| 56771 2000 $OS_{30}$ | 14.8 | $X$ | 47.51358 | 145.48077 | 222.92037 | 7.85533 | 0.0778088 | 0.21210886 | 2.7846045 | 20 | — | — |
| 56772 2000 $OW_{30}$ | 14.3 | $X$ | 182.71565 | 204.49581 | 157.58666 | 11.09221 | 0.2109753 | 0.17967615 | 3.1103488 | 20 | 3 16.3 | 19.6 |
| 56773 2000 $OO_{35}$ | 13.8 | $X$ | 258.55533 | 253.88931 | 138.25850 | 11.65502 | 0.1234754 | 0.18958094 | 3.0010479 | 20 | 7 5.4 | 18.2 |
| 56774 2000 $OH_{37}$ | 13.9 | $X$ | 287.15116 | 150.91825 | 195.52568 | 9.61079 | 0.0936912 | 0.19188771 | 2.9769482 | 20 | 6 17.6 | 18.1 |
| 56775 2000 $OU_{37}$ | 14.9 | $X$ | 264.12039 | 133.62349 | 177.61296 | 13.72761 | 0.1841703 | 0.23548454 | 2.5971345 | 20 | 3 21.9 | 18.9 |
| 56776 2000 $OQ_{38}$ | 14.9 | $X$ | 342.73931 | 84.58282 | 191.76776 | 13.31198 | 0.1536617 | 0.24199911 | 2.5503133 | 20 | 6 5.8 | 17.6 |
| 56777 2000 $OC_{39}$ | 14.2 | $X$ | 158.97229 | 138.80543 | 179.93388 | 13.63628 | 0.3007443 | 0.22058093 | 2.7128393 | 20 | 1 7.7 | 19.2 |
| 56778 2000 $OM_{39}$ | 14.4 | $X$ | 289.41943 | 119.09015 | 191.44447 | 9.44456 | 0.2060616 | 0.23807543 | 2.5782577 | 20 | 4 16.2 | 17.8 |
| 56779 2000 $OH_{41}$ | 15.0 | $X$ | 321.64402 | 7.71369 | 214.44798 | 12.27455 | 0.1051621 | 0.23216396 | 2.6218400 | 20 | 2 13.5 | 18.6 |
| 56780 2000 $OJ_{43}$ | 14.7 | $X$ | 299.27723 | 83.81365 | 172.59605 | 14.46040 | 0.1405298 | 0.23209444 | 2.6223635 | 20 | 2 25.9 | 18.3 |
| 56781 2000 $OT_{43}$ | 13.5 | $X$ | 156.76170 | 52.50409 | 312.83077 | 13.82150 | 0.2154161 | 0.17415300 | 3.1757678 | 20 | 2 24.8 | 18.9 |
| 56782 2000 $OC_{46}$ | 14.7 | $X$ | 240.33864 | 76.48892 | 225.30818 | 8.56834 | 0.1376133 | 0.22971016 | 2.6404782 | 20 | 2 16.6 | 19.0 |
| 56783 2000 $OG_{51}$ | 14.5 | $X$ | 169.16930 | 17.08527 | 256.77026 | 11.67085 | 0.1165600 | 0.21547473 | 2.7555301 | 20 | — | — |
| 56784 2000 $OH_{53}$ | 13.3 | $X$ | 206.38477 | 134.66901 | 279.31237 | 8.86929 | 0.1185089 | 0.18565283 | 3.0432316 | 20 | 6 6.4 | 18.1 |
| 56785 2000 $OS_{53}$ | 14.3 | $X$ | 333.22503 | 25.76379 | 274.37199 | 10.87586 | 0.2802762 | 0.24183025 | 2.5515003 | 20 | 6 5.5 | 16.2 |
| 56786 2000 $OX_{53}$ | 15.1 | $X$ | 13.49691 | 288.50555 | 314.26611 | 13.28414 | 0.0571735 | 0.24188099 | 2.5511435 | 20 | 6 11.9 | 18.3 |
| 56787 2000 $OZ_{53}$ | 14.7 | $X$ | 218.88738 | 63.66583 | 322.65585 | 8.68068 | 0.1006498 | 0.18876369 | 3.0097037 | 20 | 5 14.4 | 19.4 |
| 56788 2000 $OA_{54}$ | 14.1 | $X$ | 205.19098 | 92.52988 | 317.27083 | 11.88179 | 0.1853141 | 0.18833986 | 3.0142172 | 20 | 5 26.3 | 19.3 |
| 56789 2000 $OU_{54}$ | 14.5 | $X$ | 225.20611 | 47.75116 | 301.23715 | 2.31589 | 0.1178922 | 0.18534626 | 3.0465864 | 20 | 4 5.7 | 19.3 |
| 56790 2000 $OZ_{55}$ | 14.6 | $X$ | 30.45590 | 128.50591 | 299.13221 | 4.58169 | 0.0546811 | 0.21808474 | 2.7335007 | 20 | — | — |
| 56791 2000 $OH_{56}$ | 14.9 | $X$ | 150.20663 | 149.41671 | 115.42455 | 11.76132 | 0.1153900 | 0.21352033 | 2.7723191 | 20 | 12 28.9 | 19.2 |
| 56792 2000 $OP_{56}$ | 15.6 | $X$ | 139.83399 | 167.16618 | 86.28343 | 3.83766 | 0.1637139 | 0.26134229 | 2.4228671 | 20 | 12 13.5 | 19.5 |
| 56793 2000 $OB_{60}$ | 15.0 | $X$ | 270.09174 | 95.93728 | 148.16078 | 15.18604 | 0.0784033 | 0.22658349 | 2.6647136 | 20 | 1 16.5 | 19.0 |
| 56794 2000 $OO_{60}$ | 13.9 | $X$ | 110.51142 | 74.38995 | 321.42107 | 5.38783 | 0.1477338 | 0.17270044 | 3.1935502 | 20 | 2 13.8 | 18.4 |
| 56795 2000 $OE_{67}$ | 15.7 | $X$ | 156.97552 | 195.10258 | 278.95842 | 0.57694 | 0.0830874 | 0.19106861 | 2.9854501 | 20 | 7 1.2 | 20.1 |
| 56796 2000 $PT$ | 14.9 | $X$ | 191.63586 | 92.57155 | 278.56788 | 4.06130 | 0.0530081 | 0.23418416 | 2.6067399 | 20 | 3 26.5 | 18.7 |
| 56797 2000 $PC_{2}$ | 15.2 | $X$ | 120.00262 | 333.96127 | 337.00891 | 6.15114 | 0.1649624 | 0.26407478 | 2.4061245 | 20 | — | — |
| 56798 2000 $PW_{3}$ | 14.9 | $X$ | 234.55478 | 20.37192 | 332.35473 | 9.89079 | 0.0545579 | 0.23636129 | 2.5907081 | 20 | 4 19.5 | 18.8 |
| 56799 2000 $PN_{4}$ | 15.2 | $X$ | 213.21231 | 125.43151 | 169.76563 | 5.26387 | 0.1742649 | 0.22670160 | 2.6637880 | 20 | 1 17.4 | 19.7 |
| 56800 2000 $PO_{4}$ | 14.5 | $X$ | 218.81037 | 156.04628 | 166.06640 | 15.28516 | 0.1456784 | 0.23153317 | 2.6265998 | 20 | 2 22.9 | 18.6 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56801 2000 $PF_9$ | 14.1 | $X$ | 64.61762 | 358.76058 | 81.07149 | 25.21106 | 0.1277919 | 0.17386119 | 3.1793204 | 20 | 2 11.3 | 18.6 |
| 56802 2000 $PZ_9$ | 15.3 | $X$ | 314.09648 | 265.21957 | 20.04326 | 10.08980 | 0.2063076 | 0.23805717 | 2.5783896 | 20 | 4 15.4 | 18.2 |
| 56803 2000 $PA_{11}$ | 15.1 | $X$ | 113.50942 | 151.84121 | 123.00115 | 13.99370 | 0.2049278 | 0.25857580 | 2.4401178 | 20 | 12 17.9 | 19.3 |
| 56804 2000 $PP_{12}$ | 14.2 | $X$ | 248.21216 | 169.50782 | 170.97658 | 10.52075 | 0.1048014 | 0.18391357 | 3.0623879 | 20 | 4 24.0 | 18.8 |
| 56805 2000 $PR_{12}$ | 14.3 | $X$ | 16.80886 | 286.74213 | 307.75384 | 9.73601 | 0.1078202 | 0.18808953 | 3.0168912 | 20 | 6 7.3 | 18.1 |
| 56806 2000 $PM_{14}$ | 15.8 | $X$ | 228.09000 | 55.56048 | 215.04644 | 2.25025 | 0.0581004 | 0.22585108 | 2.6704714 | 20 | 1 4.8 | 19.6 |
| 56807 2000 $PR_{14}$ | 15.9 | $X$ | 209.80508 | 196.62190 | 143.57541 | 3.49595 | 0.1262111 | 0.23154268 | 2.6265278 | 20 | 3 9.6 | 20.0 |
| 56808 2000 $PO_{15}$ | 15.1 | $X$ | 22.25427 | 316.15901 | 359.78523 | 1.62621 | 0.0666294 | 0.20292461 | 2.8680028 | 20 | 10 2.3 | 18.7 |
| 56809 2000 $PE_{16}$ | 14.2 | $X$ | 158.03630 | 219.43122 | 179.30665 | 1.72317 | 0.1597445 | 0.18082487 | 3.0971621 | 20 | 4 4.7 | 19.1 |
| 56810 2000 $PU_{16}$ | 14.9 | $X$ | 286.99899 | 193.66146 | 143.96260 | 11.22666 | 0.0603106 | 0.19173558 | 2.9785226 | 20 | 6 12.2 | 19.1 |
| 56811 2000 $PG_{19}$ | 13.6 | $X$ | 159.47255 | 117.99845 | 1.15529 | 9.84965 | 0.0529564 | 0.19219681 | 2.9737556 | 20 | 7 11.6 | 18.1 |
| 56812 2000 $PM_{21}$ | 15.0 | $X$ | 279.64231 | 224.40941 | 333.36691 | 6.00433 | 0.1302318 | 0.22332204 | 2.6905950 | 20 | — | — |
| 56813 2000 $PN_{22}$ | 14.6 | $X$ | 222.28895 | 180.84190 | 109.45658 | 15.04143 | 0.1403802 | 0.22440346 | 2.6819439 | 20 | 1 21.3 | 19.0 |
| 56814 2000 $PD_{29}$ | 14.3 | $X$ | 59.85775 | 103.13069 | 105.84641 | 9.77763 | 0.0232610 | 0.24136180 | 2.5548007 | 20 | 6 30.3 | 17.4 |
| 56815 2000 $PS_{29}$ | 13.8 | $X$ | 124.07387 | 6.70152 | 38.54588 | 11.15478 | 0.0068785 | 0.17657194 | 3.1466970 | 20 | 2 27.5 | 18.4 |
| 56816 2000 $QQ$ | 15.2 | $X$ | 143.71610 | 186.02279 | 138.30629 | 4.03499 | 0.1802700 | 0.21814717 | 2.7329792 | 20 | — | — |
| 56817 2000 $QF_1$ | 14.7 | $X$ | 159.07909 | 272.58371 | 338.95014 | 21.14298 | 0.2674362 | 0.26384916 | 2.4074960 | 20 | 12 26.2 | 19.3 |
| 56818 2000 $QV_3$ | 14.1 | $X$ | 250.06250 | 350.35091 | 343.25492 | 8.91689 | 0.0884783 | 0.18367109 | 3.0650826 | 20 | 4 13.5 | 18.7 |
| 56819 2000 $QQ_5$ | 14.5 | $X$ | 178.63356 | 82.32906 | 333.27746 | 9.13195 | 0.0945723 | 0.18426006 | 3.0585475 | 20 | 5 8.7 | 19.4 |
| 56820 2000 $QK_8$ | 12.4 | $X$ | 23.95781 | 283.74011 | 323.41152 | 9.52970 | 0.0607943 | 0.19026454 | 2.9938553 | 20 | 7 4.2 | 16.3 |
| 56821 2000 $QC_{11}$ | 15.9 | $X$ | 126.08256 | 69.30026 | 180.40421 | 1.23491 | 0.1474977 | 0.25914741 | 2.4365283 | 20 | 11 26.4 | 19.8 |
| 56822 2000 $QR_{12}$ | 14.8 | $X$ | 0.14274 | 160.73949 | 171.72018 | 1.86886 | 0.0797924 | 0.20051149 | 2.8909675 | 20 | 9 22.4 | 18.3 |
| 56823 2000 $QZ_{12}$ | 14.8 | $X$ | 230.90467 | 256.96842 | 341.81916 | 4.83287 | 0.0110086 | 0.21993992 | 2.7181077 | 20 | — | — |
| 56824 2000 $QA_{13}$ | 14.8 | $X$ | 289.35338 | 39.60133 | 15.37658 | 1.80587 | 0.0695185 | 0.20134788 | 2.8829560 | 20 | 9 24.7 | 18.5 |
| 56825 2000 $QA_{14}$ | 15.6 | $X$ | 257.18197 | 357.09217 | 303.19352 | 2.92264 | 0.0624120 | 0.23251982 | 2.6191642 | 20 | 3 12.5 | 19.1 |
| 56826 2000 $QA_{25}$ | 14.5 | $X$ | 303.58723 | 259.87890 | 347.09773 | 12.45317 | 0.2022215 | 0.22914528 | 2.6448158 | 20 | 2 14.9 | 18.1 |
| 56827 2000 $QB_{28}$ | 14.1 | $X$ | 204.28401 | 182.09388 | 162.91793 | 20.16160 | 0.1135739 | 0.17804781 | 3.1292839 | 20 | 3 14.8 | 19.0 |
| 56828 2000 $QE_{28}$ | 14.6 | $X$ | 233.11388 | 190.00479 | 165.09110 | 5.45819 | 0.1533490 | 0.18313552 | 3.0710554 | 20 | 4 21.1 | 19.4 |
| 56829 2000 $QL_{28}$ | 14.7 | $X$ | 336.71503 | 200.52535 | 135.83851 | 2.95582 | 0.0830222 | 0.19489923 | 2.9462027 | 20 | 8 20.7 | 18.1 |
| 56830 2000 $QT_{29}$ | 14.1 | $X$ | 270.48564 | 210.95658 | 147.79443 | 12.07410 | 0.1457709 | 0.18844271 | 3.0131204 | 20 | 6 5.9 | 18.6 |
| 56831 2000 $QZ_{30}$ | 14.2 | $X$ | 297.06141 | 203.08264 | 135.58112 | 11.80375 | 0.1163949 | 0.19156746 | 2.9802650 | 20 | 6 18.9 | 18.3 |
| 56832 2000 $QM_{31}$ | 14.8 | $X$ | 146.09055 | 166.72352 | 126.79363 | 9.61061 | 0.2013506 | 0.21589616 | 2.7519430 | 20 | — | — |
| 56833 2000 $QN_{33}$ | 13.6 | $X$ | 147.99696 | 319.13223 | 42.98833 | 14.14625 | 0.1376533 | 0.17301192 | 3.1897161 | 20 | 2 18.2 | 18.8 |
| 56834 2000 $QO_{35}$ | 14.2 | $X$ | 311.83392 | 233.81198 | 265.81069 | 8.09429 | 0.0941782 | 0.21543092 | 2.7559037 | 20 | — | — |
| 56835 2000 $QM_{36}$ | 14.6 | $X$ | 38.57414 | 229.03554 | 317.63226 | 11.66583 | 0.0974119 | 0.23705445 | 2.5856554 | 20 | 4 30.8 | 17.9 |
| 56836 2000 $QK_{39}$ | 15.0 | $X$ | 304.74785 | 1.57036 | 322.78200 | 9.46130 | 0.0614957 | 0.19121447 | 2.9839317 | 20 | 6 17.9 | 19.1 |
| 56837 2000 $QX_{39}$ | 14.4 | $X$ | 320.40760 | 299.51362 | 327.87266 | 10.16033 | 0.1673457 | 0.18814928 | 3.0162524 | 20 | 4 6.7 | 18.3 |
| 56838 2000 $QK_{40}$ | 14.3 | $X$ | 67.41675 | 358.44388 | 334.85695 | 3.72649 | 0.0723342 | 0.20923904 | 2.8100081 | 20 | 12 23.1 | 18.3 |
| 56839 2000 $QM_{40}$ | 15.2 | $X$ | 101.40961 | 153.02855 | 150.12322 | 5.23121 | 0.0567746 | 0.21031744 | 2.8003943 | 20 | 12 23.2 | 19.3 |
| 56840 2000 $QW_{41}$ | 15.1 | $X$ | 303.11507 | 250.87657 | 332.37344 | 11.08166 | 0.1520685 | 0.22901930 | 2.6457857 | 20 | 1 21.9 | 18.9 |
| 56841 2000 $QS_{42}$ | 14.4 | $X$ | 40.70034 | 214.35380 | 318.52992 | 9.40081 | 0.0339187 | 0.18339703 | 3.0681354 | 20 | 4 12.8 | 18.7 |
| 56842 2000 $QJ_{44}$ | 15.3 | $X$ | 226.26026 | 271.28815 | 332.35071 | 8.41531 | 0.1619058 | 0.27105044 | 2.3646633 | 20 | — | — |
| 56843 2000 $QK_{45}$ | 15.0 | $X$ | 227.40056 | 326.59474 | 157.71460 | 6.50710 | 0.0191401 | 0.20202905 | 2.8764721 | 20 | 10 11.2 | 18.9 |
| 56844 2000 $QP_{45}$ | 15.5 | $X$ | 41.99601 | 281.67616 | 319.02310 | 3.94514 | 0.1699393 | 0.24483969 | 2.5305495 | 20 | 8 11.4 | 18.2 |
| 56845 2000 $QL_{50}$ | 14.7 | $X$ | 205.96160 | 174.77242 | 151.83128 | 4.40158 | 0.2090985 | 0.22702558 | 2.6612532 | 20 | 2 17.7 | 19.3 |
| 56846 2000 $QF_{53}$ | 15.0 | $X$ | 182.07512 | 308.61376 | 153.24453 | 12.33796 | 0.0661793 | 0.19060272 | 2.9903130 | 20 | 7 12.4 | 19.6 |
| 56847 2000 $QB_{59}$ | 14.9 | $X$ | 159.58480 | 309.39024 | 357.29807 | 9.50041 | 0.0451722 | 0.21827303 | 2.7319285 | 20 | — | — |
| 56848 2000 $QC_{59}$ | 15.4 | $X$ | 303.59411 | 209.34489 | 24.36091 | 4.73260 | 0.2143691 | 0.23124734 | 2.6287637 | 20 | 1 25.9 | 19.1 |
| 56849 2000 $QH_{61}$ | 14.7 | $X$ | 255.74052 | 309.60908 | 354.95819 | 10.33638 | 0.2283793 | 0.23158671 | 2.6261949 | 20 | 3 3.2 | 18.9 |
| 56850 2000 $QT_{61}$ | 14.4 | $X$ | 208.52254 | 199.86834 | 162.53423 | 13.28136 | 0.0718191 | 0.17991787 | 3.1075623 | 20 | 4 11.7 | 19.2 |
| 56851 2000 $QU_{64}$ | 14.3 | $X$ | 342.03467 | 164.02528 | 145.85656 | 12.54925 | 0.1227587 | 0.19244310 | 2.9712177 | 20 | 7 21.5 | 17.8 |
| 56852 2000 $QP_{65}$ | 14.5 | $X$ | 108.85530 | 138.39768 | 135.63783 | 13.87617 | 0.0729829 | 0.20464484 | 2.8519080 | 20 | 11 29.3 | 19.0 |
| 56853 2000 $QQ_{67}$ | 14.5 | $X$ | 290.25787 | 328.82030 | 23.55067 | 11.87711 | 0.0470549 | 0.19036528 | 2.9927990 | 20 | 7 8.3 | 18.8 |
| 56854 2000 $QL_{71}$ | 14.3 | $X$ | 312.05028 | 245.04195 | 325.81526 | 10.52845 | 0.0176140 | 0.17605317 | 3.1528755 | 20 | 2 11.7 | 18.5 |
| 56855 2000 $QJ_{73}$ | 14.4 | $X$ | 309.75896 | 348.36510 | 336.27736 | 10.90297 | 0.0761048 | 0.19084101 | 2.9878234 | 20 | 6 24.4 | 18.5 |
| 56856 2000 $QM_{73}$ | 14.9 | $X$ | 157.79899 | 160.75049 | 160.76959 | 13.52488 | 0.0620840 | 0.21918013 | 2.7243858 | 20 | — | — |
| 56857 2000 $QS_{75}$ | 14.3 | $X$ | 235.10368 | 132.68517 | 160.67463 | 21.83172 | 0.0912643 | 0.17680415 | 3.1439412 | 20 | 2 12.2 | 19.2 |
| 56858 2000 $QZ_{77}$ | 15.7 | $X$ | 291.10488 | 121.11171 | 151.03705 | 3.29368 | 0.1695565 | 0.23252053 | 2.6191589 | 20 | 3 4.5 | 19.2 |
| 56859 2000 $QA_{82}$ | 14.2 | $X$ | 95.87429 | 143.29668 | 350.09595 | 9.09835 | 0.0677572 | 0.18237040 | 3.0796390 | 20 | 5 11.4 | 18.6 |
| 56860 2000 $QP_{85}$ | 14.6 | $X$ | 135.39284 | 354.70638 | 315.78568 | 9.13221 | 0.1422489 | 0.21565277 | 2.7540132 | 20 | — | — |
| 56861 2000 $QW_{86}$ | 14.5 | $X$ | 259.02846 | 15.46482 | 311.12298 | 10.04915 | 0.1541933 | 0.18504828 | 3.0498561 | 20 | 4 5.5 | 19.3 |
| 56862 2000 $QS_{90}$ | 13.7 | $X$ | 180.37618 | 204.84552 | 178.69031 | 20.64541 | 0.1968020 | 0.17862951 | 3.1224866 | 20 | 4 8.6 | 19.0 |
| 56863 2000 $QZ_{90}$ | 14.7 | $X$ | 6.82126 | 15.57205 | 288.19098 | 4.26601 | 0.1142775 | 0.19591312 | 2.9360292 | 20 | 8 25.3 | 18.2 |
| 56864 2000 $QG_{91}$ | 13.5 | $X$ | 167.05036 | 243.40492 | 173.32952 | 26.66522 | 0.2073745 | 0.17958266 | 3.1114282 | 20 | 5 8.9 | 19.1 |
| 56865 2000 $QY_{91}$ | 14.0 | $X$ | 88.47801 | 233.32792 | 181.64633 | 21.97343 | 0.0694820 | 0.17014637 | 3.2254298 | 20 | 1 28.2 | 18.8 |
| 56866 2000 $QN_{94}$ | 13.7 | $X$ | 49.27558 | 97.80163 | 342.35632 | 15.57467 | 0.1177409 | 0.17078271 | 3.2174127 | 20 | 1 17.7 | 17.9 |
| 56867 2000 $QL_{97}$ | 14.4 | $X$ | 204.66157 | 303.04892 | 14.32064 | 7.90605 | 0.1515811 | 0.17530100 | 3.1618878 | 20 | 2 13.7 | 19.6 |
| 56868 2000 $QT_{101}$ | 13.6 | $X$ | 220.44349 | 134.12521 | 165.02407 | 23.58834 | 0.1454209 | 0.17431956 | 3.1737446 | 20 | 2 2.4 | 18.9 |
| 56869 2000 $QS_{102}$ | 14.1 | $X$ | 237.26655 | 186.21602 | 160.72936 | 15.15007 | 0.1615915 | 0.18166997 | 3.0875497 | 20 | 4 16.7 | 19.1 |
| 56870 2000 $QL_{104}$ | 14.4 | $X$ | 331.48507 | 190.65228 | 145.22031 | 11.23302 | 0.0133735 | 0.19240845 | 2.9715745 | 20 | 8 13.8 | 18.4 |
| 56871 2000 $QB_{108}$ | 14.3 | $X$ | 100.54061 | 69.01048 | 355.76948 | 4.76804 | 0.1654625 | 0.17358151 | 3.1827344 | 20 | 3 10.6 | 18.9 |
| 56872 2000 $QD_{109}$ | 14.6 | $X$ | 239.11180 | 208.37534 | 134.37553 | 11.02561 | 0.0325457 | 0.18291483 | 3.0735252 | 20 | 4 26.3 | 19.2 |
| 56873 2000 $QG_{110}$ | 15.0 | $X$ | 276.32607 | 273.67162 | 326.45163 | 10.73438 | 0.1433488 | 0.22669756 | 2.6638196 | 20 | 1 13.9 | 19.0 |
| 56874 2000 $QX_{110}$ | 13.9 | $X$ | 90.82178 | 312.93709 | 164.00976 | 27.83454 | 0.1520706 | 0.17912060 | 3.1167767 | 20 | 5 4.9 | 18.8 |
| 56875 2000 $QE_{111}$ | 15.1 | $X$ | 262.52452 | 340.22207 | 337.36870 | 1.81807 | 0.1164806 | 0.18395754 | 3.0618998 | 20 | 4 7.2 | 19.6 |
| 56876 2000 $QN_{111}$ | 14.8 | $X$ | 6.17002 | 232.98917 | 343.88012 | 15.27257 | 0.1058207 | 0.23422322 | 2.6064501 | 20 | 4 15.7 | 18.0 |
| 56877 2000 $QA_{113}$ | 14.5 | $X$ | 163.10927 | 106.81990 | 346.09424 | 9.60848 | 0.0268306 | 0.18569517 | 3.0427690 | 20 | 6 8.0 | 19.1 |
| 56878 2000 $QT_{115}$ | 14.5 | $X$ | 318.94187 | 357.27939 | 302.10052 | 4.26147 | 0.1082516 | 0.18817889 | 3.0159360 | 20 | 5 29.8 | 18.4 |
| 56879 2000 $QW_{118}$ | 14.2 | $X$ | 265.09295 | 45.04521 | 306.53983 | 7.96856 | 0.1475178 | 0.18652501 | 3.0337375 | 20 | 5 17.0 | 18.8 |
| 56880 2000 $QS_{120}$ | 14.0 | $X$ | 303.40679 | 334.26855 | 313.60258 | 8.53502 | 0.0720584 | 0.18352694 | 3.0666873 | 20 | 4 23.6 | 18.3 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56881 2000 $QE_{122}$ | 13.8 | $X$ | 343.65176 | 242.67783 | 194.49978 | 14.90738 | 0.1281673 | 0.15643910 | 3.4111895 | 20 | 12 29.6 | 18.3 |
| 56882 2000 $QT_{122}$ | 14.8 | $X$ | 21.73021 | 303.01507 | 344.75100 | 10.71134 | 0.1644200 | 0.24506249 | 2.5290155 | 20 | 9 13.2 | 17.5 |
| 56883 2000 $QH_{125}$ | 14.3 | $X$ | 258.40256 | 21.24573 | 293.18821 | 9.26449 | 0.0865123 | 0.18262651 | 3.0767592 | 20 | 3 29.1 | 19.0 |
| 56884 2000 $QK_{125}$ | 14.4 | $X$ | 179.20685 | 16.15858 | 298.44434 | 9.88660 | 0.0691213 | 0.17123729 | 3.2117161 | 20 | 1 14.5 | 19.1 |
| 56885 2000 $QP_{127}$ | 13.2 | $X$ | 172.49136 | 354.82928 | 3.30456 | 14.34588 | 0.2396478 | 0.17289309 | 3.1911775 | 20 | 3 6.9 | 18.7 |
| 56886 2000 $QG_{131}$ | 15.1 | $X$ | 111.05379 | 331.78889 | 313.19651 | 2.85715 | 0.0713937 | 0.20988035 | 2.8042810 | 20 | 12 12.3 | 19.3 |
| 56887 2000 $QZ_{131}$ | 15.5 | $X$ | 206.02398 | 275.55225 | 350.19171 | 3.89319 | 0.1305217 | 0.27226038 | 2.3576523 | 20 | — | — |
| 56888 2000 $QG_{134}$ | 14.3 | $X$ | 155.64050 | 281.16237 | 139.54129 | 12.05498 | 0.1235830 | 0.18214648 | 3.0821625 | 20 | 4 30.9 | 19.3 |
| 56889 2000 $QC_{137}$ | 13.7 | $X$ | 120.49558 | 359.45182 | 27.30030 | 6.03095 | 0.1597951 | 0.17102142 | 3.2144182 | 20 | 2 18.1 | 18.6 |
| 56890 2000 $QM_{137}$ | 14.3 | $X$ | 185.36705 | 216.92400 | 212.40307 | 8.32220 | 0.0620602 | 0.18877172 | 3.0096183 | 20 | 6 5.9 | 18.8 |
| 56891 2000 $QH_{139}$ | 14.0 | $X$ | 328.87408 | 196.71588 | 3.28631 | 12.95084 | 0.1080507 | 0.22373773 | 2.6872613 | 20 | 2 5.4 | 17.5 |
| 56892 2000 $QB_{142}$ | 14.6 | $X$ | 303.19163 | 333.86714 | 14.02115 | 9.92808 | 0.0940968 | 0.18981833 | 2.9985453 | 20 | 7 14.9 | 18.6 |
| 56893 2000 $QD_{145}$ | 15.1 | $X$ | 263.35680 | 113.84735 | 151.54171 | 13.24562 | 0.1670668 | 0.22636699 | 2.6664124 | 20 | 1 26.4 | 19.3 |
| 56894 2000 $QP_{145}$ | 14.7 | $X$ | 344.29877 | 189.07460 | 109.07029 | 4.22119 | 0.1621946 | 0.19152951 | 2.9806587 | 20 | 7 8.4 | 17.9 |
| 56895 2000 $QS_{149}$ | 14.6 | $X$ | 290.41024 | 154.27740 | 170.63671 | 9.64279 | 0.1165026 | 0.18963866 | 3.0004389 | 20 | 5 23.2 | 18.8 |
| 56896 2000 $QN_{155}$ | 14.8 | $X$ | 263.23182 | 56.01144 | 192.86876 | 11.81579 | 0.1748976 | 0.22712503 | 2.6604762 | 20 | 1 5.5 | 19.2 |
| 56897 2000 $QC_{158}$ | 14.3 | $X$ | 246.73414 | 78.87134 | 243.88898 | 8.64358 | 0.0793451 | 0.18258043 | 3.0772768 | 20 | 3 28.7 | 19.0 |
| 56898 2000 $QH_{158}$ | 14.4 | $X$ | 65.92092 | 254.07944 | 249.53200 | 8.10759 | 0.0284413 | 0.18181072 | 3.0859560 | 20 | 4 10.8 | 18.8 |
| 56899 2000 $QO_{158}$ | 14.5 | $X$ | 69.36794 | 197.76838 | 273.28338 | 10.01025 | 0.0745935 | 0.22937260 | 2.6430681 | 20 | 3 3.0 | 18.0 |
| 56900 2000 $QR_{161}$ | 14.5 | $X$ | 255.84665 | 125.00153 | 263.24968 | 8.58507 | 0.0852580 | 0.19206613 | 2.9751043 | 20 | 7 2.1 | 18.6 |
| 56901 2000 $QR_{162}$ | 14.7 | $X$ | 292.04898 | 137.14312 | 187.97279 | 10.87419 | 0.0899445 | 0.18994744 | 2.9971864 | 20 | 5 29.1 | 18.9 |
| 56902 2000 $QT_{164}$ | 14.6 | $X$ | 313.04858 | 67.65608 | 211.47836 | 10.11214 | 0.0377474 | 0.18524205 | 3.0477289 | 20 | 5 4.6 | 18.6 |
| 56903 2000 $QR_{170}$ | 14.1 | $X$ | 172.50774 | 236.14110 | 189.04557 | 8.90313 | 0.0320025 | 0.18375674 | 3.0641301 | 20 | 5 17.8 | 18.6 |
| 56904 2000 $QP_{171}$ | 14.6 | $X$ | 25.93244 | 5.16544 | 178.57718 | 13.78968 | 0.1217563 | 0.23063148 | 2.6334414 | 20 | 4 14.7 | 17.4 |
| 56905 2000 $QB_{176}$ | 14.7 | $X$ | 36.62156 | 240.19598 | 318.45074 | 10.53980 | 0.1818234 | 0.23710081 | 2.5853183 | 20 | 5 29.9 | 17.6 |
| 56906 2000 $QY_{184}$ | 14.2 | $X$ | 112.29226 | 50.23500 | 338.86354 | 14.93800 | 0.0962992 | 0.17250982 | 3.1959024 | 20 | 2 4.7 | 18.8 |
| 56907 2000 $QJ_{185}$ | 13.7 | $X$ | 222.76983 | 15.20885 | 2.21839 | 10.28276 | 0.1341043 | 0.18595965 | 3.0398833 | 20 | 5 4.6 | 18.6 |
| 56908 2000 $QX_{185}$ | 15.1 | $X$ | 46.04535 | 102.93097 | 102.68334 | 3.97308 | 0.1632593 | 0.24038220 | 2.5617369 | 20 | 6 25.9 | 17.9 |
| 56909 2000 $QP_{190}$ | 14.4 | $X$ | 147.84288 | 224.14762 | 121.52406 | 12.93147 | 0.1530393 | 0.17151739 | 3.2082186 | 20 | 1 25.3 | 19.3 |
| 56910 2000 $QJ_{192}$ | 14.0 | $X$ | 117.94701 | 11.67189 | 100.71224 | 10.84287 | 0.0523547 | 0.18360389 | 3.0658304 | 20 | 5 16.0 | 18.5 |
| 56911 2000 $QY_{192}$ | 13.8 | $X$ | 120.51594 | 343.11464 | 113.32504 | 9.34627 | 0.0444798 | 0.18188924 | 3.0850677 | 20 | 4 29.1 | 18.4 |
| 56912 2000 $QH_{195}$ | 14.9 | $X$ | 116.81488 | 281.74786 | 20.62826 | 3.65505 | 0.0439056 | 0.21191556 | 2.7862975 | 20 | — | — |
| 56913 2000 $QS_{200}$ | 14.7 | $X$ | 358.93750 | 286.69498 | 350.12996 | 9.97674 | 0.0806770 | 0.19166587 | 2.9792448 | 20 | 7 7.3 | 18.6 |
| 56914 2000 $QP_{203}$ | 14.9 | $X$ | 316.13496 | 231.54239 | 116.94222 | 3.70195 | 0.0819690 | 0.19359201 | 2.9594506 | 20 | 8 4.4 | 18.6 |
| 56915 2000 $QW_{206}$ | 14.5 | $X$ | 243.28520 | 262.41195 | 1.53354 | 12.59424 | 0.1653990 | 0.22331747 | 2.6906317 | 20 | 1 10.4 | 19.1 |
| 56916 2000 $QU_{210}$ | 14.2 | $X$ | 140.45030 | 33.74921 | 325.99983 | 6.17498 | 0.1317836 | 0.17130253 | 3.2109006 | 20 | 2 2.0 | 19.0 |
| 56917 2000 $QO_{221}$ | 14.0 | $X$ | 169.87924 | 269.82546 | 133.30796 | 17.02491 | 0.0926794 | 0.18217623 | 3.0818269 | 20 | 4 24.6 | 19.1 |
| 56918 2000 $QQ_{230}$ | 14.3 | $X$ | 84.70637 | 123.37650 | 2.96754 | 21.84235 | 0.0411203 | 0.17982880 | 3.1085883 | 20 | 4 11.4 | 18.7 |
| 56919 2000 $QF_{251}$ | 14.5 | $X$ | 232.68782 | 271.75478 | 72.18307 | 11.81243 | 0.1041666 | 0.18349546 | 3.0670381 | 20 | 4 14.6 | 19.3 |
| 56920 2000 $RA_{1}$ | 13.5 | $X$ | 141.51867 | 227.18243 | 183.54633 | 21.47713 | 0.0613680 | 0.17547508 | 3.1597962 | 20 | 3 26.6 | 18.1 |
| 56921 2000 $RW_{3}$ | 14.0 | $X$ | 329.75117 | 298.68026 | 7.26570 | 9.67528 | 0.1045140 | 0.18798165 | 3.0180452 | 20 | 6 26.8 | 17.9 |
| 56922 2000 $RE_{15}$ | 13.8 | $X$ | 204.22162 | 169.12551 | 224.12776 | 8.96644 | 0.0791211 | 0.18384781 | 3.0631181 | 20 | 5 11.7 | 18.3 |
| 56923 2000 $RB_{19}$ | 14.1 | $X$ | 334.59586 | 328.75046 | 304.77236 | 10.65310 | 0.0891196 | 0.18697331 | 3.0288863 | 20 | 5 19.9 | 18.2 |
| 56924 2000 $RJ_{20}$ | 13.7 | $X$ | 128.88707 | 179.58714 | 204.16806 | 10.99962 | 0.1398697 | 0.17125057 | 3.2115500 | 20 | 2 15.2 | 18.7 |
| 56925 2000 $RG_{21}$ | 14.6 | $X$ | 239.29252 | 322.13418 | 321.50181 | 12.18766 | 0.1434431 | 0.22516126 | 2.6759230 | 20 | 1 29.7 | 18.9 |
| 56926 2000 $RX_{21}$ | 14.5 | $X$ | 52.35367 | 303.34478 | 323.34829 | 10.01966 | 0.0841927 | 0.19594447 | 2.9357160 | 20 | 9 8.6 | 18.4 |
| 56927 2000 $RT_{22}$ | 14.3 | $X$ | 261.46183 | 159.48738 | 202.45437 | 10.11244 | 0.0472141 | 0.18628723 | 3.0363185 | 20 | 6 11.1 | 18.7 |
| 56928 2000 $RF_{27}$ | 14.0 | $X$ | 76.66134 | 143.98863 | 316.61651 | 12.93814 | 0.0876107 | 0.17322323 | 3.1871216 | 20 | 3 8.7 | 18.5 |
| 56929 2000 $RY_{27}$ | 14.8 | $X$ | 284.69898 | 336.91004 | 344.41353 | 11.68737 | 0.0671734 | 0.18491768 | 3.0512920 | 20 | 5 12.0 | 19.2 |
| 56930 2000 $RY_{28}$ | 13.5 | $X$ | 331.72321 | 16.97834 | 303.65335 | 9.72120 | 0.1134763 | 0.19154503 | 2.9804977 | 20 | 7 19.9 | 17.1 |
| 56931 2000 $RM_{32}$ | 14.5 | $X$ | 347.00814 | 47.59427 | 225.83152 | 5.78596 | 0.0216096 | 0.18544449 | 3.0455104 | 20 | 6 13.3 | 18.6 |
| 56932 2000 $RT_{40}$ | 13.6 | $X$ | 79.75032 | 149.88041 | 347.03840 | 27.51105 | 0.1316117 | 0.17682257 | 3.1437228 | 20 | 4 22.8 | 18.4 |
| 56933 2000 $RZ_{40}$ | 14.4 | $X$ | 288.06781 | 313.00776 | 328.27637 | 13.30648 | 0.1941323 | 0.23122667 | 2.6289204 | 20 | 3 5.9 | 18.2 |
| 56934 2000 $RE_{41}$ | 14.0 | $X$ | 54.96648 | 354.28616 | 248.14178 | 8.71110 | 0.0235661 | 0.19029193 | 2.9935680 | 20 | 8 1.4 | 18.2 |
| 56935 2000 $RU_{41}$ | 13.7 | $X$ | 230.69560 | 29.07187 | 296.28860 | 6.95039 | 0.1270933 | 0.17772868 | 3.1330287 | 20 | 3 11.8 | 18.8 |
| 56936 2000 $RW_{53}$ | 13.5 | $X$ | 240.62440 | 327.17929 | 299.35250 | 15.37618 | 0.0717699 | 0.17405004 | 3.1770202 | 20 | 1 20.4 | 18.3 |
| 56937 2000 $RD_{64}$ | 14.2 | $X$ | 138.74163 | 286.48638 | 3.16368 | 12.58172 | 0.1574190 | 0.20915328 | 2.8107761 | 20 | — | — |
| 56938 2000 $RO_{65}$ | 13.4 | $X$ | 288.72236 | 207.51983 | 25.04942 | 13.40676 | 0.1236382 | 0.22166889 | 2.7039556 | 20 | 1 23.5 | 17.5 |
| 56939 2000 $RC_{68}$ | 14.1 | $X$ | 136.25378 | 12.17583 | 335.65756 | 11.86438 | 0.1708966 | 0.17257161 | 3.1951395 | 20 | 1 20.8 | 19.2 |
| 56940 2000 $RG_{70}$ | 14.1 | $X$ | 204.53429 | 234.62266 | 16.57494 | 9.14769 | 0.1061691 | 0.21287047 | 2.7779586 | 20 | — | — |
| 56941 2000 $RQ_{73}$ | 15.0 | $X$ | 204.04631 | 268.56218 | 9.93735 | 12.44601 | 0.2177154 | 0.21865640 | 2.7287344 | 20 | — | — |
| 56942 2000 $RL_{75}$ | 13.7 | $X$ | 165.86746 | 81.70556 | 303.03126 | 8.20992 | 0.0910713 | 0.17476421 | 3.1683590 | 20 | 3 19.3 | 18.7 |
| 56943 2000 $RF_{76}$ | 14.1 | $X$ | 113.84797 | 287.30923 | 136.78425 | 2.10669 | 0.1806903 | 0.17635803 | 3.1492409 | 20 | 3 26.5 | 18.8 |
| 56944 2000 $RS_{85}$ | 14.1 | $X$ | 214.63998 | 188.03273 | 133.70916 | 8.00283 | 0.1107568 | 0.17471799 | 3.1689178 | 20 | 2 26.9 | 19.1 |
| 56945 2000 $RG_{88}$ | 15.0 | $X$ | 267.81358 | 9.38992 | 252.95919 | 3.25904 | 0.0919313 | 0.22855008 | 2.6494057 | 20 | 2 3.4 | 18.8 |
| 56946 2000 $RZ_{88}$ | 14.2 | $X$ | 54.76620 | 160.17980 | 331.25239 | 26.70182 | 0.1594868 | 0.17499657 | 3.1655538 | 20 | 3 17.9 | 18.5 |
| 56947 2000 $RZ_{93}$ | 15.0 | $X$ | 66.84465 | 23.43996 | 188.59284 | 13.53482 | 0.1037442 | 0.19052649 | 2.9911106 | 20 | 7 20.9 | 19.3 |
| 56948 2000 $RR_{98}$ | 14.0 | $X$ | 153.96558 | 85.73956 | 314.19205 | 21.63945 | 0.0319344 | 0.17672924 | 3.1448296 | 20 | 3 13.6 | 18.9 |
| 56949 2000 $RQ_{100}$ | 13.7 | $X$ | 281.64255 | 16.57192 | 276.51112 | 14.80004 | 0.2246411 | 0.18271597 | 3.0757548 | 20 | 3 8.7 | 18.7 |
| 56950 2000 $SA_{2}$ | 14.5 | $X$ | 270.20133 | 266.61772 | 23.15274 | 22.07597 | 0.2810645 | 0.28253652 | 2.3001332 | 20 | 2 28.4 | 18.6 |
| 56951 2000 $SK_{2}$ | 11.9 | $X$ | 321.04750 | 207.99539 | 61.74884 | 13.40204 | 0.0242742 | 0.08467349 | 5.1361504 | 20 | 5 8.8 | 18.7 |
| 56952 2000 $SU_{3}$ | 14.2 | $X$ | 345.62141 | 230.27509 | 104.88013 | 13.13891 | 0.0642828 | 0.19601350 | 2.9350267 | 20 | 9 7.3 | 18.1 |
| 56953 2000 $SN_{6}$ | 13.8 | $X$ | 87.50371 | 54.85381 | 63.98866 | 23.86210 | 0.0590910 | 0.17720134 | 3.1392414 | 20 | 4 24.2 | 18.5 |
| 56954 2000 $SF_{7}$ | 13.9 | $X$ | 192.47702 | 97.47945 | 167.51767 | 13.76792 | 0.1402228 | 0.21194353 | 2.7860524 | 20 | — | — |
| 56955 2000 $ST_{14}$ | 14.1 | $X$ | 46.97004 | 53.39461 | 126.68214 | 15.27035 | 0.0530884 | 0.23152419 | 2.6266677 | 20 | 5 12.0 | 17.7 |
| 56956 2000 $SH_{19}$ | 14.4 | $X$ | 344.00381 | 245.13341 | 337.81424 | 11.09845 | 0.1090555 | 0.17945735 | 3.1128764 | 20 | 3 26.1 | 18.4 |
| 56957 Seohideaki | 13.7 | $X$ | 197.62773 | 296.81052 | 318.91603 | 11.93695 | 0.0810831 | 0.21174673 | 2.7877783 | 20 | — | — |
| 56958 2000 $ST_{28}$ | 13.9 | $X$ | 55.78047 | 159.15277 | 337.83501 | 13.06586 | 0.0311607 | 0.17414240 | 3.1758967 | 20 | 3 20.3 | 18.4 |
| 56959 2000 $SU_{45}$ | 14.5 | $X$ | 119.78250 | 67.54607 | 248.05104 | 12.92462 | 0.1063365 | 0.21418472 | 2.7665832 | 20 | — | — |
| 56960 2000 $SN_{46}$ | 13.6 | $X$ | 150.78500 | 104.11281 | 274.29937 | 15.17250 | 0.1464906 | 0.17613703 | 3.1518747 | 20 | 2 26.1 | 18.9 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 56961 2000 $SR_{60}$ | 15.1 | $X$ | 166.53939 | 40.54289 | 176.15762 | 1.53081 | 0.1089342 | 0.20424734 | 2.8556071 | 20 | 11 16.4 | 19.6 |
| 56962 2000 $SW_{65}$ | 12.3 | $X$ | 256.20863 | 149.39513 | 183.03221 | 15.19115 | 0.0834590 | 0.08135559 | 5.2748620 | 20 | 4 29.2 | 19.5 |
| 56963 2000 $SX_{68}$ | 14.4 | $X$ | 132.69211 | 233.17964 | 8.26885 | 0.51226 | 0.1762928 | 0.20357421 | 2.8618984 | 20 | 11 14.1 | 19.2 |
| 56964 2000 $SY_{79}$ | 14.6 | $X$ | 115.56315 | 90.33883 | 157.99233 | 4.03490 | 0.1142208 | 0.20185032 | 2.8781699 | 20 | 11 5.5 | 19.1 |
| 56965 2000 $SJ_{83}$ | 14.3 | $X$ | 301.68999 | 190.44161 | 26.78469 | 11.43385 | 0.0452749 | 0.17107302 | 3.2137718 | 20 | 2 7.9 | 19.0 |
| 56966 2000 $ST_{86}$ | 14.8 | $X$ | 317.86459 | 121.71030 | 117.71331 | 5.25033 | 0.2262129 | 0.22689443 | 2.6622786 | 20 | 2 18.7 | 18.2 |
| 56967 2000 $SG_{91}$ | 13.6 | $X$ | 195.98433 | 82.18013 | 294.59743 | 14.77926 | 0.1060082 | 0.18113145 | 3.0936664 | 20 | 4 4.6 | 18.8 |
| 56968 2000 $SA_{92}$ | 11.6 | $X$ | 89.50102 | 259.39817 | 234.04044 | 14.42258 | 0.0366674 | 0.08301378 | 5.2043832 | 20 | 5 4.9 | 18.5 |
| 56969 2000 $SW_{106}$ | 14.3 | $X$ | 336.05292 | 57.30195 | 206.13629 | 4.62482 | 0.1364828 | 0.18422524 | 3.0589330 | 20 | 5 7.2 | 17.9 |
| 56970 2000 $SJ_{111}$ | 13.5 | $X$ | 49.71488 | 140.24780 | 26.94603 | 10.63621 | 0.1521683 | 0.17608434 | 3.1525034 | 20 | 5 5.5 | 17.4 |
| 56971 2000 $SG_{120}$ | 13.9 | $X$ | 207.59932 | 272.65579 | 80.15116 | 2.57754 | 0.2161413 | 0.17685047 | 3.1433922 | 20 | 3 24.8 | 19.2 |
| 56972 2000 $SP_{140}$ | 14.9 | $X$ | 197.44679 | 246.94597 | 0.20425 | 8.93626 | 0.1132016 | 0.21149691 | 2.7899732 | 20 | — | — |
| 56973 2000 $SA_{142}$ | 14.2 | $X$ | 221.60641 | 108.19294 | 215.34877 | 9.72371 | 0.0595011 | 0.17441709 | 3.1725613 | 20 | 3 4.9 | 19.1 |
| 56974 2000 $SS_{142}$ | 13.9 | $X$ | 52.10593 | 29.95154 | 308.31460 | 8.79303 | 0.0794001 | 0.15193956 | 3.4782075 | 20 | 11 27.9 | 18.9 |
| 56975 2000 $SP_{161}$ | 14.0 | $X$ | 54.05270 | 275.14336 | 102.87574 | 9.82947 | 0.0921502 | 0.16002082 | 3.3600963 | 20 | — | — |
| 56976 2000 $SS_{161}$ | 11.5 | $X$ | 191.01142 | 323.08352 | 76.19589 | 13.24129 | 0.0340200 | 0.08213994 | 5.2412291 | 20 | 5 10.9 | 18.6 |
| 56977 2000 $SB_{173}$ | 14.8 | $X$ | 15.37351 | 345.25946 | 255.01537 | 18.47532 | 0.2211548 | 0.23989388 | 2.5652120 | 20 | 6 23.8 | 16.9 |
| 56978 2000 $SR_{173}$ | 13.3 | $X$ | 30.80523 | 295.29929 | 232.10303 | 21.43514 | 0.1042633 | 0.17521543 | 3.1629171 | 20 | 3 28.0 | 17.6 |
| 56979 2000 $SB_{175}$ | 14.0 | $X$ | 265.46192 | 264.49286 | 340.70977 | 13.55387 | 0.0309254 | 0.16775130 | 3.2560579 | 20 | 1 30.7 | 18.8 |
| 56980 2000 $SS_{177}$ | 13.7 | $X$ | 261.93964 | 269.95114 | 359.53745 | 12.50829 | 0.1401386 | 0.17124350 | 3.2116384 | 20 | 2 12.7 | 18.7 |
| 56981 2000 $SQ_{182}$ | 14.0 | $X$ | 252.08270 | 233.60945 | 89.82152 | 15.12810 | 0.0964980 | 0.18117409 | 3.0931809 | 20 | 4 13.8 | 18.9 |
| 56982 2000 $SE_{189}$ | 13.2 | $X$ | 146.92344 | 100.43105 | 335.03874 | 8.40750 | 0.2200267 | 0.12595836 | 3.9414080 | 20 | 5 9.6 | 19.7 |
| 56983 2000 $SF_{190}$ | 14.4 | $X$ | 100.08253 | 272.46560 | 152.64183 | 13.34791 | 0.0624359 | 0.17403772 | 3.1771701 | 20 | 2 25.3 | 18.8 |
| 56984 2000 $SX_{193}$ | 14.6 | $X$ | 280.91660 | 140.62151 | 139.33336 | 10.37092 | 0.0845501 | 0.18014795 | 3.1049158 | 20 | 3 21.4 | 19.1 |
| 56985 2000 $SR_{202}$ | 14.0 | $X$ | 99.24766 | 309.42996 | 151.55827 | 3.47354 | 0.1852071 | 0.12396899 | 3.9834619 | 20 | 4 27.5 | 19.8 |
| 56986 2000 $SR_{210}$ | 13.5 | $X$ | 107.15096 | 44.07823 | 110.17211 | 9.96937 | 0.1229014 | 0.18221573 | 3.0813815 | 20 | 6 30.9 | 18.0 |
| 56987 2000 $SR_{211}$ | 13.7 | $X$ | 48.67113 | 260.94350 | 134.00323 | 12.47389 | 0.0643249 | 0.15946993 | 3.3678301 | 20 | — | — |
| 56988 2000 $SV_{241}$ | 14.6 | $X$ | 226.90951 | 40.38369 | 8.07505 | 9.04026 | 0.0464962 | 0.18925271 | 3.0045169 | 20 | 6 28.8 | 19.1 |
| 56989 2000 $SS_{242}$ | 14.9 | $X$ | 58.11023 | 173.84229 | 82.83761 | 3.20456 | 0.0794627 | 0.19652313 | 2.9299504 | 20 | 9 7.1 | 18.9 |
| 56990 2000 $SZ_{242}$ | 14.2 | $X$ | 75.53259 | 209.81103 | 44.40049 | 7.29639 | 0.0357966 | 0.19788341 | 2.9165077 | 20 | 9 21.7 | 18.3 |
| 56991 2000 $SB_{282}$ | 14.3 | $X$ | 30.82865 | 288.60132 | 262.86011 | 9.36518 | 0.0589905 | 0.18088825 | 3.0964387 | 20 | 4 27.5 | 18.5 |
| 56992 2000 $SM_{286}$ | 13.4 | $X$ | 216.92420 | 309.82604 | 8.01119 | 20.28239 | 0.1730348 | 0.17080990 | 3.2170714 | 20 | 2 28.9 | 18.9 |
| 56993 2000 $SA_{291}$ | 14.7 | $X$ | 305.66067 | 309.71121 | 305.37414 | 4.23790 | 0.1025978 | 0.17833483 | 3.1259253 | 20 | 3 14.5 | 18.9 |
| 56994 2000 $SR_{292}$ | 13.8 | $X$ | 281.04216 | 290.50236 | 353.19601 | 15.15406 | 0.0634811 | 0.17533557 | 3.1614721 | 20 | 3 24.3 | 18.3 |
| 56995 2000 $SU_{299}$ | 14.5 | $X$ | 6.53782 | 327.34244 | 217.55444 | 13.01994 | 0.0744181 | 0.17465977 | 3.1696219 | 20 | 3 14.1 | 18.7 |
| 56996 2000 $SP_{307}$ | 13.1 | $X$ | 119.54037 | 154.86245 | 305.59803 | 7.29450 | 0.1718449 | 0.12490539 | 3.9635279 | 20 | 5 12.2 | 19.2 |
| 56997 2000 $SV_{309}$ | 13.6 | $X$ | 212.39890 | 357.67822 | 339.51785 | 26.71462 | 0.1438502 | 0.17497478 | 3.1658165 | 20 | 3 7.7 | 18.8 |
| 56998 2000 $SA_{310}$ | 13.0 | $X$ | 228.62832 | 73.90288 | 279.12954 | 20.44549 | 0.1164402 | 0.18042514 | 3.1017349 | 20 | 4 6.4 | 18.3 |
| 56999 2000 $SD_{317}$ | 14.7 | $X$ | 73.28685 | 199.04590 | 302.06132 | 14.49633 | 0.0176594 | 0.17978406 | 3.1091041 | 20 | 4 10.8 | 19.4 |
| 57000 2000 $SJ_{319}$ | 13.6 | $X$ | 213.60858 | 319.85998 | 345.65113 | 16.78979 | 0.1204054 | 0.16898487 | 3.2401927 | 20 | 2 10.6 | 18.9 |
| 57001 2000 $SO_{327}$ | 14.2 | $X$ | 224.32400 | 264.35357 | 8.02351 | 12.57276 | 0.1760797 | 0.21812344 | 2.7331774 | 20 | 1 3.3 | 18.9 |
| 57002 2000 $ST_{343}$ | 14.8 | $X$ | 310.43033 | 227.80788 | 319.74310 | 5.18878 | 0.0452535 | 0.17004013 | 3.2267732 | 20 | 1 10.4 | 19.4 |
| 57003 2000 $SL_{349}$ | 13.6 | $X$ | 82.54862 | 58.48395 | 108.28966 | 12.37825 | 0.0901928 | 0.18015051 | 3.1048865 | 20 | 6 13.8 | 18.0 |
| 57004 2000 $SP_{349}$ | 15.1 | $X$ | 147.70967 | 235.60506 | 50.43290 | 7.75402 | 0.3193959 | 0.26671925 | 2.3901940 | 20 | — | — |
| 57005 2000 $ST_{349}$ | 14.1 | $X$ | 138.41898 | 77.68972 | 58.80010 | 11.14624 | 0.0443978 | 0.18880176 | 3.0092991 | 20 | 7 6.9 | 18.6 |
| 57006 2000 $SU_{354}$ | 14.0 | $X$ | 151.74369 | 9.93914 | 45.02075 | 11.62082 | 0.0996355 | 0.17876956 | 3.1208555 | 20 | 4 16.6 | 18.8 |
| 57007 2000 $SH_{356}$ | 14.0 | $X$ | 109.88127 | 317.51601 | 139.43870 | 16.93552 | 0.0766483 | 0.17590242 | 3.1546766 | 20 | 4 23.6 | 18.9 |
| 57008 2000 $SV_{356}$ | 14.4 | $X$ | 167.63763 | 330.49340 | 11.93861 | 13.09624 | 0.1875129 | 0.22417274 | 2.6837837 | 20 | 2 10.0 | 19.0 |
| 57009 2000 $SK_{357}$ | 14.1 | $X$ | 101.45141 | 149.92062 | 136.83872 | 16.30045 | 0.2793546 | 0.20619233 | 2.8376209 | 20 | 12 17.9 | 19.3 |
| 57010 2000 $TP_{1}$ | 14.2 | $X$ | 217.43858 | 197.84732 | 44.88968 | 11.23332 | 0.1787286 | 0.21191427 | 2.7863088 | 20 | — | — |
| 57011 2000 $TO_{18}$ | 14.1 | $X$ | 283.49810 | 76.97780 | 212.90051 | 14.51350 | 0.1335559 | 0.17835231 | 3.1257211 | 20 | 3 24.6 | 18.7 |
| 57012 2000 $TA_{21}$ | 14.2 | $X$ | 212.34505 | 192.60473 | 134.81096 | 10.32835 | 0.0719232 | 0.17507613 | 3.1645946 | 20 | 3 4.2 | 19.0 |
| 57013 2000 $TD_{39}$ | 11.8 | $X$ | 281.27649 | 270.97013 | 21.04257 | 17.58617 | 0.0557249 | 0.08174521 | 5.2580878 | 20 | 4 12.3 | 18.6 |
| 57014 2000 $TM_{39}$ | 14.3 | $X$ | 163.96578 | 236.06169 | 109.20273 | 7.19918 | 0.0942052 | 0.17213560 | 3.2005326 | 20 | 2 5.6 | 19.2 |
| 57015 2000 $TH_{40}$ | 14.3 | $X$ | 317.89352 | 155.80930 | 37.16671 | 13.24293 | 0.1215689 | 0.22241761 | 2.6978840 | 20 | 1 6.8 | 18.1 |
| 57016 2000 $TY_{41}$ | 14.3 | $X$ | 14.74125 | 154.34800 | 144.50539 | 13.64533 | 0.2063611 | 0.19679088 | 2.9272921 | 20 | 9 17.2 | 17.5 |
| 57017 2000 $TC_{42}$ | 14.2 | $X$ | 239.22611 | 227.47527 | 134.62941 | 11.07808 | 0.1041401 | 0.18391286 | 3.0623958 | 20 | 5 12.4 | 19.0 |
| 57018 2000 $TA_{46}$ | 14.5 | $X$ | 325.23866 | 305.98546 | 307.64649 | 2.96827 | 0.1069504 | 0.18180402 | 3.0860318 | 20 | 4 8.4 | 18.5 |
| 57019 2000 $TQ_{57}$ | 14.1 | $X$ | 54.12863 | 138.93896 | 49.56680 | 13.85228 | 0.1132273 | 0.23475237 | 2.6025319 | 20 | 6 4.2 | 17.3 |
| 57020 2000 $TX_{58}$ | 14.3 | $X$ | 342.01972 | 93.51678 | 138.44618 | 13.24812 | 0.1288145 | 0.22863380 | 2.6487589 | 20 | 4 6.2 | 17.5 |
| 57021 2000 $TG_{59}$ | 13.5 | $X$ | 334.97308 | 99.26790 | 96.60442 | 16.19946 | 0.1181912 | 0.17000039 | 3.2272760 | 20 | 2 15.1 | 17.8 |
| 57022 2000 $TK_{64}$ | 13.5 | $X$ | 171.00102 | 238.23035 | 100.12625 | 19.98758 | 0.2177107 | 0.17109320 | 3.2135190 | 20 | 2 12.3 | 19.1 |
| 57023 2000 $UH_{10}$ | 13.4 | $X$ | 349.57053 | 301.65603 | 51.50207 | 7.62204 | 0.1842248 | 0.19292337 | 2.9662846 | 20 | 10 10.6 | 16.5 |
| 57024 2000 $UD_{23}$ | 13.7 | $X$ | 210.31356 | 262.77372 | 60.58557 | 15.33988 | 0.1088440 | 0.17125857 | 3.2114500 | 20 | 3 2.6 | 19.0 |
| 57025 2000 $UO_{24}$ | 13.7 | $X$ | 227.89082 | 221.53043 | 70.02224 | 16.57343 | 0.1974414 | 0.17029627 | 3.2235367 | 20 | 2 3.9 | 19.3 |
| 57026 2000 $UD_{55}$ | 13.9 | $X$ | 243.34158 | 241.03648 | 67.23642 | 17.98286 | 0.2417004 | 0.17478252 | 3.1681377 | 20 | 3 8.3 | 19.5 |
| 57027 2000 $UB_{59}$ | 13.5 | $X$ | 143.57087 | 150.80690 | 285.49324 | 3.35584 | 0.1341563 | 0.12560770 | 3.9487400 | 20 | 5 4.7 | 19.5 |
| 57028 2000 $UJ_{60}$ | 14.6 | $X$ | 194.89655 | 341.27614 | 353.15587 | 4.60203 | 0.1404582 | 0.17225778 | 3.1990190 | 20 | 2 23.0 | 19.7 |
| 57029 2000 $UY_{65}$ | 14.5 | $X$ | 291.26707 | 275.84588 | 24.86377 | 4.81791 | 0.1437328 | 0.18057098 | 3.1000646 | 20 | 4 17.3 | 18.8 |
| 57030 2000 $UW_{102}$ | 13.7 | $X$ | 67.78964 | 198.63868 | 34.03063 | 11.86065 | 0.1690700 | 0.18663785 | 3.0325146 | 20 | 9 4.9 | 18.1 |
| 57031 2000 $VA$ | 14.8 | $X$ | 240.99739 | 36.97034 | 356.87881 | 4.85347 | 0.1027776 | 0.28301852 | 2.2975209 | 20 | 6 22.1 | 17.8 |
| 57032 2000 $VU_{8}$ | 14.0 | $X$ | 325.67158 | 100.69109 | 115.14044 | 2.04399 | 0.1249104 | 0.16981944 | 3.2295681 | 20 | 2 22.4 | 18.0 |
| 57033 2000 $VR_{15}$ | 14.0 | $X$ | 271.23396 | 220.05005 | 61.61093 | 17.58220 | 0.1944297 | 0.17386232 | 3.1793065 | 20 | 3 6.2 | 19.2 |
| 57034 2000 $VZ_{56}$ | 13.0 | $X$ | 317.04378 | 213.50865 | 53.38758 | 17.65738 | 0.0636008 | 0.17445719 | 3.1720752 | 20 | 4 25.1 | 17.3 |
| 57035 2000 $WG_{54}$ | 14.6 | $X$ | 117.83859 | 262.01643 | 351.04207 | 2.24528 | 0.0975020 | 0.24677046 | 2.5173326 | 20 | 11 18.2 | 18.2 |
| 57036 2000 $WV_{182}$ | 14.1 | $X$ | 236.92573 | 225.42047 | 67.57821 | 23.79262 | 0.2307770 | 0.27599028 | 2.3363623 | 20 | 2 2.5 | 18.5 |
| 57037 2000 $YC_{105}$ | 14.8 | $X$ | 33.95299 | 307.13540 | 277.70751 | 10.14902 | 0.2827810 | 0.26665476 | 2.3905793 | 20 | 7 24.9 | 17.0 |
| 57038 2001 $AX_{39}$ | 14.9 | $X$ | 282.67274 | 350.68310 | 355.33552 | 4.07924 | 0.2598090 | 0.27977264 | 2.3152571 | 20 | 5 14.1 | 17.8 |
| 57039 2001 $DF_{61}$ | 14.8 | $X$ | 284.83771 | 213.35871 | 155.93464 | 9.97621 | 0.0738331 | 0.17493538 | 3.1662919 | 20 | 7 15.7 | 19.2 |
| 57040 2001 $DH_{106}$ | 16.2 | $X$ | 122.90778 | 112.34316 | 163.61365 | 7.18956 | 0.1493983 | 0.28650369 | 2.2788508 | 20 | 12 30.2 | 19.8 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57041 2001 $EN_{12}$ | 12.0 | X | 255.79746 | 21.86202 | 73.23224 | 9.16163 | 0.0743997 | 0.08042257 | 5.3155812 | 20 | 9 18.2 | 19.1 |
| 57042 2001 $EK_{20}$ | 16.7 | X | 58.53235 | 95.03460 | 338.00900 | 7.24417 | 0.0710994 | 0.30377505 | 2.1916338 | 20 | — | — |
| 57043 2001 $FS_{13}$ | 15.6 | X | 278.57689 | 161.47641 | 140.24370 | 1.97797 | 0.1903080 | 0.25919441 | 2.4362338 | 20 | 3 23.2 | 18.8 |
| 57044 2001 $HH_{42}$ | 15.0 | X | 238.07495 | 202.65208 | 8.57086 | 0.61819 | 0.0826218 | 0.18990967 | 2.9975838 | 20 | — | — |
| 57045 2001 $KY_{33}$ | 15.3 | X | 334.72218 | 163.06540 | 178.40432 | 3.98168 | 0.1478855 | 0.21613383 | 2.7499253 | 20 | 8 24.7 | 18.1 |
| 57046 2001 $KW_{55}$ | 14.3 | X | 319.21856 | 215.12892 | 127.71066 | 9.06456 | 0.2340964 | 0.21048602 | 2.7988989 | 20 | 7 15.7 | 17.0 |
| 57047 2001 $LG_{1}$ | 14.8 | X | 102.12589 | 78.51305 | 257.46641 | 8.86350 | 0.3207470 | 0.28015591 | 2.3131450 | 20 | — | — |
| 57048 2001 $LU_{6}$ | 15.6 | X | 38.36660 | 334.62069 | 29.13723 | 5.36267 | 0.2433193 | 0.27319120 | 2.3522939 | 20 | — | — |
| 57049 2001 $LJ_{7}$ | 14.2 | X | 72.50672 | 200.24582 | 190.08722 | 10.10338 | 0.2876025 | 0.22621216 | 2.6676289 | 20 | — | — |
| 57050 2001 $LF_{11}$ | 13.7 | X | 306.78957 | 294.47420 | 99.29683 | 31.74129 | 0.3663398 | 0.21349459 | 2.7725420 | 20 | 8 16.2 | 16.8 |
| 57051 2001 $LK_{13}$ | 15.5 | X | 28.13232 | 260.27621 | 107.87321 | 13.17712 | 0.2074669 | 0.27626307 | 2.3348240 | 20 | — | — |
| 57052 2001 $MS_{6}$ | 15.4 | X | 127.89772 | 351.10586 | 45.80639 | 5.71503 | 0.3248537 | 0.23642845 | 2.5902175 | 20 | 3 19.2 | 19.7 |
| 57053 2001 $MA_{13}$ | 14.2 | X | 184.28814 | 78.24730 | 303.61534 | 11.02043 | 0.1608711 | 0.24214224 | 2.5493082 | 20 | 3 29.6 | 18.6 |
| 57054 2001 $MB_{13}$ | 14.8 | X | 120.57109 | 107.73999 | 312.37129 | 13.22608 | 0.1769728 | 0.23752064 | 2.5822710 | 20 | 3 16.6 | 18.8 |
| 57055 2001 $MN_{18}$ | 15.8 | X | 160.83257 | 219.12518 | 138.76287 | 4.03832 | 0.1652039 | 0.29100505 | 2.2552899 | 20 | 2 8.7 | 19.1 |
| 57056 2001 $MW_{19}$ | 14.8 | X | 121.37292 | 49.34123 | 338.51424 | 5.48413 | 0.1968693 | 0.23706421 | 2.5855844 | 20 | 2 15.6 | 18.4 |
| 57057 2001 $MO_{20}$ | 15.2 | X | 276.35173 | 296.73106 | 58.64940 | 3.58671 | 0.1986750 | 0.25518315 | 2.4616977 | 20 | 5 29.9 | 18.5 |
| 57058 2001 $MX_{20}$ | 15.8 | X | 69.19243 | 288.10120 | 99.57568 | 10.34088 | 0.2169213 | 0.28035941 | 2.3120255 | 20 | — | — |
| 57059 2001 $MA_{24}$ | 15.3 | X | 66.73926 | 71.43898 | 322.36545 | 5.61161 | 0.1463063 | 0.27926174 | 2.3180800 | 20 | — | — |
| 57060 2001 $MO_{25}$ | 15.7 | X | 170.70151 | 42.21931 | 307.24036 | 3.99841 | 0.1815385 | 0.28902672 | 2.2655695 | 20 | 2 8.8 | 19.2 |
| 57061 2001 $MZ_{26}$ | 14.1 | X | 312.57554 | 120.30024 | 249.46806 | 16.20402 | 0.1690018 | 0.20989360 | 2.8041630 | 20 | 8 11.9 | 17.6 |
| 57062 2001 $NC_{1}$ | 15.8 | X | 318.36508 | 293.35185 | 100.20869 | 5.13111 | 0.1971156 | 0.26560424 | 2.3968786 | 20 | 10 24.6 | 17.5 |
| 57063 2001 $NE_{3}$ | 15.1 | X | 123.26010 | 246.03247 | 142.78701 | 3.20801 | 0.2397253 | 0.23618828 | 2.5919731 | 20 | 2 23.6 | 18.8 |
| 57064 2001 $NW_{6}$ | 16.7 | X | 296.95543 | 85.29882 | 305.12573 | 2.38382 | 0.1551831 | 0.31492568 | 2.1395905 | 20 | 9 10.8 | 18.1 |
| 57065 2001 $NZ_{6}$ | 15.2 | X | 20.20806 | 190.73604 | 171.94578 | 5.21220 | 0.2384828 | 0.26738470 | 2.3862266 | 20 | — | — |
| 57066 2001 $NS_{8}$ | 16.3 | X | 173.77714 | 58.93396 | 326.10182 | 5.16343 | 0.1655484 | 0.29608225 | 2.2294332 | 20 | 3 24.9 | 19.7 |
| 57067 2001 $NB_{21}$ | 16.0 | X | 169.56649 | 28.32184 | 311.75349 | 7.14391 | 0.1851527 | 0.28729624 | 2.2746579 | 20 | 1 28.0 | 19.4 |
| 57068 2001 $OC_{1}$ | 16.5 | X | 3.57618 | 199.96174 | 189.64483 | 2.35534 | 0.1806610 | 0.27152083 | 2.3619314 | 20 | — | — |
| 57069 2001 $OA_{3}$ | 15.0 | X | 200.21935 | 229.46577 | 123.88693 | 13.23399 | 0.1348192 | 0.24374651 | 2.5381100 | 20 | 3 19.5 | 19.1 |
| 57070 2001 $OB_{6}$ | 14.3 | X | 98.05825 | 207.57293 | 208.69100 | 9.04000 | 0.0958522 | 0.18300170 | 3.0725524 | 20 | 2 12.4 | 18.7 |
| 57071 2001 $OA_{7}$ | 15.2 | X | 83.84013 | 147.92855 | 221.52378 | 3.37688 | 0.1719552 | 0.27815877 | 2.3242038 | 20 | — | — |
| 57072 2001 $OZ_{10}$ | 15.0 | X | 358.60211 | 309.19695 | 79.12698 | 6.97362 | 0.0611100 | 0.21886712 | 2.7269826 | 20 | 12 4.9 | 18.5 |
| 57073 2001 $OB_{13}$ | 15.1 | X | 77.91244 | 40.41351 | 306.39631 | 9.30045 | 0.2457626 | 0.27641153 | 2.3339879 | 20 | — | — |
| 57074 2001 $OO_{13}$ | 15.0 | X | 204.88329 | 274.18988 | 102.89146 | 5.38807 | 0.2698866 | 0.24285524 | 2.5443161 | 20 | 4 17.6 | 19.6 |
| 57075 2001 $OU_{13}$ | 15.4 | X | 102.43951 | 225.03115 | 117.67395 | 5.12393 | 0.2064866 | 0.27691458 | 2.3311605 | 20 | — | — |
| 57076 2001 $OY_{16}$ | 14.9 | X | 344.60065 | 257.73840 | 147.24914 | 8.21082 | 0.2051603 | 0.21738891 | 2.7393306 | 20 | 12 20.2 | 17.7 |
| 57077 2001 $OB_{19}$ | 14.7 | X | 7.76688 | 241.62631 | 181.60517 | 4.13464 | 0.1447992 | 0.22542389 | 2.6738441 | 20 | — | — |
| 57078 2001 $OJ_{19}$ | 15.3 | X | 262.93348 | 207.19749 | 178.20947 | 9.54878 | 0.1719535 | 0.25618651 | 2.4552660 | 20 | 6 27.1 | 18.8 |
| 57079 2001 $OY_{20}$ | 13.9 | X | 83.00506 | 101.59498 | 335.66278 | 12.77736 | 0.1299846 | 0.23283878 | 2.6167717 | 20 | 2 20.8 | 17.1 |
| 57080 2001 $OE_{21}$ | 15.3 | X | 324.60260 | 188.72489 | 164.46038 | 6.72190 | 0.1531063 | 0.25786080 | 2.4446264 | 20 | 8 29.5 | 17.2 |
| 57081 2001 $OH_{21}$ | 15.2 | X | 25.91352 | 112.70960 | 308.45536 | 5.89934 | 0.0808285 | 0.27607378 | 2.3358912 | 20 | — | — |
| 57082 2001 $OX_{21}$ | 14.8 | X | 44.06217 | 218.57411 | 157.50261 | 2.93533 | 0.2219905 | 0.21903301 | 2.7256055 | 20 | — | — |
| 57083 2001 $OM_{31}$ | 13.3 | X | 307.31911 | 241.43889 | 258.97060 | 23.34554 | 0.2420607 | 0.27390446 | 2.3482085 | 20 | — | — |
| 57084 2001 $OH_{35}$ | 15.4 | X | 132.25199 | 249.26324 | 111.05030 | 23.58611 | 0.2454485 | 0.28600652 | 2.2814910 | 20 | 1 22.9 | 18.5 |
| 57085 2001 $OY_{37}$ | 15.0 | X | 184.33569 | 160.00256 | 328.04525 | 19.01876 | 0.0763645 | 0.36599895 | 1.9356024 | 20 | 9 1.3 | 17.1 |
| 57086 2001 $OJ_{39}$ | 14.3 | X | 112.87408 | 310.36515 | 122.83762 | 8.54626 | 0.1703802 | 0.23748609 | 2.5825214 | 20 | 4 3.4 | 18.1 |
| 57087 2001 $OB_{41}$ | 15.5 | X | 7.23502 | 58.64557 | 332.56801 | 7.52244 | 0.2029498 | 0.27192973 | 2.3595630 | 20 | — | — |
| 57088 2001 $OT_{41}$ | 15.3 | X | 33.45629 | 345.08917 | 66.41102 | 6.82429 | 0.1701512 | 0.27778458 | 2.3262905 | 20 | — | — |
| 57089 2001 $OF_{42}$ | 13.4 | X | 120.62202 | 111.95573 | 328.56505 | 10.38190 | 0.0914931 | 0.18595922 | 3.0398880 | 20 | 4 6.1 | 18.0 |
| 57090 2001 $OF_{44}$ | 13.7 | X | 88.28335 | 116.79105 | 313.04444 | 13.54106 | 0.1570478 | 0.17836758 | 3.1255427 | 20 | 2 25.4 | 18.0 |
| 57091 2001 $OL_{44}$ | 15.4 | X | 103.44775 | 204.40539 | 199.49825 | 13.47519 | 0.0788941 | 0.23113900 | 2.6295851 | 20 | 1 24.9 | 19.1 |
| 57092 2001 $OG_{45}$ | 15.2 | X | 133.64682 | 220.99038 | 162.68820 | 12.44702 | 0.2276185 | 0.23584631 | 2.5944780 | 20 | 2 25.4 | 19.2 |
| 57093 2001 $OM_{46}$ | 15.6 | X | 155.99703 | 54.43935 | 289.99632 | 4.71006 | 0.1903352 | 0.28751977 | 2.2734788 | 20 | 1 20.3 | 18.9 |
| 57094 2001 $OA_{48}$ | 15.5 | X | 289.74120 | 203.36341 | 199.07134 | 6.46957 | 0.1652946 | 0.26068950 | 2.4269101 | 20 | 9 1.8 | 18.0 |
| 57095 2001 $OX_{48}$ | 15.3 | X | 202.95419 | 180.57953 | 193.61033 | 3.07848 | 0.2122157 | 0.24307276 | 2.5427980 | 20 | 4 11.3 | 19.4 |
| 57096 2001 $OQ_{56}$ | 15.1 | X | 85.06699 | 236.28054 | 197.87422 | 12.89399 | 0.1717188 | 0.23125973 | 2.6286698 | 20 | 2 22.1 | 18.5 |
| 57097 2001 $OP_{58}$ | 15.5 | X | 17.53764 | 16.28542 | 343.36253 | 2.46487 | 0.1878675 | 0.26602073 | 2.3943763 | 20 | 12 26.1 | 18.4 |
| 57098 2001 $OB_{66}$ | 13.9 | X | 286.29247 | 103.13244 | 338.71374 | 9.09771 | 0.1083679 | 0.20981244 | 2.8048861 | 20 | 10 18.1 | 17.4 |
| 57099 2001 $OL_{69}$ | 16.0 | X | 197.25427 | 247.91400 | 126.29881 | 6.66794 | 0.1705708 | 0.29554583 | 2.2321300 | 20 | 4 7.3 | 19.5 |
| 57100 2001 $OM_{69}$ | 14.4 | X | 19.34153 | 267.23912 | 144.39499 | 30.87030 | 0.1787666 | 0.22094586 | 2.7098514 | 20 | — | — |
| 57101 2001 $OC_{70}$ | 14.9 | X | 148.65204 | 10.22062 | 17.14541 | 4.23002 | 0.3150913 | 0.23548498 | 2.5971313 | 20 | 3 21.1 | 19.5 |
| 57102 2001 $OJ_{71}$ | 15.5 | X | 19.24977 | 213.38955 | 140.55859 | 6.86327 | 0.1452212 | 0.26575249 | 2.3959872 | 20 | 12 14.6 | 18.4 |
| 57103 2001 $OF_{72}$ | 16.0 | X | 45.15427 | 34.68678 | 310.26387 | 1.21040 | 0.2147840 | 0.26838078 | 2.3803187 | 20 | — | — |
| 57104 2001 $OH_{72}$ | 13.9 | X | 62.55227 | 112.79650 | 334.71994 | 7.06513 | 0.0742492 | 0.28373677 | 2.2936420 | 20 | 1 17.9 | 16.3 |
| 57105 2001 $OJ_{72}$ | 15.9 | X | 139.80397 | 336.02820 | 35.86859 | 1.41658 | 0.2009086 | 0.28482241 | 2.2878099 | 20 | 2 10.0 | 19.2 |
| 57106 2001 $OQ_{73}$ | 15.4 | X | 83.16679 | 103.25503 | 219.27061 | 3.99003 | 0.1994028 | 0.27257105 | 2.3558604 | 20 | — | — |
| 57107 2001 $OF_{74}$ | 15.7 | X | 71.84173 | 79.68647 | 301.23693 | 7.11981 | 0.1825057 | 0.27865124 | 2.3214646 | 20 | — | — |
| 57108 2001 $OS_{74}$ | 12.6 | X | 261.30371 | 120.95667 | 274.72926 | 12.54545 | 0.1565420 | 0.19788606 | 2.9164817 | 20 | 7 8.4 | 16.8 |
| 57109 2001 $OW_{74}$ | 15.8 | X | 90.46135 | 91.28735 | 145.19489 | 24.93153 | 0.0167249 | 0.36803256 | 1.9284656 | 20 | 10 18.6 | 18.4 |
| 57110 2001 $OV_{79}$ | 14.7 | X | 114.52630 | 251.49682 | 182.62335 | 24.08066 | 0.3245124 | 0.23720755 | 2.5845427 | 20 | 4 22.2 | 19.1 |
| 57111 2001 $OQ_{80}$ | 13.4 | X | 42.48301 | 109.51617 | 293.78212 | 12.68268 | 0.1912309 | 0.22143708 | 2.7058423 | 20 | — | — |
| 57112 2001 $OC_{81}$ | 13.5 | X | 14.61696 | 62.32803 | 310.22343 | 7.74297 | 0.1720184 | 0.21268729 | 2.7795535 | 20 | 12 21.0 | 16.9 |
| 57113 2001 $OY_{83}$ | 16.0 | X | 138.69472 | 350.66792 | 43.95702 | 7.65494 | 0.1510502 | 0.29163148 | 2.2520591 | 20 | 3 6.4 | 19.1 |
| 57114 2001 $OY_{85}$ | 15.4 | X | 180.88090 | 42.44578 | 312.72888 | 3.01992 | 0.2280463 | 0.23707264 | 2.5855231 | 20 | 3 1.6 | 19.9 |
| 57115 2001 $OS_{87}$ | 14.0 | X | 84.19529 | 157.42457 | 284.36802 | 22.55090 | 0.1519267 | 0.18380835 | 3.0635565 | 20 | 2 24.7 | 18.6 |
| 57116 2001 $OW_{92}$ | 16.2 | X | 21.59499 | 343.42928 | 322.21946 | 13.63168 | 0.1228602 | 0.36841180 | 1.9271419 | 20 | 10 22.1 | 18.3 |
| 57117 2001 $OU_{93}$ | 16.2 | X | 166.77617 | 348.16223 | 45.41468 | 4.65209 | 0.1099874 | 0.29573985 | 2.2311537 | 20 | 3 29.6 | 19.3 |
| 57118 2001 $OF_{95}$ | 15.1 | X | 10.85942 | 191.78090 | 157.96888 | 14.44674 | 0.2330650 | 0.26462210 | 2.4028056 | 20 | 12 11.8 | 18.1 |
| 57119 2001 $OJ_{97}$ | 15.7 | X | 102.36004 | 257.42267 | 105.01165 | 7.46377 | 0.1546735 | 0.28118868 | 2.3074776 | 20 | — | — |
| 57120 2001 $OX_{97}$ | 13.6 | X | 160.73100 | 308.07938 | 118.81891 | 14.66504 | 0.1159656 | 0.19338112 | 2.9616018 | 20 | 5 13.6 | 18.5 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57121 2001 $OK_{98}$ | 15.4 | $X$ | 138.17140 | 8.02201 | 26.41981 | 4.23902 | 0.2277071 | 0.23698813 | 2.5861378 | 20 | 3 15.3 | 19.4 |
| 57122 2001 $OS_{99}$ | 15.7 | $X$ | 339.24281 | 60.33164 | 312.04576 | 1.67330 | 0.2089743 | 0.26495119 | 2.4008156 | 20 | 11 7.5 | 17.3 |
| 57123 2001 $OV_{100}$ | 15.4 | $X$ | 68.51401 | 357.99856 | 342.75309 | 6.61413 | 0.1520989 | 0.27450296 | 2.3447940 | 20 | — | — |
| 57124 2001 $OJ_{101}$ | 13.4 | $X$ | 334.11435 | 312.94230 | 158.56139 | 1.11118 | 0.1327961 | 0.17463986 | 3.1698628 | 20 | — | — |
| 57125 2001 $OA_{103}$ | 13.1 | $X$ | 144.24720 | 182.04165 | 301.31230 | 12.25684 | 0.0203850 | 0.19545893 | 2.9405758 | 20 | 6 25.9 | 17.3 |
| 57126 2001 $OM_{106}$ | 15.5 | $X$ | 206.62722 | 7.14334 | 305.77878 | 6.55433 | 0.2126484 | 0.29002826 | 2.2603508 | 20 | 1 27.3 | 19.2 |
| 57127 2001 $OV_{106}$ | 15.5 | $X$ | 176.21928 | 88.64519 | 312.20482 | 7.11235 | 0.1065234 | 0.29465817 | 2.2366107 | 20 | 4 13.2 | 18.8 |
| 57128 2001 $PG$ | 14.3 | $X$ | 107.08378 | 180.47008 | 262.45444 | 11.03077 | 0.1377404 | 0.23753453 | 2.5821703 | 20 | 3 26.1 | 18.1 |
| 57129 2001 $PO$ | 14.2 | $X$ | 60.86669 | 229.59009 | 240.37707 | 21.17612 | 0.0685825 | 0.23683116 | 2.5872804 | 20 | 2 11.7 | 17.9 |
| 57130 2001 $PE_{5}$ | 13.7 | $X$ | 148.03396 | 296.36180 | 105.63881 | 12.28589 | 0.0911428 | 0.18886769 | 3.0085988 | 20 | 3 30.6 | 18.4 |
| 57131 2001 $PF_{6}$ | 15.4 | $X$ | 322.78117 | 31.37498 | 26.82344 | 3.82996 | 0.1714689 | 0.26627276 | 2.3928651 | 20 | 12 9.9 | 17.3 |
| 57132 2001 $PO_{6}$ | 14.1 | $X$ | 92.78429 | 109.24179 | 343.46052 | 9.05386 | 0.1085488 | 0.18601319 | 3.0392999 | 20 | 3 24.1 | 18.3 |
| 57133 2001 $PV_{6}$ | 14.9 | $X$ | 324.89040 | 181.38202 | 213.37978 | 3.30600 | 0.1038636 | 0.21161659 | 2.7889212 | 20 | 10 22.2 | 18.0 |
| 57134 2001 $PX_{6}$ | 14.9 | $X$ | 42.97914 | 129.04867 | 322.25391 | 8.06640 | 0.0829685 | 0.23113938 | 2.6295822 | 20 | 1 3.5 | 17.9 |
| 57135 2001 $PB_{7}$ | 15.6 | $X$ | 115.08296 | 74.97520 | 285.84402 | 5.22641 | 0.1466488 | 0.28165946 | 2.3049057 | 20 | — | — |
| 57136 2001 $PE_{23}$ | 15.2 | $X$ | 323.50992 | 103.70245 | 327.62631 | 5.04118 | 0.2243010 | 0.26885715 | 2.3775062 | 20 | — | — |
| 57137 2001 $PH_{23}$ | 15.9 | $X$ | 32.03596 | 33.17741 | 4.34405 | 7.46096 | 0.1506615 | 0.27729238 | 2.3290426 | 20 | — | — |
| 57138 2001 $PU_{25}$ | 15.5 | $X$ | 266.45373 | 282.64375 | 104.84815 | 6.31208 | 0.1224194 | 0.25453192 | 2.4658948 | 20 | 7 13.2 | 18.5 |
| 57139 2001 $PU_{26}$ | 14.5 | $X$ | 29.74490 | 44.32428 | 350.64565 | 5.84707 | 0.0479237 | 0.22180483 | 2.7028507 | 20 | — | — |
| 57140 Gaddi | 15.8 | $X$ | 303.83155 | 200.65061 | 188.20788 | 2.98298 | 0.1832770 | 0.26009945 | 2.4305791 | 20 | 9 7.5 | 18.1 |
| 57141 2001 $PG_{32}$ | 15.9 | $X$ | 262.86342 | 40.54599 | 49.49904 | 9.34892 | 0.1627633 | 0.26372407 | 2.4082572 | 20 | 10 4.2 | 18.7 |
| 57142 2001 $PO_{35}$ | 15.7 | $X$ | 57.50525 | 162.78126 | 246.46458 | 11.41863 | 0.1058411 | 0.28028994 | 2.3124075 | 20 | — | — |
| 57143 2001 $PC_{37}$ | 14.5 | $X$ | 21.44527 | 21.39066 | 62.59009 | 8.92777 | 0.2267041 | 0.22579875 | 2.6708840 | 20 | — | — |
| 57144 2001 $PJ_{43}$ | 15.6 | $X$ | 330.61540 | 243.99550 | 176.28363 | 6.44504 | 0.0909412 | 0.27146311 | 2.3622662 | 20 | 12 23.9 | 18.2 |
| 57145 2001 $PV_{43}$ | 16.3 | $X$ | 223.09644 | 271.85357 | 89.00416 | 6.75301 | 0.1217148 | 0.29937597 | 2.2130510 | 20 | 4 16.9 | 19.5 |
| 57146 2001 $PC_{46}$ | 14.8 | $X$ | 33.16197 | 31.60459 | 27.06376 | 14.98405 | 0.0782575 | 0.22596083 | 2.6696066 | 20 | — | — |
| 57147 2001 $PB_{49}$ | 16.1 | $X$ | 153.96219 | 298.84264 | 53.95802 | 8.15622 | 0.1671502 | 0.28768498 | 2.2726083 | 20 | 1 29.2 | 19.4 |
| 57148 2001 $PX_{57}$ | 15.8 | $X$ | 329.28024 | 155.55189 | 322.27383 | 4.80854 | 0.1687528 | 0.27612846 | 2.3355828 | 20 | — | — |
| 57149 2001 $PF_{59}$ | 13.5 | $X$ | 131.94084 | 256.46853 | 143.48352 | 24.24179 | 0.2250058 | 0.18162833 | 3.0880216 | 20 | 3 22.7 | 18.7 |
| 57150 2001 $QA_{1}$ | 15.8 | $X$ | 346.61010 | 70.53231 | 315.10837 | 6.80074 | 0.1404141 | 0.26683716 | 2.3894898 | 20 | 12 4.9 | 18.3 |
| 57151 2001 $QY_{1}$ | 14.7 | $X$ | 119.00842 | 204.44875 | 225.95770 | 3.27960 | 0.1901451 | 0.23632654 | 2.5909620 | 20 | 4 4.3 | 18.5 |
| 57152 2001 $QL_{2}$ | 13.4 | $X$ | 100.60536 | 23.27761 | 343.88920 | 19.27154 | 0.0928497 | 0.17651045 | 3.1474278 | 20 | — | — |
| 57153 2001 $QB_{4}$ | 15.2 | $X$ | 336.27173 | 302.02806 | 134.55060 | 5.27188 | 0.2028053 | 0.27237753 | 2.3569762 | 20 | — | — |
| 57154 2001 $QL_{7}$ | 15.7 | $X$ | 111.43205 | 228.07620 | 149.45358 | 3.05844 | 0.2516060 | 0.28307475 | 2.2972167 | 20 | 1 21.7 | 18.5 |
| 57155 2001 $QM_{8}$ | 15.3 | $X$ | 14.94091 | 51.21475 | 320.19305 | 4.96355 | 0.1229117 | 0.26930915 | 2.3748452 | 20 | 12 29.3 | 18.0 |
| 57156 2001 $QM_{10}$ | 15.7 | $X$ | 260.48013 | 55.82617 | 342.76062 | 1.82379 | 0.1992745 | 0.25438172 | 2.4668654 | 20 | 7 8.9 | 19.1 |
| 57157 2001 $QW_{11}$ | 15.2 | $X$ | 75.84948 | 231.64083 | 155.87156 | 5.04870 | 0.1740162 | 0.27892312 | 2.3199558 | 20 | — | — |
| 57158 2001 $QF_{14}$ | 15.7 | $X$ | 122.17911 | 276.30944 | 63.54863 | 4.48133 | 0.1578059 | 0.28179650 | 2.3041583 | 20 | — | — |
| 57159 2001 $QM_{15}$ | 15.4 | $X$ | 54.27936 | 297.26611 | 110.96673 | 5.68029 | 0.1447984 | 0.27938571 | 2.3173943 | 20 | — | — |
| 57160 2001 $QW_{15}$ | 14.9 | $X$ | 151.47201 | 1.90923 | 19.69900 | 3.74521 | 0.1898823 | 0.23732390 | 2.5836979 | 20 | 3 8.5 | 19.0 |
| 57161 2001 $QX_{15}$ | 14.7 | $X$ | 0.27263 | 43.83555 | 346.75457 | 7.85365 | 0.2219768 | 0.21568654 | 2.7537257 | 20 | 12 31.6 | 17.9 |
| 57162 2001 $QM_{16}$ | 15.1 | $X$ | 173.20309 | 305.30337 | 108.37126 | 5.73800 | 0.1883335 | 0.24391638 | 2.5369315 | 20 | 5 6.9 | 19.3 |
| 57163 2001 $QL_{17}$ | 15.3 | $X$ | 337.39107 | 347.53060 | 85.59514 | 4.12285 | 0.1566942 | 0.27226901 | 2.3576025 | 20 | — | — |
| 57164 2001 $QO_{17}$ | 14.7 | $X$ | 114.62659 | 303.21305 | 127.33619 | 8.53155 | 0.1756012 | 0.23873967 | 2.5734733 | 20 | 4 2.4 | 18.5 |
| 57165 2001 $QK_{18}$ | 16.1 | $X$ | 184.50540 | 243.10237 | 145.89103 | 3.64839 | 0.1666728 | 0.24215427 | 2.5492238 | 20 | 4 15.2 | 20.2 |
| 57166 2001 $QN_{18}$ | 15.6 | $X$ | 7.63672 | 8.95911 | 348.41796 | 10.23860 | 0.0959168 | 0.26569069 | 2.3963587 | 20 | 11 20.1 | 18.5 |
| 57167 2001 $QV_{18}$ | 15.4 | $X$ | 17.12640 | 212.31756 | 145.30507 | 6.02045 | 0.1561805 | 0.26677316 | 2.3898719 | 20 | 12 18.2 | 18.2 |
| 57168 2001 $QE_{19}$ | 16.6 | $X$ | 147.45299 | 38.39473 | 318.34458 | 2.28308 | 0.0592265 | 0.28594962 | 2.2817936 | 20 | 1 11.6 | 19.5 |
| 57169 2001 $QN_{19}$ | 14.6 | $X$ | 70.04206 | 125.15427 | 320.14758 | 5.13399 | 0.0784960 | 0.23342426 | 2.6123943 | 20 | 2 4.6 | 17.6 |
| 57170 2001 $QB_{20}$ | 15.4 | $X$ | 143.20031 | 358.32562 | 51.06413 | 1.92656 | 0.1473382 | 0.23845438 | 2.5755254 | 20 | 3 30.8 | 19.3 |
| 57171 2001 $QT_{20}$ | 15.3 | $X$ | 114.28188 | 51.63439 | 334.10341 | 5.11536 | 0.2188558 | 0.28312735 | 2.2969321 | 20 | 2 1.6 | 18.0 |
| 57172 2001 $QY_{20}$ | 14.8 | $X$ | 197.09711 | 185.72447 | 172.47710 | 15.27857 | 0.1110714 | 0.24004599 | 2.5641283 | 20 | 3 18.6 | 18.7 |
| 57173 2001 $QE_{22}$ | 14.7 | $X$ | 82.85340 | 247.03364 | 168.38170 | 12.65856 | 0.1689190 | 0.22853373 | 2.6495320 | 20 | 1 26.6 | 18.0 |
| 57174 2001 $QZ_{22}$ | 15.2 | $X$ | 69.72164 | 319.49713 | 61.38544 | 4.32692 | 0.2519568 | 0.22396493 | 2.6854436 | 20 | — | — |
| 57175 2001 $QD_{24}$ | 15.6 | $X$ | 296.82021 | 287.60150 | 111.89592 | 3.09330 | 0.2061130 | 0.25877149 | 2.4388875 | 20 | 9 7.9 | 17.9 |
| 57176 2001 $QP_{24}$ | 14.0 | $X$ | 263.01371 | 173.77861 | 353.42670 | 11.75750 | 0.0998243 | 0.27479612 | 2.3431260 | 20 | — | — |
| 57177 2001 $QV_{24}$ | 15.9 | $X$ | 298.71280 | 206.34488 | 117.55883 | 4.74809 | 0.1900855 | 0.30431101 | 2.1890597 | 20 | 5 19.6 | 18.2 |
| 57178 2001 $QC_{25}$ | 15.2 | $X$ | 101.79978 | 258.27621 | 115.47043 | 4.85798 | 0.2284174 | 0.22751783 | 2.6574132 | 20 | 1 10.7 | 18.6 |
| 57179 2001 $QW_{25}$ | 15.1 | $X$ | 325.08145 | 262.29020 | 124.86516 | 7.93790 | 0.2268817 | 0.26067413 | 2.4270055 | 20 | 10 31.4 | 16.8 |
| 57180 2001 $QK_{27}$ | 14.7 | $X$ | 96.72385 | 339.71709 | 150.02416 | 13.88626 | 0.0984344 | 0.24434700 | 2.5339500 | 20 | 5 18.4 | 18.4 |
| 57181 2001 $QU_{28}$ | 15.0 | $X$ | 50.43075 | 5.90673 | 28.29640 | 2.24874 | 0.1852612 | 0.21963852 | 2.7205938 | 20 | — | — |
| 57182 2001 $QA_{29}$ | 14.5 | $X$ | 41.17647 | 147.48879 | 215.24367 | 2.80404 | 0.0657764 | 0.21426659 | 2.7658783 | 20 | 12 28.1 | 18.2 |
| 57183 2001 $QG_{29}$ | 14.2 | $X$ | 183.14768 | 189.23359 | 168.85746 | 8.71414 | 0.3051402 | 0.18414097 | 3.0598662 | 20 | 3 12.2 | 19.6 |
| 57184 2001 $QP_{29}$ | 14.0 | $X$ | 148.98099 | 197.37404 | 189.65029 | 11.76591 | 0.1686439 | 0.23309168 | 2.6148786 | 20 | 3 8.7 | 18.2 |
| 57185 2001 $QB_{30}$ | 14.4 | $X$ | 16.94470 | 9.84779 | 20.57852 | 7.46677 | 0.2156237 | 0.21374011 | 2.7704184 | 20 | — | — |
| 57186 2001 $QK_{30}$ | 14.7 | $X$ | 11.59480 | 350.29098 | 17.53988 | 6.95201 | 0.1279455 | 0.26304902 | 2.4123756 | 20 | 12 17.7 | 17.6 |
| 57187 2001 $QP_{30}$ | 14.2 | $X$ | 65.26976 | 306.06808 | 66.59580 | 2.94016 | 0.0925737 | 0.21853319 | 2.7297599 | 20 | — | — |
| 57188 2001 $QW_{30}$ | 14.6 | $X$ | 344.67609 | 332.90989 | 23.39754 | 7.00883 | 0.1356385 | 0.25740541 | 2.4475089 | 20 | 10 16.1 | 16.9 |
| 57189 2001 $QX_{30}$ | 14.4 | $X$ | 24.93024 | 349.93412 | 37.82657 | 5.70714 | 0.1613888 | 0.21415393 | 2.7668483 | 20 | — | — |
| 57190 2001 $QM_{31}$ | 14.6 | $X$ | 140.03909 | 259.67077 | 131.39382 | 3.95580 | 0.2291512 | 0.23350119 | 2.6118204 | 20 | 3 13.2 | 18.7 |
| 57191 2001 $QY_{31}$ | 13.9 | $X$ | 199.29056 | 339.19502 | 45.26634 | 11.67000 | 0.2315773 | 0.18806222 | 3.0171832 | 20 | 4 23.5 | 19.1 |
| 57192 2001 $QO_{33}$ | 16.0 | $X$ | 339.37292 | 272.79862 | 141.76255 | 9.77353 | 0.2597859 | 0.26962572 | 2.3729860 | 20 | — | — |
| 57193 2001 $QF_{34}$ | 16.1 | $X$ | 347.57130 | 267.38064 | 104.75487 | 0.30121 | 0.2253393 | 0.26465773 | 2.4025900 | 20 | 11 29.1 | 17.9 |
| 57194 2001 $QP_{34}$ | 15.8 | $X$ | 18.98293 | 148.93634 | 258.79653 | 1.46283 | 0.2275841 | 0.27569478 | 2.3380315 | 20 | — | — |
| 57195 2001 $QV_{40}$ | 15.3 | $X$ | 132.41638 | 116.07340 | 312.12723 | 5.24613 | 0.2720919 | 0.24118861 | 2.5560235 | 20 | 4 20.4 | 19.7 |
| 57196 2001 $QS_{42}$ | 15.4 | $X$ | 157.89848 | 78.89937 | 336.61979 | 4.96522 | 0.2003259 | 0.24372037 | 2.5382915 | 20 | 4 22.1 | 19.5 |
| 57197 2001 $QL_{44}$ | 14.8 | $X$ | 347.57493 | 317.13943 | 109.37572 | 3.09173 | 0.2191326 | 0.22009689 | 2.7168153 | 20 | — | — |
| 57198 2001 $QO_{46}$ | 14.3 | $X$ | 63.68064 | 246.01107 | 220.76648 | 1.20865 | 0.2384754 | 0.18459992 | 3.0547924 | 20 | 3 23.1 | 17.8 |
| 57199 2001 $QS_{47}$ | 15.2 | $X$ | 310.07695 | 110.64619 | 303.71085 | 6.35501 | 0.1162111 | 0.26599648 | 2.3945218 | 20 | 11 4.4 | 17.7 |
| 57200 2001 $QS_{51}$ | 15.5 | $X$ | 342.99460 | 39.35600 | 12.77938 | 6.60759 | 0.2529198 | 0.21646856 | 2.7470896 | 20 | — | — |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57201 2001 $QL_{52}$ | 14.4 | $X$ | 327.14309 | 63.12304 | 332.39926 | 5.91788 | 0.0711897 | 0.21218578 | 2.7839315 | 20 | 10 24.7 | 17.9 |
| 57202 2001 $QJ_{53}$ | 15.5 | $X$ | 18.78085 | 36.69257 | 23.36944 | 4.24537 | 0.1564844 | 0.27576331 | 2.3376441 | 20 | — | — |
| 57203 2001 $QC_{54}$ | 15.7 | $X$ | 52.01818 | 30.12398 | 1.75739 | 4.50599 | 0.1763015 | 0.27643802 | 2.3338389 | 20 | — | — |
| 57204 2001 $QD_{54}$ | 14.8 | $X$ | 136.79425 | 358.44205 | 59.57919 | 3.65805 | 0.3003906 | 0.18527867 | 3.0473273 | 20 | 4 18.8 | 20.1 |
| 57205 2001 $QM_{55}$ | 15.8 | $X$ | 116.66467 | 21.88625 | 6.26669 | 6.92376 | 0.1261741 | 0.28579118 | 2.2826369 | 20 | 1 25.7 | 18.5 |
| 57206 2001 $QS_{56}$ | 16.2 | $X$ | 134.51576 | 42.41805 | 352.82854 | 5.49454 | 0.0921983 | 0.29035843 | 2.2586369 | 20 | 2 20.9 | 19.1 |
| 57207 2001 $QY_{56}$ | 16.1 | $X$ | 163.11787 | 286.74380 | 112.63422 | 7.39435 | 0.1116353 | 0.29484707 | 2.2356553 | 20 | 4 4.8 | 19.3 |
| 57208 2001 $QB_{57}$ | 14.8 | $X$ | 324.86758 | 350.87008 | 83.64686 | 4.68674 | 0.1785395 | 0.21717472 | 2.7411315 | 20 | 12 18.9 | 17.3 |
| 57209 2001 $QV_{58}$ | 14.6 | $X$ | 45.09754 | 213.52440 | 176.18614 | 8.01343 | 0.2213733 | 0.22425403 | 2.6831351 | 20 | — | — |
| 57210 2001 $QK_{59}$ | 15.3 | $X$ | 33.49304 | 182.26783 | 197.14089 | 6.08239 | 0.1332654 | 0.26964620 | 2.3728658 | 20 | — | — |
| 57211 2001 $QL_{60}$ | 15.4 | $X$ | 140.35521 | 72.14705 | 334.81275 | 6.61640 | 0.1492644 | 0.29063855 | 2.2571854 | 20 | 3 18.7 | 18.6 |
| 57212 2001 $QM_{60}$ | 13.8 | $X$ | 65.52949 | 98.61145 | 14.10192 | 12.25071 | 0.0451942 | 0.18520813 | 3.0481009 | 20 | 3 10.6 | 18.0 |
| 57213 2001 $QQ_{60}$ | 16.2 | $X$ | 109.36619 | 263.48115 | 102.29167 | 5.01146 | 0.1354304 | 0.28135926 | 2.3065449 | 20 | — | — |
| 57214 2001 $QC_{63}$ | 14.6 | $X$ | 76.85899 | 250.52973 | 155.47317 | 15.02051 | 0.2444785 | 0.17508467 | 3.1644918 | 20 | 1 27.6 | 18.7 |
| 57215 2001 $QA_{65}$ | 15.7 | $X$ | 165.24320 | 261.31945 | 85.80117 | 5.53478 | 0.1552044 | 0.28669019 | 2.2778625 | 20 | 1 31.3 | 19.1 |
| 57216 2001 $QD_{65}$ | 15.4 | $X$ | 16.82127 | 240.39757 | 121.38203 | 6.87658 | 0.1490595 | 0.26531733 | 2.3986063 | 20 | 12 21.8 | 18.2 |
| 57217 2001 $QJ_{66}$ | 15.3 | $X$ | 141.93050 | 93.92414 | 298.15446 | 4.46262 | 0.1635579 | 0.28867574 | 2.2674055 | 20 | 3 2.4 | 18.4 |
| 57218 2001 $QY_{69}$ | 15.4 | $X$ | 74.60311 | 103.86219 | 277.15779 | 5.46201 | 0.1450961 | 0.27729270 | 2.3290408 | 20 | — | — |
| 57219 2001 $QY_{71}$ | 13.9 | $X$ | 17.23969 | 41.06014 | 6.23326 | 15.21785 | 0.1442691 | 0.21758008 | 2.7377259 | 20 | — | — |
| 57220 2001 $QG_{72}$ | 14.0 | $X$ | 56.43093 | 6.12643 | 9.86658 | 17.46100 | 0.0998550 | 0.21980864 | 2.7191900 | 20 | — | — |
| 57221 2001 $QN_{74}$ | 15.3 | $X$ | 222.28237 | 137.77935 | 205.60067 | 2.92508 | 0.1498726 | 0.23883470 | 2.5727906 | 20 | 3 22.7 | 19.2 |
| 57222 2001 $QW_{74}$ | 15.5 | $X$ | 181.95747 | 321.47119 | 353.84460 | 6.81305 | 0.2304205 | 0.28321363 | 2.2964656 | 20 | 1 13.0 | 19.3 |
| 57223 2001 $QZ_{74}$ | 14.2 | $X$ | 103.89460 | 356.14580 | 17.19651 | 7.32925 | 0.2337974 | 0.17259263 | 3.1948800 | 20 | 1 24.6 | 18.9 |
| 57224 2001 $QF_{75}$ | 14.9 | $X$ | 135.73190 | 254.34834 | 20.51153 | 13.42662 | 0.1170588 | 0.26847715 | 2.3797491 | 20 | — | — |
| 57225 2001 $QG_{75}$ | 15.0 | $X$ | 200.90531 | 336.10229 | 19.92058 | 6.75950 | 0.1698725 | 0.23689206 | 2.5868369 | 20 | 3 20.5 | 19.3 |
| 57226 2001 $QN_{75}$ | 14.4 | $X$ | 251.57699 | 268.17640 | 22.22439 | 14.70902 | 0.0736679 | 0.23395968 | 2.6084071 | 20 | 2 29.2 | 18.3 |
| 57227 2001 $QR_{75}$ | 14.6 | $X$ | 138.77118 | 202.37813 | 166.60004 | 2.56735 | 0.1161432 | 0.22847881 | 2.6499566 | 20 | 2 1.4 | 18.3 |
| 57228 2001 $QY_{75}$ | 13.9 | $X$ | 267.94608 | 269.99506 | 27.61225 | 13.22259 | 0.1670928 | 0.23876197 | 2.5733130 | 20 | 3 15.3 | 17.8 |
| 57229 2001 $QF_{76}$ | 13.9 | $X$ | 113.93764 | 36.79460 | 23.14290 | 13.27463 | 0.1816840 | 0.17728601 | 3.1382418 | 20 | 3 24.1 | 18.6 |
| 57230 2001 $QK_{77}$ | 14.7 | $X$ | 257.93406 | 191.56255 | 177.81558 | 4.92219 | 0.2029498 | 0.24612127 | 2.5217573 | 20 | 5 27.3 | 18.4 |
| 57231 2001 $QS_{77}$ | 14.1 | $X$ | 100.34129 | 248.76886 | 47.13293 | 5.87436 | 0.0581232 | 0.21116526 | 2.7928936 | 20 | 12 13.0 | 18.2 |
| 57232 2001 $QD_{78}$ | 14.1 | $X$ | 55.30019 | 165.96394 | 226.21689 | 10.52936 | 0.0836449 | 0.21773292 | 2.7364445 | 20 | — | — |
| 57233 2001 $QU_{79}$ | 14.8 | $X$ | 65.55255 | 270.56045 | 45.25027 | 7.32238 | 0.1041836 | 0.26324455 | 2.4111809 | 20 | 12 14.7 | 18.2 |
| 57234 2001 $QV_{79}$ | 15.1 | $X$ | 203.73507 | 188.95048 | 192.14410 | 1.13301 | 0.1372482 | 0.23915214 | 2.5705134 | 20 | 4 22.3 | 18.9 |
| 57235 2001 $QD_{80}$ | 14.3 | $X$ | 248.84948 | 256.93510 | 32.40349 | 15.42174 | 0.0712326 | 0.23222672 | 2.6213676 | 20 | 2 26.5 | 18.3 |
| 57236 2001 $QG_{80}$ | 13.6 | $X$ | 105.99497 | 331.65096 | 17.58433 | 12.31753 | 0.1695350 | 0.22077342 | 2.7112622 | 20 | — | — |
| 57237 2001 $QL_{80}$ | 14.2 | $X$ | 67.29042 | 106.20355 | 21.74651 | 5.66479 | 0.1427793 | 0.23075723 | 2.6324846 | 20 | 4 7.5 | 17.3 |
| 57238 2001 $QW_{80}$ | 15.6 | $X$ | 276.17111 | 30.37506 | 291.12401 | 6.03048 | 0.1981353 | 0.29970141 | 2.2114486 | 20 | 4 7.9 | 18.7 |
| 57239 2001 $QD_{81}$ | 15.6 | $X$ | 166.86789 | 34.99827 | 289.20015 | 6.41061 | 0.1325857 | 0.28275255 | 2.2989615 | 20 | 1 1.2 | 18.9 |
| 57240 2001 $QB_{83}$ | 15.2 | $X$ | 161.21104 | 82.06344 | 258.26277 | 3.69372 | 0.1865398 | 0.28339965 | 2.2954606 | 20 | 1 19.9 | 18.7 |
| 57241 2001 $QC_{83}$ | 15.9 | $X$ | 339.91531 | 55.67272 | 264.11482 | 2.94495 | 0.1598123 | 0.30707384 | 2.1759096 | 20 | 8 16.9 | 17.3 |
| 57242 2001 $QK_{83}$ | 14.8 | $X$ | 170.74138 | 50.07337 | 341.40680 | 13.18458 | 0.1643423 | 0.23758478 | 2.5818062 | 20 | 3 30.9 | 19.2 |
| 57243 2001 $QH_{84}$ | 14.4 | $X$ | 65.75935 | 102.67014 | 353.41163 | 14.40870 | 0.1014677 | 0.22926619 | 2.6438859 | 20 | 2 19.9 | 17.6 |
| 57244 2001 $QK_{84}$ | 16.3 | $X$ | 174.91715 | 209.92523 | 179.32879 | 3.78686 | 0.0943736 | 0.29643627 | 2.2276579 | 20 | 3 30.6 | 19.4 |
| 57245 2001 $QQ_{84}$ | 14.5 | $X$ | 222.77769 | 343.87127 | 48.33199 | 1.51778 | 0.2510043 | 0.19070141 | 2.9892813 | 20 | 5 18.4 | 19.7 |
| 57246 2001 $QW_{84}$ | 15.8 | $X$ | 44.77542 | 352.69916 | 91.97716 | 6.43712 | 0.1285750 | 0.28481842 | 2.2878313 | 20 | — | — |
| 57247 2001 $QD_{86}$ | 14.0 | $X$ | 34.26098 | 278.10771 | 112.90746 | 16.44575 | 0.0955162 | 0.16935023 | 3.2355307 | 20 | — | — |
| 57248 2001 $QT_{91}$ | 14.2 | $X$ | 65.94167 | 103.60421 | 320.32985 | 28.32615 | 0.3290566 | 0.23012273 | 2.6373213 | 20 | 2 7.3 | 16.5 |
| 57249 2001 $QW_{93}$ | 13.6 | $X$ | 48.23546 | 316.03823 | 332.59601 | 14.44472 | 0.1328719 | 0.20540367 | 2.8448798 | 20 | 10 6.1 | 17.7 |
| 57250 2001 $QQ_{94}$ | 15.7 | $X$ | 267.29478 | 267.22203 | 177.91779 | 2.09337 | 0.0683713 | 0.26162546 | 2.4211185 | 20 | 10 14.9 | 18.5 |
| 57251 2001 $QO_{96}$ | 15.0 | $X$ | 128.28066 | 83.08583 | 351.82994 | 7.20319 | 0.1792892 | 0.23674089 | 2.5879380 | 20 | 4 16.9 | 19.0 |
| 57252 2001 $QS_{96}$ | 13.4 | $X$ | 11.04941 | 172.28154 | 1.37061 | 13.84486 | 0.0904356 | 0.23565871 | 2.5958547 | 20 | 3 5.1 | 16.3 |
| 57253 2001 $QT_{99}$ | 13.6 | $X$ | 23.02284 | 55.96357 | 73.76395 | 27.41135 | 0.1886147 | 0.17610864 | 3.1522133 | 20 | 2 9.9 | 17.6 |
| 57254 2001 $QO_{103}$ | 14.8 | $X$ | 333.15838 | 86.61205 | 7.45319 | 3.43027 | 0.0363385 | 0.22276572 | 2.6950727 | 20 | — | — |
| 57255 2001 $QR_{103}$ | 15.8 | $X$ | 237.43393 | 298.87900 | 34.03414 | 6.26257 | 0.1953752 | 0.29653468 | 2.2271650 | 20 | 3 20.3 | 19.3 |
| 57256 2001 $QF_{104}$ | 14.8 | $X$ | 187.00246 | 53.12911 | 345.19973 | 4.80588 | 0.2220075 | 0.24216874 | 2.5491222 | 20 | 4 25.9 | 19.2 |
| 57257 2001 $QG_{104}$ | 15.2 | $X$ | 192.63914 | 4.35313 | 9.33474 | 5.61840 | 0.1778025 | 0.24094593 | 2.5577395 | 20 | 4 1.9 | 19.2 |
| 57258 2001 $QX_{104}$ | 15.2 | $X$ | 221.23745 | 100.15790 | 239.87010 | 7.52854 | 0.1427431 | 0.23824995 | 2.5769985 | 20 | 3 15.2 | 19.4 |
| 57259 2001 $QO_{105}$ | 14.8 | $X$ | 3.26466 | 351.24444 | 1.92651 | 5.04276 | 0.1235851 | 0.20692550 | 2.8309142 | 20 | 10 28.9 | 18.1 |
| 57260 2001 $QE_{106}$ | 15.0 | $X$ | 110.59332 | 193.51529 | 246.60119 | 10.76322 | 0.2127840 | 0.23697975 | 2.5861987 | 20 | 4 7.7 | 19.0 |
| 57261 2001 $QO_{106}$ | 16.0 | $X$ | 23.14833 | 233.24523 | 192.95259 | 6.74551 | 0.0882551 | 0.27836416 | 2.3230604 | 20 | — | — |
| 57262 2001 $QS_{106}$ | 14.8 | $X$ | 306.31682 | 153.12867 | 283.35140 | 9.56156 | 0.1162746 | 0.26717609 | 2.3874685 | 20 | 12 3.1 | 17.2 |
| 57263 2001 $QM_{109}$ | 14.6 | $X$ | 102.74209 | 342.05016 | 60.01028 | 9.61036 | 0.1758967 | 0.17850425 | 3.1239471 | 20 | 2 19.9 | 19.2 |
| 57264 2001 $QP_{113}$ | 13.5 | $X$ | 136.86772 | 59.52870 | 4.98354 | 10.13583 | 0.1186726 | 0.18513585 | 3.0488942 | 20 | 4 10.1 | 18.3 |
| 57265 2001 $QR_{119}$ | 15.5 | $X$ | 270.12265 | 327.55107 | 91.28982 | 3.65419 | 0.1578650 | 0.25810533 | 2.4430821 | 20 | 8 28.8 | 18.4 |
| 57266 2001 $QM_{121}$ | 16.3 | $X$ | 145.37978 | 90.24152 | 349.34307 | 6.03926 | 0.1217513 | 0.29836880 | 2.2180284 | 20 | 5 3.9 | 19.4 |
| 57267 2001 $QE_{122}$ | 15.4 | $X$ | 164.50540 | 332.69788 | 79.37697 | 3.86073 | 0.1718873 | 0.24358111 | 2.5392589 | 20 | 4 25.8 | 19.4 |
| 57268 2001 $QP_{123}$ | 16.0 | $X$ | 351.51964 | 8.63291 | 64.63112 | 3.88681 | 0.1084730 | 0.27453200 | 2.3446287 | 20 | — | — |
| 57269 2001 $QJ_{131}$ | 14.2 | $X$ | 323.08910 | 294.99332 | 173.81882 | 21.64073 | 0.0967926 | 0.22234700 | 2.6984551 | 20 | — | — |
| 57270 2001 $QT_{134}$ | 15.0 | $X$ | 356.92292 | 96.40201 | 311.41533 | 8.03876 | 0.1677772 | 0.21460923 | 2.7629337 | 20 | — | — |
| 57271 2001 $QC_{137}$ | 14.0 | $X$ | 204.32593 | 129.66898 | 277.90282 | 8.40761 | 0.0691573 | 0.19145332 | 2.9814494 | 20 | 5 29.4 | 18.6 |
| 57272 2001 $QE_{137}$ | 14.5 | $X$ | 91.86417 | 96.16126 | 2.26898 | 25.28879 | 0.2625431 | 0.17857503 | 3.1231216 | 20 | 4 14.1 | 19.3 |
| 57273 2001 $QR_{137}$ | 14.2 | $X$ | 175.15471 | 40.99253 | 314.64943 | 8.07172 | 0.1096958 | 0.23349818 | 2.6118429 | 20 | 2 21.1 | 18.1 |
| 57274 2001 $QQ_{138}$ | 15.3 | $X$ | 187.69616 | 284.09207 | 305.94385 | 5.53367 | 0.0677938 | 0.26858013 | 2.3791407 | 20 | — | — |
| 57275 2001 $QE_{139}$ | 14.5 | $X$ | 234.25069 | 358.72277 | 333.61984 | 12.47025 | 0.2445743 | 0.24032403 | 2.5621502 | 20 | 3 12.8 | 18.9 |
| 57276 2001 $QP_{139}$ | 12.9 | $X$ | 284.36998 | 60.30542 | 298.45060 | 9.51371 | 0.1635688 | 0.19610303 | 2.9341334 | 20 | 6 19.7 | 17.0 |
| 57277 2001 $QV_{139}$ | 14.1 | $X$ | 54.81762 | 73.72573 | 283.72674 | 7.92757 | 0.1735154 | 0.21504225 | 2.7592233 | 20 | — | — |
| 57278 2001 $QZ_{140}$ | 15.3 | $X$ | 14.38681 | 27.46847 | 299.17939 | 6.68647 | 0.1444888 | 0.25857584 | 2.4401176 | 20 | 10 24.1 | 18.1 |
| 57279 2001 $QU_{147}$ | 14.6 | $X$ | 128.99053 | 179.21846 | 127.99766 | 14.65346 | 0.1045645 | 0.21964367 | 2.7205513 | 20 | — | — |
| 57280 2001 $QO_{148}$ | 16.5 | $X$ | 174.44841 | 267.14241 | 68.84501 | 10.04256 | 0.0067611 | 0.28645137 | 2.2791283 | 20 | 1 12.8 | 19.3 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57281 2001 $QP_{148}$ | 14.9 | X | 201.56085 | 282.94239 | 81.03800 | 8.57588 | 0.2103936 | 0.24131011 | 2.5551655 | 20 | 4 2.1 | 19.3 |
| 57282 2001 $QX_{155}$ | 15.9 | X | 227.40636 | 114.00614 | 303.91220 | 4.98394 | 0.1172466 | 0.25259469 | 2.4784866 | 20 | 7 6.3 | 19.4 |
| 57283 2001 $QZ_{156}$ | 16.1 | X | 89.40198 | 136.86434 | 287.42330 | 4.57550 | 0.1375863 | 0.28673216 | 2.2776402 | 20 | 2 3.1 | 18.3 |
| 57284 2001 $QB_{157}$ | 15.6 | X | 19.50958 | 219.93520 | 177.66242 | 8.77133 | 0.0365884 | 0.27430743 | 2.3459081 | 20 | — | — |
| 57285 2001 $QR_{158}$ | 15.2 | X | 29.69605 | 60.20475 | 328.70575 | 9.20081 | 0.2121646 | 0.21936027 | 2.7228940 | 20 | — | — |
| 57286 2001 $QQ_{159}$ | 16.1 | X | 49.49465 | 259.32447 | 144.09228 | 6.28286 | 0.1285326 | 0.27758531 | 2.3274038 | 20 | — | — |
| 57287 2001 $QC_{163}$ | 15.6 | X | 127.53724 | 73.72070 | 342.91407 | 4.35720 | 0.1944118 | 0.23710728 | 2.5852713 | 20 | 3 26.9 | 19.5 |
| 57288 2001 $QZ_{163}$ | 13.8 | X | 338.73087 | 184.94474 | 1.55530 | 9.95534 | 0.0316805 | 0.17790841 | 3.1309182 | 20 | 2 16.3 | 18.1 |
| 57289 2001 $QP_{165}$ | 15.7 | X | 359.90130 | 327.69488 | 72.83430 | 7.58722 | 0.1020168 | 0.27124700 | 2.3635208 | 20 | — | — |
| 57290 2001 $QM_{169}$ | 13.3 | X | 79.62807 | 92.61979 | 273.62104 | 17.39398 | 0.0823953 | 0.16990586 | 3.2284729 | 20 | — | — |
| 57291 2001 $QQ_{172}$ | 14.1 | X | 75.78230 | 238.96567 | 215.15843 | 10.82336 | 0.1514555 | 0.18362139 | 3.0656356 | 20 | 3 8.7 | 18.3 |
| 57292 2001 $QV_{174}$ | 13.9 | X | 270.81079 | 256.57339 | 136.88560 | 11.76439 | 0.3493117 | 0.19864282 | 2.9090698 | 20 | 6 22.0 | 18.5 |
| 57293 2001 $QY_{178}$ | 15.1 | X | 316.62567 | 280.96929 | 142.14919 | 6.12954 | 0.0907090 | 0.26286544 | 2.4134986 | 20 | 12 2.6 | 17.7 |
| 57294 2001 $QC_{179}$ | 15.0 | X | 329.30310 | 240.33886 | 142.20772 | 6.63126 | 0.1056735 | 0.25824396 | 2.4422077 | 20 | 10 27.9 | 17.6 |
| 57295 2001 $QX_{181}$ | 14.1 | X | 149.18896 | 55.95443 | 351.32195 | 10.66209 | 0.1475624 | 0.18428674 | 3.0582524 | 20 | 4 2.9 | 19.0 |
| 57296 2001 $QE_{186}$ | 14.5 | X | 162.66609 | 150.45187 | 284.41888 | 13.40269 | 0.1342541 | 0.24403231 | 2.5361280 | 20 | 5 18.4 | 18.7 |
| 57297 2001 $QB_{188}$ | 14.8 | X | 175.43657 | 209.68824 | 237.50651 | 9.78665 | 0.1346444 | 0.24747816 | 2.5125312 | 20 | 6 17.9 | 18.8 |
| 57298 2001 $QE_{193}$ | 14.8 | X | 150.07482 | 103.86651 | 289.47356 | 10.82944 | 0.0298149 | 0.23717561 | 2.5847748 | 20 | 2 29.6 | 18.6 |
| 57299 2001 $QM_{194}$ | 14.9 | X | 291.34305 | 232.99922 | 235.34236 | 10.75557 | 0.1104309 | 0.21417232 | 2.7666899 | 20 | 12 5.3 | 18.2 |
| 57300 2001 $QP_{196}$ | 15.9 | X | 115.54956 | 237.18977 | 201.37557 | 4.39008 | 0.2546927 | 0.23784868 | 2.5798961 | 20 | 4 19.4 | 19.9 |
| 57301 2001 $QY_{197}$ | 14.9 | X | 302.07355 | 278.81188 | 245.88982 | 6.10034 | 0.0447092 | 0.27449062 | 2.3448643 | 20 | — | — |
| 57302 2001 $QE_{198}$ | 14.9 | X | 356.23196 | 67.18141 | 327.70276 | 4.38598 | 0.1440324 | 0.21067170 | 2.7972540 | 20 | 12 16.7 | 18.3 |
| 57303 2001 $QL_{198}$ | 14.0 | X | 236.83908 | 146.23373 | 235.01067 | 8.57303 | 0.1291655 | 0.19140433 | 2.9819581 | 20 | 5 27.5 | 18.5 |
| 57304 2001 $QV_{198}$ | 14.0 | X | 135.79143 | 176.14747 | 199.20293 | 7.12249 | 0.1726228 | 0.17650562 | 3.1474851 | 20 | 2 16.2 | 19.0 |
| 57305 2001 $QJ_{199}$ | 13.5 | X | 169.35124 | 15.67479 | 51.18565 | 10.57870 | 0.0533300 | 0.18614119 | 3.0379064 | 20 | 5 15.0 | 17.9 |
| 57306 2001 $QB_{200}$ | 15.0 | X | 149.15782 | 38.58549 | 270.63423 | 2.89452 | 0.0790416 | 0.22133539 | 2.7066711 | 20 | — | — |
| 57307 2001 $QS_{200}$ | 14.0 | X | 215.00920 | 355.81632 | 53.64186 | 10.79968 | 0.0826274 | 0.18978637 | 2.9988819 | 20 | 6 11.3 | 18.5 |
| 57308 2001 $QL_{201}$ | 15.7 | X | 46.23069 | 327.32569 | 177.57337 | 23.94226 | 0.1609362 | 0.29090375 | 2.2558134 | 20 | 3 20.7 | 17.5 |
| 57309 2001 $QT_{206}$ | 15.7 | X | 125.86179 | 61.82751 | 26.00196 | 2.64234 | 0.1433936 | 0.24223069 | 2.5486876 | 20 | 4 29.1 | 19.5 |
| 57310 2001 $QE_{211}$ | 15.8 | X | 107.56991 | 242.58359 | 209.88024 | 2.76671 | 0.1115460 | 0.23929362 | 2.5695001 | 20 | 4 9.7 | 19.3 |
| 57311 2001 $QR_{214}$ | 15.9 | X | 118.30902 | 86.94390 | 342.47291 | 7.53089 | 0.0793672 | 0.29115368 | 2.2545223 | 20 | 3 13.5 | 18.5 |
| 57312 2001 $QM_{216}$ | 15.6 | X | 308.80124 | 55.16304 | 22.47399 | 4.34042 | 0.0650394 | 0.26754880 | 2.3852508 | 20 | 12 9.5 | 18.1 |
| 57313 2001 $QM_{220}$ | 16.5 | X | 118.25862 | 227.86358 | 180.30403 | 5.52879 | 0.0859801 | 0.28751993 | 2.2734780 | 20 | 2 14.1 | 19.2 |
| 57314 2001 $QK_{226}$ | 14.5 | X | 35.22813 | 215.74274 | 285.23544 | 5.87058 | 0.0726210 | 0.23651553 | 2.5895816 | 20 | 2 22.3 | 17.5 |
| 57315 2001 $QC_{233}$ | 16.1 | X | 20.41336 | 226.05396 | 172.52468 | 3.61128 | 0.0431690 | 0.27259253 | 2.3557367 | 20 | — | — |
| 57316 2001 $QD_{233}$ | 14.5 | X | 164.25447 | 265.59993 | 172.90464 | 8.42193 | 0.2189538 | 0.19067806 | 2.9895253 | 20 | 5 30.4 | 19.8 |
| 57317 2001 $QF_{235}$ | 15.9 | X | 321.21650 | 216.14469 | 175.89302 | 0.94017 | 0.1921578 | 0.26136068 | 2.4227534 | 20 | 10 24.9 | 17.7 |
| 57318 2001 $QT_{237}$ | 15.2 | X | 281.38046 | 243.36303 | 156.77590 | 3.15940 | 0.1935750 | 0.25597294 | 2.4566315 | 20 | 8 10.7 | 17.8 |
| 57319 2001 $QX_{237}$ | 15.2 | X | 60.58553 | 93.15105 | 355.40038 | 13.24983 | 0.1485613 | 0.23035552 | 2.6355442 | 20 | 2 7.4 | 18.2 |
| 57320 2001 $QN_{239}$ | 15.5 | X | 294.03347 | 271.05362 | 148.09727 | 3.15478 | 0.1596844 | 0.26222560 | 2.4174231 | 20 | 10 10.8 | 17.6 |
| 57321 2001 $QV_{239}$ | 15.0 | X | 205.63088 | 340.46084 | 176.52212 | 5.99837 | 0.0802756 | 0.26233166 | 2.4167715 | 20 | 10 28.5 | 18.2 |
| 57322 2001 $QX_{239}$ | 15.3 | X | 118.49593 | 242.23076 | 201.29543 | 6.98278 | 0.1610186 | 0.23740161 | 2.5831340 | 20 | 4 18.2 | 19.0 |
| 57323 2001 $QN_{240}$ | 13.8 | X | 281.33985 | 128.74896 | 338.36886 | 9.08045 | 0.1484178 | 0.21123086 | 2.7923154 | 20 | 11 8.4 | 17.3 |
| 57324 2001 $QX_{240}$ | 15.7 | X | 355.52954 | 157.60967 | 335.38418 | 3.25718 | 0.0539561 | 0.22935069 | 2.6432365 | 20 | — | — |
| 57325 2001 $QS_{241}$ | 15.6 | X | 234.52697 | 317.32349 | 166.60958 | 8.87062 | 0.1134599 | 0.26202608 | 2.4186501 | 20 | 10 16.8 | 18.8 |
| 57326 2001 $QY_{241}$ | 15.5 | X | 314.43911 | 115.20654 | 6.96199 | 4.74851 | 0.0908764 | 0.27344289 | 2.3508502 | 20 | — | — |
| 57327 2001 $QY_{242}$ | 16.6 | X | 8.01032 | 257.29111 | 6.72634 | 4.65294 | 0.0777068 | 0.30433926 | 2.1889242 | 20 | 7 10.5 | 18.6 |
| 57328 2001 $QC_{243}$ | 16.1 | X | 123.84512 | 22.73815 | 167.96020 | 8.01360 | 0.0426927 | 0.25649460 | 2.4532995 | 20 | 9 3.5 | 19.4 |
| 57329 2001 $QE_{245}$ | 15.4 | X | 58.71390 | 265.32609 | 170.25717 | 13.57170 | 0.1447709 | 0.22751124 | 2.6574645 | 20 | 1 11.1 | 18.6 |
| 57330 2001 $QR_{245}$ | 14.4 | X | 54.68371 | 241.95617 | 180.07816 | 14.65541 | 0.0799764 | 0.22560353 | 2.6724246 | 20 | — | — |
| 57331 2001 $QU_{245}$ | 14.4 | X | 93.72078 | 269.72233 | 183.71987 | 25.38768 | 0.2303701 | 0.18021732 | 3.1041191 | 20 | 4 16.6 | 19.0 |
| 57332 2001 $QL_{246}$ | 14.4 | X | 28.64498 | 59.86342 | 10.76592 | 14.00403 | 0.1911568 | 0.22114980 | 2.7081852 | 20 | — | — |
| 57333 2001 $QX_{246}$ | 14.8 | X | 69.11946 | 304.79025 | 164.95004 | 13.46529 | 0.1968457 | 0.23187341 | 2.6240297 | 20 | 3 26.4 | 17.7 |
| 57334 2001 $QH_{252}$ | 15.3 | X | 184.17313 | 17.64356 | 36.97136 | 2.92161 | 0.2188210 | 0.24553013 | 2.5258032 | 20 | 5 15.2 | 19.5 |
| 57335 2001 $QY_{254}$ | 14.7 | X | 40.98128 | 49.63674 | 22.42347 | 12.03576 | 0.1734893 | 0.22836743 | 2.6508181 | 20 | — | — |
| 57336 2001 $QN_{256}$ | 16.0 | X | 56.52975 | 294.79421 | 127.53170 | 6.98879 | 0.0854334 | 0.27999644 | 2.3140232 | 20 | — | — |
| 57337 2001 $QD_{257}$ | 15.3 | X | 333.70239 | 43.74271 | 32.95387 | 7.35498 | 0.0978699 | 0.26901820 | 2.3765572 | 20 | — | — |
| 57338 2001 $QT_{259}$ | 15.1 | X | 144.97953 | 154.31268 | 200.62409 | 11.25226 | 0.2474310 | 0.23173656 | 2.6250627 | 20 | 1 31.8 | 19.6 |
| 57339 2001 $QG_{260}$ | 15.4 | X | 230.25910 | 221.26931 | 269.36975 | 5.53856 | 0.0995115 | 0.26236169 | 2.4165870 | 20 | 10 17.7 | 18.7 |
| 57340 2001 $QF_{262}$ | 14.8 | X | 22.02125 | 156.95275 | 295.13107 | 7.94845 | 0.1329387 | 0.22497842 | 2.6773726 | 20 | — | — |
| 57341 2001 $QR_{263}$ | 13.8 | X | 27.11361 | 162.01950 | 329.37182 | 14.93022 | 0.2276479 | 0.17510387 | 3.1642605 | 20 | 2 15.4 | 16.8 |
| 57342 2001 $QJ_{264}$ | 14.6 | X | 356.79047 | 274.20117 | 153.34664 | 9.52460 | 0.1224009 | 0.26753593 | 2.3853272 | 20 | — | — |
| 57343 2001 $QH_{269}$ | 14.0 | X | 155.44449 | 135.51072 | 300.69419 | 13.99973 | 0.1603280 | 0.24207959 | 2.5497480 | 20 | 5 12.5 | 18.3 |
| 57344 2001 $QN_{269}$ | 14.6 | X | 32.54941 | 318.57136 | 92.25786 | 4.30980 | 0.0914881 | 0.21857661 | 2.7293983 | 20 | — | — |
| 57345 2001 $QG_{275}$ | 16.1 | X | 299.24846 | 324.36013 | 106.31550 | 4.66128 | 0.1368493 | 0.26703349 | 2.3883184 | 20 | 11 12.0 | 18.3 |
| 57346 2001 $QV_{277}$ | 15.5 | X | 280.85163 | 267.28129 | 92.83408 | 6.88339 | 0.1362921 | 0.25277082 | 2.4773351 | 20 | 6 22.3 | 18.4 |
| 57347 2001 $QQ_{279}$ | 14.3 | X | 263.27665 | 241.34431 | 89.23740 | 13.08888 | 0.0587838 | 0.19499895 | 2.9451982 | 20 | 5 6.6 | 18.6 |
| 57348 2001 $QW_{281}$ | 13.5 | X | 270.13915 | 331.72130 | 301.78581 | 18.28157 | 0.2431570 | 0.23919466 | 2.5702087 | 20 | 2 2.2 | 17.6 |
| 57349 2001 $QC_{282}$ | 14.5 | X | 192.74345 | 309.18126 | 83.10453 | 14.81304 | 0.1660653 | 0.24145970 | 2.5541101 | 20 | 4 30.9 | 18.8 |
| 57350 2001 $QU_{285}$ | 14.8 | X | 284.82286 | 61.74490 | 38.77679 | 9.98637 | 0.1126964 | 0.21447817 | 2.7640590 | 20 | 11 13.2 | 18.1 |
| 57351 2001 $QC_{287}$ | 15.9 | X | 332.61302 | 236.99387 | 196.75349 | 5.65866 | 0.0751122 | 0.27068382 | 2.3667980 | 20 | — | — |
| 57352 2001 $QP_{287}$ | 15.4 | X | 9.80960 | 217.34382 | 182.70078 | 6.59747 | 0.1006172 | 0.27071134 | 2.3666375 | 20 | — | — |
| 57353 2001 $QM_{288}$ | 13.7 | X | 144.79269 | 130.83237 | 247.41864 | 12.83699 | 0.0462983 | 0.18263413 | 3.0766736 | 20 | 2 12.2 | 18.4 |
| 57354 2001 $QB_{292}$ | 15.3 | X | 150.40280 | 177.82973 | 215.81493 | 2.72831 | 0.1415402 | 0.23536292 | 2.5980291 | 20 | 3 16.6 | 19.2 |
| 57355 2001 $QJ_{292}$ | 14.5 | X | 316.13087 | 230.47683 | 211.10819 | 11.74659 | 0.0756802 | 0.21152855 | 2.7896949 | 20 | 12 10.1 | 18.0 |
| 57356 2001 $QG_{293}$ | 13.4 | X | 32.20432 | 75.90360 | 274.42912 | 22.22712 | 0.2354204 | 0.26495348 | 2.4008017 | 20 | — | — |
| 57357 2001 $QZ_{296}$ | 14.9 | X | 179.77630 | 199.30981 | 196.51538 | 4.24231 | 0.0732958 | 0.23882869 | 2.5728337 | 20 | 4 16.5 | 18.6 |
| 57358 2001 $QB_{297}$ | 15.3 | X | 71.32334 | 315.82896 | 29.07971 | 7.21857 | 0.0819087 | 0.26945940 | 2.3739624 | 20 | — | — |
| 57359 Robcrawford | 13.6 | X | 172.05104 | 73.80362 | 18.47675 | 22.17320 | 0.1254775 | 0.24038909 | 2.5616879 | 20 | 6 18.9 | 18.1 |
| 57360 2001 $RJ_4$ | 15.1 | X | 268.71525 | 178.94952 | 298.28274 | 6.64254 | 0.1562725 | 0.26810454 | 2.3819535 | 20 | 11 18.2 | 17.6 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57361 2001 $RE_{17}$ | 15.0 | $X$ | 274.52839 | 319.48509 | 162.70078 | 5.89389 | 0.0578302 | 0.21456416 | 2.7633205 | 20 | 12 4.8 | 18.7 |
| 57362 2001 $RO_{20}$ | 15.5 | $X$ | 57.34889 | 267.02562 | 170.39144 | 5.25416 | 0.1897773 | 0.28256861 | 2.2999591 | 20 | — | — |
| 57363 2001 $RD_{25}$ | 15.9 | $X$ | 285.51981 | 249.26051 | 180.62516 | 2.50973 | 0.0948968 | 0.26317419 | 2.4116106 | 20 | 10 18.8 | 18.3 |
| 57364 2001 $RU_{27}$ | 16.2 | $X$ | 286.90274 | 77.21884 | 347.49121 | 0.75458 | 0.1681735 | 0.26248660 | 2.4158203 | 20 | 10 2.5 | 18.4 |
| 57365 2001 $RJ_{33}$ | 15.5 | $X$ | 351.95344 | 232.49169 | 271.16552 | 5.95774 | 0.1311017 | 0.28724084 | 2.2749504 | 20 | — | — |
| 57366 2001 $RA_{35}$ | 16.0 | $X$ | 85.61458 | 231.05213 | 187.69749 | 6.22028 | 0.1077353 | 0.28571718 | 2.2830310 | 20 | 1 15.1 | 18.4 |
| 57367 2001 $RM_{43}$ | 14.5 | $X$ | 229.52141 | 30.92247 | 30.58899 | 8.43563 | 0.2539510 | 0.19549118 | 2.9402524 | 20 | 6 28.5 | 19.6 |
| 57368 2001 $RP_{44}$ | 14.1 | $X$ | 111.17465 | 251.78936 | 151.96053 | 14.44221 | 0.3025244 | 0.17538798 | 3.1608423 | 20 | 3 14.4 | 19.1 |
| 57369 2001 $RK_{45}$ | 14.7 | $X$ | 149.06240 | 190.20745 | 243.47572 | 3.15026 | 0.2052432 | 0.18638988 | 3.0352036 | 20 | 5 10.2 | 19.8 |
| 57370 2001 $RO_{45}$ | 15.5 | $X$ | 111.90698 | 236.70857 | 145.43032 | 5.27620 | 0.1400173 | 0.22899113 | 2.6460026 | 20 | 1 20.5 | 19.1 |
| 57371 2001 $RB_{48}$ | 14.1 | $X$ | 322.71608 | 214.51728 | 192.08053 | 5.75419 | 0.0481789 | 0.21059947 | 2.7978937 | 20 | 11 5.3 | 17.7 |
| 57372 2001 $RK_{48}$ | 15.3 | $X$ | 290.91562 | 326.60074 | 173.46832 | 5.84448 | 0.0956494 | 0.27052799 | 2.3677068 | 20 | — | — |
| 57373 2001 $RX_{52}$ | 15.3 | $X$ | 30.01142 | 328.86209 | 99.86720 | 3.90646 | 0.1597116 | 0.22463708 | 2.6800841 | 20 | — | — |
| 57374 2001 $RZ_{52}$ | 14.3 | $X$ | 93.34022 | 69.07315 | 29.80348 | 5.66795 | 0.1646932 | 0.18573018 | 3.0423865 | 20 | 4 12.0 | 18.4 |
| 57375 2001 $RK_{53}$ | 15.8 | $X$ | 297.47395 | 344.58032 | 107.04476 | 7.24051 | 0.0768914 | 0.26800626 | 2.3825358 | 20 | 12 11.9 | 18.3 |
| 57376 2001 $RK_{64}$ | 15.3 | $X$ | 145.53255 | 189.92938 | 248.42901 | 7.04901 | 0.1585089 | 0.24082329 | 2.5586078 | 20 | 5 8.4 | 19.3 |
| 57377 2001 $RS_{64}$ | 15.7 | $X$ | 50.04594 | 235.55934 | 271.16108 | 5.51777 | 0.0774884 | 0.29105976 | 2.2550072 | 20 | 3 17.8 | 18.1 |
| 57378 2001 $RD_{66}$ | 14.6 | $X$ | 349.51847 | 262.59795 | 219.48491 | 9.71291 | 0.1266558 | 0.22395205 | 2.6855466 | 20 | — | — |
| 57379 2001 $RS_{66}$ | 15.3 | $X$ | 346.47060 | 185.20079 | 301.34012 | 6.03160 | 0.0659481 | 0.27779024 | 2.3262590 | 20 | — | — |
| 57380 2001 $RY_{66}$ | 15.2 | $X$ | 239.85111 | 259.88558 | 265.95171 | 5.55105 | 0.0473614 | 0.26856095 | 2.3792540 | 20 | 12 29.1 | 17.9 |
| 57381 2001 $RL_{68}$ | 16.1 | $X$ | 359.30031 | 19.07747 | 235.51808 | 6.38387 | 0.0893118 | 0.30074258 | 2.2063417 | 20 | 6 6.9 | 18.0 |
| 57382 2001 $RS_{68}$ | 13.9 | $X$ | 180.03269 | 194.82529 | 239.41451 | 9.00434 | 0.0771398 | 0.19212555 | 2.9744909 | 20 | 6 5.8 | 18.4 |
| 57383 2001 $RP_{70}$ | 13.6 | $X$ | 180.62474 | 50.04357 | 329.27746 | 8.03776 | 0.0961065 | 0.18548615 | 3.0450545 | 20 | 3 27.9 | 18.4 |
| 57384 2001 $RR_{70}$ | 15.4 | $X$ | 268.05257 | 244.65076 | 308.75458 | 6.38338 | 0.0661051 | 0.27639461 | 2.3340832 | 20 | — | — |
| 57385 2001 $RU_{70}$ | 14.1 | $X$ | 150.95537 | 209.09493 | 240.33372 | 7.80579 | 0.0607000 | 0.18985881 | 2.9981190 | 20 | 5 23.2 | 18.4 |
| 57386 2001 $RX_{71}$ | 14.6 | $X$ | 38.93419 | 91.63374 | 4.16459 | 11.68809 | 0.1946944 | 0.17230229 | 3.1984681 | 20 | 1 25.2 | 18.3 |
| 57387 2001 $RG_{72}$ | 15.6 | $X$ | 119.11504 | 343.41353 | 331.89318 | 6.13938 | 0.1262096 | 0.27401860 | 2.3475563 | 20 | — | — |
| 57388 2001 $RQ_{72}$ | 14.4 | $X$ | 82.23022 | 97.76785 | 358.99299 | 4.15415 | 0.1386991 | 0.23257859 | 2.6187230 | 20 | 3 17.5 | 17.6 |
| 57389 2001 $RV_{75}$ | 15.6 | $X$ | 98.53938 | 196.47744 | 163.48316 | 2.92546 | 0.1948228 | 0.27556066 | 2.3387900 | 20 | — | — |
| 57390 2001 $RT_{76}$ | 14.6 | $X$ | 178.28035 | 140.64114 | 80.27543 | 5.64080 | 0.0372749 | 0.26374379 | 2.4081372 | 20 | 12 21.5 | 17.7 |
| 57391 2001 $RB_{77}$ | 13.9 | $X$ | 164.89293 | 205.75909 | 195.76121 | 15.77756 | 0.1650151 | 0.18255106 | 3.0776069 | 20 | 4 14.7 | 18.9 |
| 57392 2001 $RW_{77}$ | 14.6 | $X$ | 12.37986 | 325.59305 | 211.85996 | 14.40855 | 0.0715389 | 0.23534990 | 2.5981250 | 20 | 3 5.3 | 17.9 |
| 57393 2001 $RS_{78}$ | 14.8 | $X$ | 146.73445 | 247.32329 | 130.43785 | 2.79872 | 0.1081812 | 0.23010053 | 2.6374909 | 20 | 2 20.8 | 18.7 |
| 57394 2001 $RD_{84}$ | 15.5 | $X$ | 355.42296 | 140.92742 | 321.76519 | 3.64955 | 0.0584271 | 0.27807000 | 2.3246984 | 20 | — | — |
| 57395 2001 $RX_{84}$ | 16.1 | $X$ | 264.02325 | 171.22704 | 325.00955 | 7.31347 | 0.0861466 | 0.27014967 | 2.3699167 | 20 | 12 19.9 | 18.8 |
| 57396 2001 $RS_{86}$ | 15.8 | $X$ | 5.39667 | 275.04639 | 187.14402 | 5.84617 | 0.0716363 | 0.27758111 | 2.3274272 | 20 | — | — |
| 57397 2001 $RU_{86}$ | 15.0 | $X$ | 20.81669 | 95.06584 | 350.21210 | 3.54247 | 0.0788527 | 0.22434877 | 2.6823797 | 20 | — | — |
| 57398 2001 $RN_{87}$ | 15.9 | $X$ | 169.46715 | 356.00984 | 190.06359 | 5.98794 | 0.0315702 | 0.26229889 | 2.4169727 | 20 | 10 26.9 | 19.1 |
| 57399 2001 $RL_{89}$ | 15.2 | $X$ | 116.64302 | 65.96575 | 24.78501 | 4.88769 | 0.1695220 | 0.23832958 | 2.5764245 | 20 | 4 25.7 | 18.9 |
| 57400 2001 $RR_{90}$ | 16.0 | $X$ | 226.97321 | 288.19445 | 134.91345 | 5.50732 | 0.0920702 | 0.25190708 | 2.4829948 | 20 | 7 15.0 | 19.4 |
| 57401 2001 $RB_{93}$ | 15.4 | $X$ | 109.80057 | 230.03846 | 178.44211 | 3.93242 | 0.1495610 | 0.23139625 | 2.6276358 | 20 | 2 21.0 | 18.8 |
| 57402 2001 $RR_{94}$ | 15.0 | $X$ | 241.66212 | 206.20723 | 206.06403 | 8.12540 | 0.1138625 | 0.25141800 | 2.4862138 | 20 | 7 14.1 | 18.6 |
| 57403 2001 $RG_{95}$ | 13.6 | $X$ | 348.03534 | 59.64060 | 100.02871 | 13.24914 | 0.1098543 | 0.22722834 | 2.6596697 | 20 | 1 5.8 | 16.7 |
| 57404 2001 $RG_{101}$ | 15.6 | $X$ | 127.34881 | 325.37281 | 99.39491 | 4.67823 | 0.1771681 | 0.23824975 | 2.5770000 | 20 | 4 7.6 | 19.5 |
| 57405 2001 $RS_{109}$ | 15.9 | $X$ | 119.26622 | 81.62617 | 357.12400 | 7.44923 | 0.1235730 | 0.23937546 | 2.5689144 | 20 | 4 6.2 | 19.5 |
| 57406 2001 $RT_{110}$ | 16.5 | $X$ | 229.16414 | 297.23058 | 137.85906 | 4.26114 | 0.0405594 | 0.30886766 | 2.1674766 | 20 | 8 16.7 | 19.0 |
| 57407 2001 $RB_{112}$ | 15.9 | $X$ | 243.68648 | 16.56871 | 122.48365 | 1.99538 | 0.1185611 | 0.26736936 | 2.3863179 | 20 | 11 17.7 | 18.6 |
| 57408 2001 $RC_{115}$ | 15.8 | $X$ | 173.70223 | 74.12360 | 1.97146 | 6.11448 | 0.1896214 | 0.24533444 | 2.5271462 | 20 | 6 1.4 | 20.0 |
| 57409 2001 $RT_{120}$ | 16.0 | $X$ | 261.26222 | 61.80894 | 62.78208 | 2.28579 | 0.1340600 | 0.26665153 | 2.3905986 | 20 | 11 21.0 | 18.5 |
| 57410 2001 $RD_{126}$ | 16.0 | $X$ | 161.45117 | 40.34492 | 11.07796 | 10.76837 | 0.0918460 | 0.29441045 | 2.2378651 | 20 | 4 12.3 | 18.9 |
| 57411 2001 $RC_{128}$ | 15.5 | $X$ | 163.85237 | 35.97313 | 35.15931 | 5.35466 | 0.1204556 | 0.24398219 | 2.5364752 | 20 | 5 15.4 | 19.3 |
| 57412 2001 $RP_{150}$ | 15.0 | $X$ | 338.74345 | 306.91469 | 114.73236 | 15.43228 | 0.2049318 | 0.21776182 | 2.7362024 | 20 | 12 31.9 | 17.7 |
| 57413 2001 $SE$ | 16.1 | $X$ | 212.48988 | 37.42761 | 329.60362 | 2.14236 | 0.2151390 | 0.29584198 | 2.2306402 | 20 | 4 6.9 | 19.7 |
| 57414 2001 $SJ$ | 14.6 | $X$ | 168.76959 | 29.95123 | 3.58848 | 7.42853 | 0.1979443 | 0.23928114 | 2.5695894 | 20 | 4 5.5 | 18.8 |
| 57415 2001 $SD_{1}$ | 14.7 | $X$ | 356.40958 | 227.36427 | 203.80940 | 4.39322 | 0.1447500 | 0.21779949 | 2.7358869 | 20 | — | — |
| 57416 2001 $SL_{1}$ | 15.2 | $X$ | 140.84153 | 202.36379 | 204.44557 | 4.25106 | 0.1725405 | 0.18319325 | 3.0704102 | 20 | 3 29.6 | 20.1 |
| 57417 2001 $ST_{1}$ | 15.8 | $X$ | 108.11791 | 112.53993 | 336.46606 | 3.20741 | 0.0440301 | 0.23795225 | 2.5791475 | 20 | 3 26.2 | 19.2 |
| 57418 2001 $SE_{4}$ | 15.5 | $X$ | 221.10759 | 77.24418 | 257.95215 | 3.10865 | 0.2153955 | 0.29286504 | 2.2457308 | 20 | 3 4.6 | 19.1 |
| 57419 2001 $SJ_{5}$ | 16.0 | $X$ | 51.54764 | 275.50934 | 168.04275 | 4.80184 | 0.1511368 | 0.22797238 | 2.6538797 | 20 | 1 10.3 | 18.8 |
| 57420 2001 $SE_{7}$ | 16.1 | $X$ | 269.80018 | 284.81756 | 138.48497 | 1.45231 | 0.1534445 | 0.25917903 | 2.4363302 | 20 | 9 3.2 | 18.9 |
| 57421 2001 $SY_{8}$ | 14.7 | $X$ | 353.35011 | 209.83050 | 196.23085 | 7.90422 | 0.2208723 | 0.21396166 | 2.7685057 | 20 | — | — |
| 57422 2001 $SR_{9}$ | 14.7 | $X$ | 206.24543 | 154.10328 | 295.47171 | 0.85969 | 0.0864322 | 0.19416280 | 2.9536477 | 20 | 7 23.4 | 19.0 |
| 57423 2001 $SW_{20}$ | 15.5 | $X$ | 341.22914 | 41.25576 | 106.57036 | 3.22257 | 0.0221467 | 0.22766354 | 2.6562792 | 20 | — | — |
| 57424 Caelumnoctu | 13.8 | $X$ | 161.74076 | 45.47284 | 353.30356 | 9.67271 | 0.0947719 | 0.18641802 | 3.0348981 | 20 | 4 2.2 | 18.4 |
| 57425 2001 $SR_{22}$ | 14.4 | $X$ | 36.70411 | 280.96067 | 188.24328 | 25.48228 | 0.2752451 | 0.17417097 | 3.1755493 | 20 | 2 5.3 | 17.9 |
| 57426 2001 $SW_{26}$ | 14.7 | $X$ | 47.52662 | 346.26705 | 91.67471 | 0.24107 | 0.1979953 | 0.17256953 | 3.1951651 | 20 | 1 14.5 | 18.1 |
| 57427 2001 $SD_{28}$ | 15.2 | $X$ | 177.95047 | 96.05832 | 14.96572 | 14.03757 | 0.2324639 | 0.19458749 | 2.9493486 | 20 | 7 22.2 | 20.6 |
| 57428 2001 $SW_{31}$ | 14.3 | $X$ | 198.36027 | 327.01674 | 83.66491 | 2.33626 | 0.1390581 | 0.19174690 | 2.9784054 | 20 | 5 25.0 | 19.0 |
| 57429 2001 $SX_{33}$ | 14.4 | $X$ | 336.23128 | 278.44779 | 135.94971 | 0.94876 | 0.0640181 | 0.21310068 | 2.7759576 | 20 | 12 5.0 | 17.9 |
| 57430 2001 $SJ_{38}$ | 14.7 | $X$ | 152.75044 | 115.56342 | 60.45226 | 3.36768 | 0.1191209 | 0.25628212 | 2.4546553 | 20 | 9 21.7 | 18.3 |
| 57431 2001 $SB_{39}$ | 14.5 | $X$ | 295.48858 | 265.99552 | 133.24895 | 2.83723 | 0.0851123 | 0.20430082 | 2.8551087 | 20 | 9 12.0 | 18.0 |
| 57432 2001 $SM_{40}$ | 15.2 | $X$ | 3.87537 | 117.09263 | 46.81988 | 6.93007 | 0.0978967 | 0.28513975 | 2.2861122 | 20 | 1 28.6 | 17.6 |
| 57433 2001 $SE_{42}$ | 15.8 | $X$ | 277.07365 | 289.67825 | 148.75983 | 6.32946 | 0.0840610 | 0.26126810 | 2.4233257 | 20 | 10 20.4 | 18.5 |
| 57434 2001 $SH_{46}$ | 15.2 | $X$ | 149.74431 | 207.49650 | 93.67095 | 3.18883 | 0.2268409 | 0.27926588 | 2.3180571 | 20 | — | — |
| 57435 2001 $SQ_{47}$ | 15.5 | $X$ | 302.93384 | 30.68369 | 49.84926 | 7.02908 | 0.0994827 | 0.26459692 | 2.4029581 | 20 | 12 2.1 | 17.9 |
| 57436 2001 $SA_{50}$ | 15.1 | $X$ | 109.95679 | 302.11268 | 164.04332 | 11.77243 | 0.1170918 | 0.23879780 | 2.5730556 | 20 | 5 5.3 | 18.8 |
| 57437 2001 $SB_{52}$ | 15.2 | $X$ | 108.36864 | 40.69739 | 40.26930 | 12.34527 | 0.1496934 | 0.23434938 | 2.6055146 | 20 | 4 5.4 | 18.8 |
| 57438 2001 $SM_{52}$ | 15.6 | $X$ | 96.46455 | 233.88311 | 155.16381 | 6.22315 | 0.0669088 | 0.22654646 | 2.6650040 | 20 | — | — |
| 57439 2001 $SJ_{53}$ | 15.2 | $X$ | 149.29132 | 285.50231 | 150.91931 | 4.04863 | 0.0686549 | 0.24052993 | 2.5606878 | 20 | 5 5.4 | 18.8 |
| 57440 2001 $SR_{53}$ | 15.1 | $X$ | 148.78044 | 266.66577 | 156.43423 | 5.60150 | 0.0910214 | 0.23849274 | 2.5752493 | 20 | 4 19.8 | 18.9 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57441 2001 $SW_{53}$ | 15.5 | $X$ | 125.23635 | 51.94177 | 61.06618 | 5.39193 | 0.1215779 | 0.24112199 | 2.5564943 | 20 | 5 29.4 | 19.3 |
| 57442 2001 $SF_{54}$ | 15.2 | $X$ | 75.66448 | 115.22437 | 138.97505 | 5.54874 | 0.0768557 | 0.25773385 | 2.4454291 | 20 | 10 5.6 | 18.5 |
| 57443 2001 $SM_{54}$ | 14.1 | $X$ | 200.37656 | 310.28749 | 50.92573 | 10.74205 | 0.0428408 | 0.18542345 | 3.0457408 | 20 | 4 3.1 | 18.6 |
| 57444 2001 $SM_{55}$ | 14.6 | $X$ | 83.41421 | 255.75578 | 162.04361 | 8.92011 | 0.1094391 | 0.22740689 | 2.6582774 | 20 | 1 22.7 | 17.9 |
| 57445 2001 $SE_{56}$ | 14.5 | $X$ | 93.23893 | 359.26407 | 132.41961 | 2.81684 | 0.2665855 | 0.18334346 | 3.0687330 | 20 | 6 5.2 | 19.2 |
| 57446 2001 $SM_{56}$ | 14.8 | $X$ | 155.29835 | 250.04627 | 155.19143 | 7.14304 | 0.2140883 | 0.18361692 | 3.0656853 | 20 | 4 14.6 | 20.0 |
| 57447 2001 $SQ_{58}$ | 14.9 | $X$ | 65.20762 | 78.36532 | 31.99989 | 3.77067 | 0.0428204 | 0.23291608 | 2.6161927 | 20 | 2 28.2 | 18.2 |
| 57448 2001 $SV_{58}$ | 14.8 | $X$ | 11.62747 | 16.35772 | 39.25099 | 7.10193 | 0.0671045 | 0.21698475 | 2.7427311 | 20 | — | — |
| 57449 2001 $SA_{65}$ | 14.0 | $X$ | 197.98870 | 33.77089 | 37.64290 | 11.43275 | 0.0993392 | 0.19217043 | 2.9740277 | 20 | 6 19.9 | 18.8 |
| 57450 2001 $SU_{69}$ | 14.7 | $X$ | 144.10989 | 146.45473 | 138.67160 | 7.07326 | 0.1025904 | 0.27009086 | 2.3702607 | 20 | — | — |
| 57451 2001 $SV_{69}$ | 14.5 | $X$ | 208.61097 | 147.29975 | 185.70541 | 14.34480 | 0.1360397 | 0.23414726 | 2.6070138 | 20 | 2 25.3 | 18.7 |
| 57452 2001 $SX_{69}$ | 15.7 | $X$ | 111.78827 | 194.67519 | 140.87136 | 7.32472 | 0.1559518 | 0.27350186 | 2.3505123 | 20 | — | — |
| 57453 2001 $SL_{70}$ | 15.3 | $X$ | 278.69863 | 142.34421 | 126.14167 | 6.92484 | 0.1094292 | 0.28667436 | 2.2779463 | 20 | 2 16.4 | 18.2 |
| 57454 2001 $SZ_{70}$ | 15.3 | $X$ | 228.86886 | 238.88763 | 89.64499 | 8.03564 | 0.1627695 | 0.28959434 | 2.2626081 | 20 | 3 10.8 | 18.9 |
| 57455 2001 $SJ_{71}$ | 15.1 | $X$ | 76.77543 | 204.35384 | 154.84337 | 7.15278 | 0.1315151 | 0.27011906 | 2.3700958 | 20 | — | — |
| 57456 2001 $SK_{71}$ | 14.3 | $X$ | 139.90696 | 298.08973 | 107.52719 | 8.35410 | 0.1419721 | 0.17872236 | 3.1214050 | 20 | 3 29.6 | 19.3 |
| 57457 2001 $SC_{72}$ | 14.1 | $X$ | 179.68159 | 317.25982 | 121.95146 | 5.14901 | 0.1262958 | 0.18813057 | 3.0164523 | 20 | 6 11.8 | 18.8 |
| 57458 2001 $SX_{73}$ | 15.1 | $X$ | 286.19681 | 67.14896 | 39.50448 | 9.55834 | 0.1949176 | 0.26619611 | 2.3933245 | 20 | 11 30.8 | 17.1 |
| 57459 2001 $SC_{74}$ | 14.6 | $X$ | 250.93997 | 250.23701 | 295.63578 | 6.48959 | 0.1310570 | 0.27218390 | 2.3580939 | 20 | — | — |
| 57460 2001 $SA_{75}$ | 15.8 | $X$ | 306.76154 | 244.56632 | 347.50577 | 6.33203 | 0.0644439 | 0.28809853 | 2.2704330 | 20 | 2 10.3 | 18.6 |
| 57461 2001 $SY_{75}$ | 14.6 | $X$ | 0.68427 | 177.69671 | 160.54464 | 2.31460 | 0.0812008 | 0.20453334 | 2.8529444 | 20 | 10 2.3 | 18.0 |
| 57462 2001 $SZ_{75}$ | 15.1 | $X$ | 89.09908 | 332.08529 | 43.65004 | 5.89193 | 0.0807012 | 0.27545571 | 2.3393841 | 20 | — | — |
| 57463 2001 $SB_{76}$ | 14.8 | $X$ | 339.41117 | 73.45776 | 74.28937 | 2.92819 | 0.1001878 | 0.22332263 | 2.6905902 | 20 | — | — |
| 57464 2001 $SY_{93}$ | 16.5 | $X$ | 306.06784 | 265.17788 | 221.91636 | 1.99631 | 0.1156273 | 0.27351950 | 2.3504112 | 20 | — | — |
| 57465 2001 $SH_{108}$ | 14.4 | $X$ | 41.73588 | 226.77184 | 249.32166 | 12.91470 | 0.0795675 | 0.22606904 | 2.6687547 | 20 | 1 29.6 | 17.9 |
| 57466 2001 $SU_{108}$ | 15.1 | $X$ | 183.43666 | 347.35900 | 334.19608 | 6.36977 | 0.1308962 | 0.27987941 | 2.3146682 | 20 | 1 16.4 | 18.5 |
| 57467 2001 $SZ_{108}$ | 14.1 | $X$ | 71.97066 | 107.80930 | 270.21473 | 11.79804 | 0.1981400 | 0.21863818 | 2.7288860 | 20 | — | — |
| 57468 2001 $SF_{111}$ | 13.9 | $X$ | 201.59000 | 7.98014 | 17.28190 | 11.54850 | 0.1194955 | 0.18494894 | 3.0509480 | 20 | 4 25.5 | 18.8 |
| 57469 2001 $SA_{115}$ | 15.2 | $X$ | 40.37943 | 346.72004 | 185.28117 | 5.14168 | 0.1960401 | 0.23773122 | 2.5807458 | 20 | 5 1.9 | 17.6 |
| 57470 2001 $ST_{115}$ | 16.1 | $X$ | 270.62719 | 123.25383 | 189.87076 | 6.31286 | 0.1790992 | 0.29852196 | 2.2172697 | 20 | 3 26.8 | 19.1 |
| 57471 Mariemarsina | 14.3 | $X$ | 111.92791 | 313.15169 | 114.95114 | 6.30782 | 0.1629836 | 0.18182181 | 3.0858304 | 20 | 3 28.9 | 18.9 |
| 57472 2001 $SO_{124}$ | 15.4 | $X$ | 104.24075 | 154.99231 | 246.39773 | 2.59571 | 0.1681779 | 0.23148468 | 2.6269666 | 20 | 2 7.5 | 18.9 |
| 57473 2001 $SE_{127}$ | 15.8 | $X$ | 255.22350 | 251.46728 | 185.52145 | 4.81012 | 0.0809767 | 0.25873599 | 2.4391106 | 20 | 9 11.9 | 18.7 |
| 57474 2001 $SL_{129}$ | 15.8 | $X$ | 51.11564 | 195.38658 | 213.67246 | 5.86079 | 0.1081162 | 0.27684383 | 2.3315576 | 20 | — | — |
| 57475 2001 $SO_{132}$ | 15.9 | $X$ | 21.13791 | 292.86646 | 201.06322 | 4.40583 | 0.0890891 | 0.28489475 | 2.2874227 | 20 | 1 11.8 | 18.3 |
| 57476 2001 $SB_{134}$ | 15.9 | $X$ | 204.97476 | 149.11833 | 313.24562 | 2.61155 | 0.0303032 | 0.25480731 | 2.4641178 | 20 | 8 17.5 | 19.2 |
| 57477 2001 $SU_{151}$ | 15.3 | $X$ | 154.98437 | 202.72675 | 209.33788 | 4.05136 | 0.1757186 | 0.18509704 | 3.0493205 | 20 | 4 18.1 | 20.3 |
| 57478 2001 $SW_{151}$ | 15.1 | $X$ | 30.36757 | 226.52011 | 200.21690 | 6.52422 | 0.0888921 | 0.27502345 | 2.3418347 | 20 | — | — |
| 57479 2001 $SD_{153}$ | 16.5 | $X$ | 31.31399 | 41.11884 | 227.50481 | 3.52134 | 0.1750189 | 0.30867667 | 2.1683706 | 20 | 9 13.4 | 18.6 |
| 57480 2001 $SO_{153}$ | 14.2 | $X$ | 329.30929 | 47.04462 | 327.66968 | 1.22567 | 0.0816012 | 0.20659840 | 2.8339014 | 20 | 10 1.2 | 17.5 |
| 57481 2001 $ST_{153}$ | 14.9 | $X$ | 137.73210 | 108.04812 | 356.57286 | 4.40640 | 0.1437614 | 0.24062880 | 2.5599863 | 20 | 6 2.3 | 18.8 |
| 57482 2001 $SH_{154}$ | 15.1 | $X$ | 222.54849 | 320.42465 | 195.14899 | 6.60516 | 0.0367959 | 0.21116731 | 2.7928756 | 20 | 11 11.9 | 18.9 |
| 57483 2001 $SU_{155}$ | 15.0 | $X$ | 232.78889 | 179.39765 | 221.54882 | 1.22735 | 0.1048615 | 0.19426451 | 2.9526167 | 20 | 6 19.3 | 19.5 |
| 57484 2001 $ST_{159}$ | 15.6 | $X$ | 359.33400 | 186.63806 | 324.14229 | 5.70598 | 0.0562422 | 0.28220979 | 2.3019082 | 20 | 1 6.1 | 18.1 |
| 57485 2001 $SN_{161}$ | 15.1 | $X$ | 93.91194 | 63.12222 | 350.27063 | 3.61594 | 0.0891665 | 0.22873596 | 2.6479702 | 20 | 1 30.7 | 18.5 |
| 57486 2001 $SH_{163}$ | 15.2 | $X$ | 278.45919 | 343.05754 | 205.38662 | 4.74919 | 0.2129385 | 0.27410398 | 2.3470688 | 20 | — | — |
| 57487 2001 $SN_{163}$ | 15.4 | $X$ | 232.75110 | 260.56454 | 199.80903 | 6.19927 | 0.0812368 | 0.25601623 | 2.4563545 | 20 | 9 12.4 | 18.6 |
| 57488 2001 $ST_{163}$ | 15.3 | $X$ | 356.53577 | 93.14090 | 339.80767 | 2.80279 | 0.1348598 | 0.21679641 | 2.7443194 | 20 | — | — |
| 57489 2001 $SN_{173}$ | 15.5 | $X$ | 155.87341 | 181.80767 | 38.25935 | 6.46264 | 0.0281557 | 0.26422954 | 2.4051849 | 20 | 11 22.6 | 18.7 |
| 57490 2001 $ST_{175}$ | 15.7 | $X$ | 214.97408 | 41.17093 | 127.89241 | 3.18018 | 0.1565685 | 0.26371183 | 2.4083317 | 20 | 11 14.5 | 19.0 |
| 57491 2001 $SY_{176}$ | 15.2 | $X$ | 305.24609 | 123.60139 | 169.60204 | 8.05353 | 0.0427547 | 0.24315911 | 2.5421959 | 20 | 5 11.6 | 18.5 |
| 57492 2001 $SR_{179}$ | 16.0 | $X$ | 179.00713 | 355.24790 | 5.52306 | 6.19483 | 0.2147617 | 0.29333309 | 2.2433413 | 20 | 3 4.5 | 19.5 |
| 57493 2001 $SR_{185}$ | 15.6 | $X$ | 299.02785 | 42.14517 | 44.95178 | 3.01770 | 0.1616328 | 0.26649737 | 2.3915204 | 20 | 12 2.9 | 17.6 |
| 57494 2001 $SM_{199}$ | 15.0 | $X$ | 114.76489 | 332.29733 | 23.23237 | 2.96912 | 0.0320031 | 0.22742095 | 2.6581679 | 20 | — | — |
| 57495 2001 $SS_{211}$ | 14.8 | $X$ | 45.55887 | 98.43926 | 26.88526 | 13.17245 | 0.1511683 | 0.23343633 | 2.6123042 | 20 | 3 4.5 | 17.7 |
| 57496 2001 $SB_{234}$ | 15.6 | $X$ | 232.51022 | 170.84747 | 36.34114 | 7.62821 | 0.0618251 | 0.27407893 | 2.3472118 | 20 | — | — |
| 57497 2001 $SP_{235}$ | 14.6 | $X$ | 134.07484 | 25.55683 | 185.10530 | 2.39097 | 0.1488895 | 0.25905822 | 2.4370876 | 20 | 10 16.6 | 18.5 |
| 57498 2001 $SE_{239}$ | 16.2 | $X$ | 249.31228 | 13.02833 | 176.15863 | 8.02505 | 0.0855054 | 0.27367558 | 2.3495175 | 20 | — | — |
| 57499 2001 $SX_{239}$ | 14.9 | $X$ | 332.38762 | 346.85723 | 101.11602 | 6.19031 | 0.1314325 | 0.21446398 | 2.7641810 | 20 | — | — |
| 57500 2001 $SM_{244}$ | 14.5 | $X$ | 295.55443 | 194.25884 | 50.44764 | 14.04936 | 0.0968235 | 0.23469757 | 2.6029370 | 20 | 2 20.7 | 18.3 |
| 57501 2001 $SE_{250}$ | 15.6 | $X$ | 190.09096 | 357.28957 | 130.59414 | 3.35117 | 0.0533869 | 0.25355871 | 2.4722005 | 20 | 9 1.3 | 18.8 |
| 57502 2001 $SK_{252}$ | 15.6 | $X$ | 172.07430 | 333.93778 | 189.40266 | 5.50115 | 0.0883040 | 0.25554328 | 2.4593844 | 20 | 9 24.3 | 19.2 |
| 57503 2001 $ST_{252}$ | 15.8 | $X$ | 71.71906 | 309.60972 | 93.74135 | 2.33972 | 0.0137328 | 0.27711995 | 2.3300086 | 20 | — | — |
| 57504 2001 $SL_{265}$ | 15.5 | $X$ | 166.64775 | 290.18091 | 328.77875 | 1.59749 | 0.0208769 | 0.27019017 | 2.3696799 | 20 | — | — |
| 57505 2001 $SK_{266}$ | 15.2 | $X$ | 61.82131 | 176.09930 | 203.38662 | 3.61195 | 0.1112801 | 0.21928486 | 2.7235182 | 20 | — | — |
| 57506 2001 $SK_{268}$ | 13.9 | $X$ | 83.45183 | 29.42222 | 59.86164 | 10.90565 | 0.0795209 | 0.17677563 | 3.1442793 | 20 | 3 12.8 | 18.4 |
| 57507 2001 $SM_{268}$ | 14.7 | $X$ | 329.99663 | 290.12821 | 85.76046 | 3.19624 | 0.1065179 | 0.20449694 | 2.8532830 | 20 | 10 5.4 | 18.0 |
| 57508 2001 $SN_{270}$ | 14.8 | $X$ | 213.94578 | 276.98875 | 81.81220 | 14.95758 | 0.2366953 | 0.24214410 | 2.5492952 | 20 | 4 8.6 | 19.5 |
| 57509 Sly | 14.9 | $X$ | 217.93423 | 192.93840 | 144.91738 | 13.18754 | 0.1915752 | 0.23699945 | 2.5860554 | 20 | 3 13.6 | 19.2 |
| 57510 2001 $SG_{280}$ | 15.0 | $X$ | 194.14011 | 149.39257 | 169.17881 | 2.87876 | 0.0888478 | 0.23053528 | 2.6341740 | 20 | 1 26.4 | 18.9 |
| 57511 2001 $ST_{280}$ | 14.9 | $X$ | 276.61491 | 202.61350 | 172.07392 | 2.36705 | 0.0774588 | 0.19696835 | 2.9255336 | 20 | 7 12.9 | 18.8 |
| 57512 2001 $SL_{281}$ | 14.3 | $X$ | 152.23220 | 3.49784 | 229.47926 | 8.01897 | 0.1122546 | 0.26475180 | 2.4020208 | 20 | 12 2.4 | 17.8 |
| 57513 2001 $SS_{281}$ | 13.9 | $X$ | 183.51680 | 52.40649 | 324.14053 | 8.79018 | 0.1131999 | 0.18416337 | 3.0596180 | 20 | 3 27.2 | 18.8 |
| 57514 2001 $SU_{281}$ | 14.9 | $X$ | 211.16234 | 152.94519 | 227.87149 | 14.43695 | 0.1363436 | 0.24171253 | 2.5523287 | 20 | 4 28.4 | 18.9 |
| 57515 2001 $SX_{281}$ | 14.0 | $X$ | 113.51584 | 275.89571 | 165.90046 | 25.84151 | 0.2496980 | 0.17986364 | 3.1081870 | 20 | 4 27.3 | 19.3 |
| 57516 2001 $SZ_{281}$ | 14.2 | $X$ | 37.01305 | 285.11425 | 145.58285 | 22.45014 | 0.0324204 | 0.22263007 | 2.6961673 | 20 | — | — |
| 57517 2001 $SV_{285}$ | 15.0 | $X$ | 220.19579 | 251.94144 | 130.44921 | 13.99517 | 0.1721386 | 0.24430390 | 2.5342480 | 20 | 5 12.9 | 19.3 |
| 57518 2001 $SB_{286}$ | 12.6 | $X$ | 19.46808 | 211.82680 | 86.52240 | 15.33013 | 0.2167943 | 0.20280931 | 2.8690897 | 20 | 10 4.7 | 16.2 |
| 57519 2001 $SV_{287}$ | 14.6 | $X$ | 31.91221 | 24.70131 | 125.71876 | 12.80348 | 0.1778443 | 0.23524269 | 2.5989143 | 20 | 3 13.4 | 17.2 |
| 57520 2001 $SB_{289}$ | 14.3 | $X$ | 6.29096 | 351.80435 | 156.82280 | 14.31199 | 0.2252410 | 0.22438527 | 2.6820888 | 20 | 1 8.5 | 17.1 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57521 2001 $SD_{289}$ | 16.0 | X | 100.88812 | 246.13597 | 100.98667 | 5.78961 | 0.1676493 | 0.27522829 | 2.3406726 | 20 | — | — |
| 57522 2001 $SR_{290}$ | 14.6 | X | 347.47228 | 220.64615 | 179.41846 | 17.57146 | 0.1494500 | 0.21070076 | 2.7969969 | 20 | 12 10.9 | 18.1 |
| 57523 2001 $ST_{290}$ | 14.7 | X | 118.22409 | 229.17188 | 171.87926 | 15.43809 | 0.1118862 | 0.22938206 | 2.6429954 | 20 | 2 15.7 | 18.5 |
| 57524 2001 $SX_{291}$ | 14.2 | X | 18.71241 | 276.90398 | 184.85593 | 21.47300 | 0.0618942 | 0.22231611 | 2.6987051 | 20 | — | — |
| 57525 2001 $SC_{316}$ | 14.5 | X | 127.21297 | 37.84732 | 331.79854 | 11.24982 | 0.0766483 | 0.22519663 | 2.6756427 | 20 | 1 18.1 | 18.3 |
| 57526 2001 $SD_{316}$ | 14.0 | X | 8.01325 | 15.04805 | 5.93513 | 16.76283 | 0.2539886 | 0.21006947 | 2.8025977 | 20 | — | — |
| 57527 2001 $SN_{316}$ | 14.2 | X | 171.93883 | 34.33576 | 306.30911 | 13.02067 | 0.1112336 | 0.22742947 | 2.6581015 | 20 | 2 1.1 | 18.1 |
| 57528 2001 $SM_{343}$ | 14.7 | X | 106.62801 | 342.60071 | 68.06736 | 14.91846 | 0.0929808 | 0.23209620 | 2.6223502 | 20 | 2 18.8 | 18.5 |
| 57529 2001 $SX_{344}$ | 14.4 | X | 145.28819 | 256.46980 | 151.77766 | 22.46968 | 0.1524530 | 0.18362455 | 3.0656004 | 20 | 4 8.3 | 19.5 |
| 57530 2001 $SZ_{345}$ | 14.1 | X | 191.25306 | 229.28692 | 141.45937 | 13.71832 | 0.1576719 | 0.18427831 | 3.0583457 | 20 | 4 4.6 | 19.3 |
| 57531 2001 $SL_{346}$ | 13.6 | X | 58.69445 | 251.04151 | 246.96686 | 13.07960 | 0.2414074 | 0.18372998 | 3.0644275 | 20 | 4 23.9 | 17.4 |
| 57532 2001 $TA$ | 13.7 | X | 182.51877 | 74.58212 | 283.93420 | 11.35131 | 0.1901207 | 0.23085778 | 2.6317201 | 20 | 3 1.5 | 18.4 |
| 57533 2001 $TT_{2}$ | 15.6 | X | 59.82699 | 260.17031 | 213.94344 | 2.67188 | 0.1599032 | 0.23260153 | 2.6185508 | 20 | 3 7.8 | 18.4 |
| 57534 2001 $TP_{8}$ | 14.0 | X | 120.17853 | 30.84690 | 30.60414 | 12.06925 | 0.1420163 | 0.17714757 | 3.1398766 | 20 | 3 27.9 | 18.7 |
| 57535 2001 $TN_{9}$ | 16.4 | X | 53.38501 | 324.97463 | 208.69326 | 5.12457 | 0.0493226 | 0.29496677 | 2.2350504 | 20 | 5 3.9 | 18.6 |
| 57536 2001 $TA_{13}$ | 14.3 | X | 64.65966 | 308.90520 | 149.14752 | 25.15452 | 0.1643592 | 0.17327412 | 3.1864975 | 20 | 3 5.8 | 18.3 |
| 57537 2001 $TQ_{13}$ | 14.9 | X | 256.29307 | 206.17097 | 153.71398 | 10.52202 | 0.1731284 | 0.24524275 | 2.5277761 | 20 | 5 18.6 | 18.8 |
| 57538 2001 $TW_{13}$ | 14.5 | X | 140.86021 | 36.92735 | 29.29961 | 15.36458 | 0.0774233 | 0.23982271 | 2.5657195 | 20 | 4 12.7 | 18.0 |
| 57539 2001 $TU_{17}$ | 14.1 | X | 168.83842 | 183.70210 | 232.04414 | 13.02052 | 0.1427518 | 0.23982107 | 2.5657312 | 20 | 5 1.6 | 18.0 |
| 57540 2001 $TE_{18}$ | 14.0 | X | 305.50132 | 315.22699 | 36.50552 | 2.60594 | 0.0896231 | 0.19654961 | 2.9296872 | 20 | 7 23.2 | 17.6 |
| 57541 2001 $TV_{18}$ | 14.2 | X | 325.82827 | 152.47047 | 89.89051 | 14.60686 | 0.1143563 | 0.23700381 | 2.5860237 | 20 | 3 29.6 | 17.6 |
| 57542 2001 $TW_{18}$ | 14.8 | X | 249.61098 | 98.73424 | 175.15262 | 13.67830 | 0.0925876 | 0.23136398 | 2.6278802 | 20 | 1 27.3 | 18.9 |
| 57543 2001 $TZ_{19}$ | 14.7 | X | 183.18320 | 298.25561 | 350.45057 | 12.16623 | 0.1425424 | 0.22401835 | 2.6850167 | 20 | — | — |
| 57544 2001 $TL_{20}$ | 14.8 | X | 225.19409 | 162.27980 | 279.33756 | 9.72569 | 0.1087416 | 0.19575831 | 2.9375769 | 20 | 7 30.3 | 19.2 |
| 57545 2001 $TG_{21}$ | 14.3 | X | 56.41176 | 109.22975 | 14.17377 | 20.86050 | 0.0724582 | 0.17714239 | 3.1399378 | 20 | 3 17.7 | 18.5 |
| 57546 2001 $TO_{21}$ | 15.8 | X | 304.58056 | 304.34871 | 90.64476 | 6.63631 | 0.0861373 | 0.25865918 | 2.4395934 | 20 | 10 3.8 | 18.5 |
| 57547 2001 $TV_{21}$ | 14.5 | X | 9.80703 | 78.06327 | 71.74047 | 12.46953 | 0.0755393 | 0.23103342 | 2.6303862 | 20 | 2 1.1 | 17.8 |
| 57548 2001 $TU_{22}$ | 15.0 | X | 67.71891 | 110.12371 | 11.08189 | 3.77364 | 0.0763225 | 0.23395905 | 2.6084118 | 20 | 3 20.1 | 18.2 |
| 57549 2001 $TE_{28}$ | 14.8 | X | 22.48715 | 215.98756 | 287.65299 | 4.43531 | 0.0564361 | 0.23037169 | 2.6354209 | 20 | 2 8.6 | 18.1 |
| 57550 2001 $TQ_{28}$ | 14.9 | X | 88.24998 | 70.50230 | 335.40522 | 6.42612 | 0.0795362 | 0.22609809 | 2.6685261 | 20 | 1 12.6 | 18.2 |
| 57551 2001 $TE_{29}$ | 14.9 | X | 60.95697 | 262.04581 | 241.81009 | 4.89084 | 0.1764358 | 0.23349593 | 2.6118597 | 20 | 4 23.4 | 17.8 |
| 57552 2001 $TM_{31}$ | 14.3 | X | 243.76287 | 8.23501 | 0.78718 | 8.81004 | 0.0568037 | 0.18962318 | 3.0006022 | 20 | 5 25.4 | 18.7 |
| 57553 2001 $TP_{34}$ | 16.1 | X | 170.41907 | 348.08057 | 344.42130 | 2.78596 | 0.1757826 | 0.28126847 | 2.3070412 | 20 | 1 19.7 | 19.6 |
| 57554 2001 $TS_{36}$ | 14.7 | X | 148.43710 | 253.43230 | 39.51107 | 22.86380 | 0.1789433 | 0.27048607 | 2.3679514 | 20 | — | — |
| 57555 2001 $TM_{37}$ | 13.9 | X | 278.19133 | 344.85498 | 17.52950 | 10.95230 | 0.1030353 | 0.19166607 | 2.9792428 | 20 | 6 25.0 | 18.2 |
| 57556 2001 $TO_{38}$ | 14.1 | X | 60.07310 | 119.56372 | 275.16232 | 11.42211 | 0.1549468 | 0.21731082 | 2.7399869 | 20 | — | — |
| 57557 2001 $TH_{39}$ | 15.6 | X | 284.35904 | 289.73336 | 359.65146 | 7.54141 | 0.1626770 | 0.29048670 | 2.2579720 | 20 | 3 14.3 | 18.3 |
| 57558 2001 $TA_{46}$ | 14.8 | X | 60.48718 | 20.91549 | 112.10115 | 2.33530 | 0.1271821 | 0.17825617 | 3.1268449 | 20 | 4 6.9 | 18.8 |
| 57559 2001 $TY_{46}$ | 14.9 | X | 3.29940 | 217.10237 | 198.03546 | 3.54228 | 0.0929135 | 0.21331041 | 2.7741377 | 20 | — | — |
| 57560 2001 $TB_{47}$ | 14.5 | X | 118.82757 | 278.66538 | 176.19834 | 1.03710 | 0.1342212 | 0.18156664 | 3.0887209 | 20 | 5 1.9 | 19.0 |
| 57561 2001 $TA_{48}$ | 16.0 | X | 55.37216 | 91.58269 | 112.71231 | 8.47823 | 0.0905857 | 0.29818913 | 2.2189193 | 20 | 6 30.0 | 18.2 |
| 57562 2001 $TS_{48}$ | 13.9 | X | 145.56150 | 151.98648 | 224.23338 | 13.65786 | 0.1080586 | 0.22856979 | 2.6492534 | 20 | 2 12.0 | 18.1 |
| 57563 2001 $TT_{49}$ | 15.0 | X | 116.76636 | 354.73010 | 41.02192 | 14.03408 | 0.1642661 | 0.23090293 | 2.6313771 | 20 | 2 23.4 | 19.0 |
| 57564 2001 $TV_{49}$ | 14.2 | X | 160.18324 | 28.68288 | 22.89888 | 24.02043 | 0.2133010 | 0.18614199 | 3.0378977 | 20 | 4 20.8 | 19.5 |
| 57565 2001 $TB_{52}$ | 14.6 | X | 120.43956 | 267.72878 | 183.84049 | 11.80993 | 0.1547785 | 0.18299260 | 3.0726542 | 20 | 5 3.6 | 19.4 |
| 57566 2001 $TU_{54}$ | 16.1 | X | 246.27709 | 220.57863 | 255.57308 | 3.41709 | 0.1001190 | 0.26196590 | 2.4190204 | 20 | 10 20.7 | 19.0 |
| 57567 Crikey | 14.9 | X | 40.63933 | 249.20894 | 222.99818 | 2.56729 | 0.1571443 | 0.17355010 | 3.1831185 | 20 | 2 10.4 | 18.7 |
| 57568 2001 $TR_{57}$ | 15.7 | X | 131.07236 | 358.83971 | 213.34559 | 6.20288 | 0.0866117 | 0.25954390 | 2.4340463 | 20 | 10 13.2 | 19.2 |
| 57569 2001 $TE_{60}$ | 15.8 | X | 256.75348 | 119.78644 | 43.17555 | 7.10609 | 0.0532839 | 0.26904755 | 2.3763844 | 20 | — | — |
| 57570 2001 $TO_{61}$ | 14.5 | X | 170.84357 | 178.40468 | 179.82268 | 5.60830 | 0.1664909 | 0.18057278 | 3.1000440 | 20 | 2 28.0 | 19.6 |
| 57571 2001 $TR_{61}$ | 14.7 | X | 126.13368 | 329.81731 | 113.75833 | 3.98600 | 0.1633795 | 0.18258164 | 3.0772632 | 20 | 4 29.9 | 19.5 |
| 57572 2001 $TY_{63}$ | 14.5 | X | 245.76140 | 191.35029 | 269.52208 | 0.95270 | 0.0301120 | 0.20450571 | 2.8532014 | 20 | 9 30.9 | 18.3 |
| 57573 2001 $TD_{65}$ | 14.8 | X | 257.63523 | 352.89167 | 83.58037 | 3.21114 | 0.0393704 | 0.20252951 | 2.8717315 | 20 | 9 15.4 | 18.7 |
| 57574 2001 $TF_{66}$ | 15.2 | X | 350.33405 | 162.47740 | 239.34150 | 1.73024 | 0.1064729 | 0.21114325 | 2.7930877 | 20 | 12 12.5 | 18.5 |
| 57575 2001 $TT_{66}$ | 14.6 | X | 351.89964 | 278.34221 | 156.50165 | 2.44749 | 0.0508034 | 0.21585339 | 2.7523065 | 20 | — | — |
| 57576 2001 $TV_{66}$ | 15.3 | X | 144.76021 | 328.21507 | 95.22086 | 2.49957 | 0.1002779 | 0.23662699 | 2.5887684 | 20 | 4 15.8 | 19.0 |
| 57577 2001 $TY_{66}$ | 15.1 | X | 337.62571 | 241.53816 | 187.46611 | 4.51201 | 0.0528359 | 0.21292416 | 2.7774916 | 20 | 12 24.8 | 18.7 |
| 57578 2001 $TC_{67}$ | 14.5 | X | 312.33716 | 281.68473 | 175.76463 | 3.92363 | 0.0636591 | 0.21283302 | 2.7782845 | 20 | 12 25.2 | 18.0 |
| 57579 2001 $TD_{67}$ | 14.5 | X | 154.52000 | 16.19526 | 54.37175 | 9.22962 | 0.0686489 | 0.18581093 | 3.0415051 | 20 | 5 4.9 | 19.0 |
| 57580 2001 $TF_{67}$ | 14.4 | X | 201.07928 | 21.32864 | 42.68647 | 6.98829 | 0.0567116 | 0.19150875 | 2.9808741 | 20 | 6 16.3 | 18.9 |
| 57581 2001 $TH_{67}$ | 14.8 | X | 278.32931 | 283.01944 | 225.69947 | 3.13305 | 0.2282138 | 0.21238560 | 2.7821850 | 20 | 12 21.9 | 17.7 |
| 57582 2001 $TP_{67}$ | 14.4 | X | 60.54810 | 243.37090 | 215.40465 | 9.70941 | 0.1989466 | 0.17378173 | 3.1802894 | 20 | 2 29.0 | 18.5 |
| 57583 2001 $TZ_{67}$ | 14.4 | X | 108.38984 | 241.05534 | 162.84925 | 2.82431 | 0.1840504 | 0.17567740 | 3.1573698 | 20 | 2 25.3 | 19.0 |
| 57584 2001 $TO_{68}$ | 15.2 | X | 42.69781 | 273.08422 | 201.64648 | 3.92170 | 0.0115798 | 0.22894162 | 2.6463841 | 20 | 1 29.5 | 18.8 |
| 57585 2001 $TG_{70}$ | 14.2 | X | 115.32292 | 340.85032 | 111.17120 | 3.78977 | 0.1940170 | 0.18196548 | 3.0842060 | 20 | 5 2.5 | 18.9 |
| 57586 2001 $TA_{71}$ | 15.6 | X | 58.28300 | 126.67342 | 242.65007 | 1.11365 | 0.1009820 | 0.21778848 | 2.7359792 | 20 | — | — |
| 57587 2001 $TZ_{73}$ | 14.2 | X | 71.68984 | 54.20136 | 31.41279 | 11.66524 | 0.0641557 | 0.17559375 | 3.1583725 | 20 | 2 19.7 | 18.6 |
| 57588 2001 $TB_{74}$ | 14.7 | X | 255.02379 | 172.95763 | 244.77395 | 1.03122 | 0.0605634 | 0.19870640 | 2.9084492 | 20 | 8 12.7 | 18.7 |
| 57589 2001 $TH_{74}$ | 14.6 | X | 40.08485 | 249.81851 | 213.65116 | 5.46260 | 0.1358482 | 0.17224561 | 3.1991696 | 20 | 1 27.4 | 18.5 |
| 57590 2001 $TJ_{76}$ | 14.3 | X | 25.65674 | 24.92383 | 96.86140 | 2.12272 | 0.1535437 | 0.17169374 | 3.2060213 | 20 | 1 29.1 | 18.0 |
| 57591 2001 $TM_{76}$ | 14.7 | X | 156.50471 | 348.21178 | 73.81645 | 3.54040 | 0.1889950 | 0.18398639 | 3.0615798 | 20 | 5 2.8 | 19.7 |
| 57592 2001 $TB_{77}$ | 14.5 | X | 78.34256 | 303.68838 | 131.15364 | 2.24952 | 0.0537232 | 0.22783061 | 2.6549805 | 20 | 1 31.4 | 18.0 |
| 57593 2001 $TF_{77}$ | 15.2 | X | 318.41223 | 218.22068 | 171.38852 | 1.59451 | 0.1305436 | 0.20422475 | 2.8558176 | 20 | 10 1.5 | 18.3 |
| 57594 2001 $TQ_{78}$ | 14.9 | X | 226.06010 | 261.15999 | 75.00965 | 3.56088 | 0.0665918 | 0.23611897 | 2.5924803 | 20 | 3 24.7 | 18.5 |
| 57595 2001 $TV_{78}$ | 14.3 | X | 168.98200 | 240.58502 | 61.10931 | 14.60218 | 0.1941152 | 0.22448637 | 2.6812834 | 20 | — | — |
| 57596 2001 $TD_{81}$ | 15.5 | X | 211.22139 | 310.22802 | 218.99653 | 9.09112 | 0.1507817 | 0.26528240 | 2.3988169 | 20 | 11 10.7 | 18.7 |
| 57597 2001 $TU_{88}$ | 15.1 | X | 286.45389 | 165.23514 | 9.17838 | 9.08324 | 0.0494537 | 0.22320628 | 2.6915252 | 20 | — | — |
| 57598 2001 $TZ_{95}$ | 15.5 | X | 247.11617 | 185.50711 | 337.16779 | 4.07237 | 0.1349073 | 0.21313091 | 2.7756951 | 20 | 12 6.3 | 19.3 |
| 57599 2001 $TK_{96}$ | 15.6 | X | 302.40695 | 129.52296 | 254.84665 | 1.91848 | 0.0780147 | 0.25568503 | 2.4584753 | 20 | 9 9.3 | 18.2 |
| 57600 2001 $TM_{96}$ | 14.5 | X | 17.30500 | 178.76710 | 15.83085 | 11.27491 | 0.1164121 | 0.23786463 | 2.5797808 | 20 | 4 10.5 | 17.3 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57601 2001 $TY_{96}$ | 14.5 | $X$ | 46.18978 | 264.34752 | 217.43552 | 23.86055 | 0.2171111 | 0.17498538 | 3.1656887 | 20 | 3 4.3 | 18.5 |
| 57602 2001 $TA_{102}$ | 14.9 | $X$ | 50.05912 | 121.83522 | 343.36807 | 6.58100 | 0.1405625 | 0.17584762 | 3.1553320 | 20 | 2 17.2 | 18.7 |
| 57603 2001 $TM_{102}$ | 14.5 | $X$ | 290.21212 | 31.84426 | 276.73781 | 12.49872 | 0.1332331 | 0.24392779 | 2.5368524 | 20 | 4 19.6 | 18.2 |
| 57604 2001 $TF_{105}$ | 14.5 | $X$ | 216.91043 | 139.51610 | 225.79256 | 12.79984 | 0.1604713 | 0.24010062 | 2.5637393 | 20 | 4 12.2 | 18.6 |
| 57605 2001 $TA_{106}$ | 14.3 | $X$ | 314.73743 | 253.64542 | 51.16700 | 10.00939 | 0.0913950 | 0.24255914 | 2.5463863 | 20 | 6 1.4 | 17.2 |
| 57606 2001 $TU_{110}$ | 14.5 | $X$ | 68.62484 | 108.29864 | 322.57030 | 4.77492 | 0.0863445 | 0.17337370 | 3.1852773 | 20 | 1 26.7 | 18.7 |
| 57607 2001 $TZ_{110}$ | 15.2 | $X$ | 355.37875 | 254.02729 | 304.02597 | 2.60802 | 0.1379904 | 0.28760546 | 2.2730272 | 20 | 2 24.8 | 17.1 |
| 57608 2001 $TY_{114}$ | 14.8 | $X$ | 22.01754 | 287.04326 | 350.10932 | 5.89935 | 0.1586414 | 0.25097983 | 2.4891067 | 20 | 8 30.8 | 17.2 |
| 57609 2001 $TD_{116}$ | 14.5 | $X$ | 110.40699 | 80.22604 | 302.14446 | 3.15451 | 0.1059605 | 0.22458951 | 2.6804625 | 20 | 1 15.3 | 17.9 |
| 57610 2001 $TK_{116}$ | 13.3 | $X$ | 92.47210 | 70.31765 | 44.97122 | 17.17546 | 0.2437398 | 0.17735937 | 3.1373764 | 20 | 5 10.9 | 18.0 |
| 57611 2001 $TM_{116}$ | 14.4 | $X$ | 197.58913 | 115.37399 | 43.45454 | 11.19876 | 0.0732669 | 0.20123022 | 2.8840796 | 20 | 10 13.7 | 18.7 |
| 57612 2001 $TY_{116}$ | 14.2 | $X$ | 275.68938 | 284.41054 | 50.68218 | 8.59629 | 0.1671783 | 0.24098378 | 2.5574717 | 20 | 5 6.8 | 17.7 |
| 57613 2001 $TC_{124}$ | 15.6 | $X$ | 71.36718 | 269.72516 | 227.98427 | 16.12075 | 0.2218434 | 0.23669092 | 2.5883022 | 20 | 5 9.9 | 18.8 |
| 57614 2001 $TY_{125}$ | 13.9 | $X$ | 91.54650 | 200.43479 | 282.07173 | 9.50758 | 0.0891371 | 0.18470392 | 3.0536457 | 20 | 4 24.8 | 18.3 |
| 57615 2001 $TJ_{133}$ | 15.7 | $X$ | 8.58667 | 262.89467 | 106.90602 | 7.60842 | 0.1445164 | 0.26380919 | 2.4077392 | 20 | 12 19.5 | 18.3 |
| 57616 2001 $TV_{137}$ | 14.6 | $X$ | 76.96313 | 23.88983 | 78.56360 | 16.02279 | 0.0744951 | 0.23411300 | 2.6072682 | 20 | 3 17.2 | 18.3 |
| 57617 2001 $TV_{139}$ | 15.8 | $X$ | 359.30166 | 319.15490 | 133.74910 | 7.30345 | 0.0725307 | 0.27654969 | 2.3332105 | 20 | — | — |
| 57618 2001 $TN_{142}$ | 15.5 | $X$ | 100.22528 | 50.77479 | 79.70059 | 6.99018 | 0.1211787 | 0.24138937 | 2.5546061 | 20 | 5 23.8 | 18.9 |
| 57619 2001 $TJ_{147}$ | 15.7 | $X$ | 221.34997 | 109.06578 | 72.21768 | 8.13412 | 0.1323664 | 0.26678025 | 2.3898296 | 20 | 12 11.0 | 18.7 |
| 57620 2001 $TV_{147}$ | 15.3 | $X$ | 238.28631 | 124.82398 | 168.23513 | 9.36762 | 0.0526586 | 0.23430882 | 2.6058153 | 20 | 2 10.9 | 19.2 |
| 57621 2001 $TN_{151}$ | 14.7 | $X$ | 151.51873 | 308.99023 | 83.71701 | 6.87736 | 0.1777339 | 0.18176219 | 3.0865052 | 20 | 3 27.1 | 19.8 |
| 57622 2001 $TY_{151}$ | 15.2 | $X$ | 48.96281 | 120.67207 | 40.89841 | 22.75141 | 0.0558273 | 0.23789272 | 2.5795777 | 20 | 4 17.9 | 18.4 |
| 57623 2001 $TB_{153}$ | 13.9 | $X$ | 42.87973 | 38.10906 | 101.62986 | 7.50914 | 0.1376826 | 0.17829631 | 3.1263755 | 20 | 3 23.3 | 17.8 |
| 57624 2001 $TZ_{157}$ | 14.5 | $X$ | 53.59311 | 268.55112 | 166.20700 | 10.24921 | 0.0856742 | 0.17130715 | 3.2108429 | 20 | 1 9.6 | 18.8 |
| 57625 2001 $TJ_{158}$ | 14.5 | $X$ | 110.02574 | 271.51777 | 71.53421 | 13.48273 | 0.0396410 | 0.22057212 | 2.7129116 | 20 | — | — |
| 57626 2001 $TE_{165}$ | 12.2 | $X$ | 298.38375 | 184.98780 | 118.19923 | 11.98190 | 0.0685637 | 0.08318831 | 5.1971015 | 20 | 5 17.0 | 19.1 |
| 57627 2001 $TO_{168}$ | 14.6 | $X$ | 258.38529 | 97.47199 | 282.07224 | 9.04383 | 0.0713750 | 0.19278978 | 2.9676547 | 20 | 6 26.6 | 18.8 |
| 57628 2001 $TR_{168}$ | 14.2 | $X$ | 107.79442 | 187.95273 | 302.32238 | 8.92784 | 0.1809494 | 0.18304855 | 3.0720282 | 20 | 6 7.8 | 19.0 |
| 57629 2001 $TY_{168}$ | 14.1 | $X$ | 20.70190 | 209.74510 | 251.94812 | 20.95744 | 0.0554682 | 0.22185508 | 2.7024425 | 20 | — | — |
| 57630 2001 $TY_{171}$ | 14.4 | $X$ | 352.15414 | 352.36654 | 63.01014 | 10.27445 | 0.1534626 | 0.21396499 | 2.7684769 | 20 | — | — |
| 57631 2001 $TK_{179}$ | 15.4 | $X$ | 337.19894 | 124.52523 | 13.16463 | 14.59385 | 0.0832017 | 0.22336193 | 2.6902746 | 20 | — | — |
| 57632 2001 $TB_{182}$ | 15.7 | $X$ | 210.01778 | 214.17229 | 355.82481 | 3.12968 | 0.1725151 | 0.26881929 | 2.3777294 | 20 | 12 29.8 | 18.8 |
| 57633 2001 $TJ_{182}$ | 14.6 | $X$ | 149.59772 | 249.76833 | 280.25559 | 5.53449 | 0.1710112 | 0.19829836 | 2.9124377 | 20 | 9 1.7 | 19.5 |
| 57634 2001 $TR_{182}$ | 14.6 | $X$ | 193.53720 | 242.84283 | 280.80575 | 6.21751 | 0.2573541 | 0.20207707 | 2.8760164 | 20 | 9 27.3 | 19.8 |
| 57635 2001 $TF_{183}$ | 15.8 | $X$ | 221.52621 | 259.35593 | 314.68801 | 4.19290 | 0.1737518 | 0.27010338 | 2.3701875 | 20 | — | — |
| 57636 2001 $TT_{187}$ | 14.3 | $X$ | 127.89837 | 192.28694 | 253.76069 | 9.65379 | 0.0378138 | 0.18350854 | 3.0668923 | 20 | 4 17.2 | 18.8 |
| 57637 2001 $TH_{189}$ | 15.1 | $X$ | 34.43466 | 335.30738 | 325.54920 | 5.02868 | 0.1305482 | 0.25697461 | 2.4502435 | 20 | 10 17.2 | 18.2 |
| 57638 2001 $TL_{190}$ | 15.4 | $X$ | 150.18162 | 39.36912 | 260.47180 | 4.07180 | 0.0564628 | 0.27263254 | 2.3555062 | 20 | — | — |
| 57639 2001 $TO_{190}$ | 15.5 | $X$ | 76.79825 | 243.87604 | 10.25121 | 4.78563 | 0.1144844 | 0.25504476 | 2.4625881 | 20 | 10 8.9 | 18.7 |
| 57640 2001 $TC_{191}$ | 14.8 | $X$ | 3.23458 | 166.71109 | 248.36228 | 10.51543 | 0.0933444 | 0.21350281 | 2.7724708 | 20 | — | — |
| 57641 2001 $TW_{191}$ | 14.7 | $X$ | 129.90111 | 72.60603 | 331.31997 | 4.29024 | 0.1701472 | 0.17749322 | 3.1357990 | 20 | 3 15.6 | 19.5 |
| 57642 2001 $TH_{196}$ | 14.1 | $X$ | 358.90733 | 43.37035 | 105.21589 | 13.09629 | 0.1919544 | 0.22845815 | 2.6501164 | 20 | — | — |
| 57643 2001 $TV_{199}$ | 15.8 | $X$ | 0.59307 | 312.86813 | 109.31938 | 7.27035 | 0.0846053 | 0.27072911 | 2.3665340 | 20 | — | — |
| 57644 2001 $TV_{201}$ | 12.3 | $X$ | 261.97417 | 232.83444 | 104.11767 | 12.59275 | 0.0520538 | 0.08571147 | 5.0945998 | 20 | 5 15.6 | 19.2 |
| 57645 2001 $TK_{202}$ | 14.6 | $X$ | 31.34595 | 337.67291 | 45.12740 | 12.80388 | 0.1821625 | 0.21793044 | 2.7347909 | 20 | — | — |
| 57646 2001 $TO_{202}$ | 13.9 | $X$ | 121.96122 | 269.30006 | 140.45337 | 14.57201 | 0.1423903 | 0.18195333 | 3.0843433 | 20 | 3 15.2 | 18.6 |
| 57647 2001 $TL_{203}$ | 14.4 | $X$ | 58.88991 | 50.11299 | 61.59729 | 15.08866 | 0.0994081 | 0.23390883 | 2.6087851 | 20 | 3 5.2 | 17.8 |
| 57648 2001 $TM_{203}$ | 13.7 | $X$ | 38.84327 | 8.64566 | 104.68908 | 12.70755 | 0.1359700 | 0.17729112 | 3.1381816 | 20 | 2 9.8 | 17.5 |
| 57649 2001 $TG_{210}$ | 14.4 | $X$ | 295.36991 | 273.46402 | 245.08111 | 10.40713 | 0.1422653 | 0.22385007 | 2.6863622 | 20 | — | — |
| 57650 2001 $TH_{217}$ | 15.3 | $X$ | 305.54322 | 134.68176 | 248.23704 | 3.73408 | 0.2366960 | 0.25997735 | 2.4313400 | 20 | 8 22.7 | 17.3 |
| 57651 2001 $TQ_{218}$ | 14.7 | $X$ | 264.92142 | 38.42591 | 132.61704 | 5.74428 | 0.0976508 | 0.21723631 | 2.7406133 | 20 | — | — |
| 57652 2001 $TR_{224}$ | 14.5 | $X$ | 65.42089 | 293.63479 | 131.46319 | 14.55429 | 0.2757841 | 0.17424814 | 3.1746118 | 20 | 2 9.6 | 18.2 |
| 57653 2001 $TE_{226}$ | 14.3 | $X$ | 1.75145 | 6.43564 | 119.78135 | 15.69087 | 0.1702723 | 0.22632498 | 2.6667424 | 20 | — | — |
| 57654 2001 $TL_{226}$ | 13.4 | $X$ | 118.54841 | 237.04229 | 114.88352 | 15.87750 | 0.0384116 | 0.17387388 | 3.1791657 | 20 | — | — |
| 57655 2001 $TU_{228}$ | 13.1 | $X$ | 217.52710 | 333.22563 | 307.48901 | 16.14670 | 0.1726937 | 0.17759778 | 3.1345680 | 20 | 1 12.3 | 18.3 |
| 57656 2001 $TG_{229}$ | 14.5 | $X$ | 19.80978 | 221.88045 | 322.82010 | 12.86488 | 0.0984293 | 0.23614108 | 2.5923185 | 20 | 3 25.3 | 17.6 |
| 57657 2001 $TF_{230}$ | 15.6 | $X$ | 252.41765 | 328.81062 | 88.95727 | 7.82772 | 0.0853899 | 0.25435434 | 2.4670424 | 20 | 8 13.8 | 18.8 |
| 57658 Nilrem | 15.1 | $X$ | 321.76341 | 184.32670 | 33.03566 | 13.61732 | 0.0296012 | 0.23310705 | 2.6147637 | 20 | 2 29.8 | 18.7 |
| 57659 2001 $UP_{4}$ | 14.3 | $X$ | 101.60803 | 120.71800 | 221.84682 | 14.52887 | 0.0790146 | 0.21666320 | 2.7454442 | 20 | — | — |
| 57660 2001 $UY_{6}$ | 15.1 | $X$ | 256.15797 | 296.25392 | 103.20417 | 1.88738 | 0.0660166 | 0.19528966 | 2.9422747 | 20 | 7 20.7 | 19.0 |
| 57661 2001 $UQ_{12}$ | 14.6 | $X$ | 254.58701 | 173.66926 | 212.12542 | 9.38485 | 0.1031647 | 0.19293818 | 2.9661329 | 20 | 6 24.7 | 19.0 |
| 57662 2001 $UJ_{13}$ | 14.8 | $X$ | 244.68262 | 298.34113 | 124.52034 | 2.91518 | 0.0462378 | 0.19596381 | 2.9355228 | 20 | 8 8.6 | 19.0 |
| 57663 2001 $UA_{15}$ | 14.4 | $X$ | 203.15039 | 320.75181 | 53.94073 | 10.36372 | 0.1102255 | 0.18452422 | 3.0556279 | 20 | 4 19.2 | 19.2 |
| 57664 2001 $UY_{17}$ | 13.2 | $X$ | 171.54218 | 92.28838 | 308.25253 | 21.08006 | 0.2409793 | 0.18421105 | 3.0590900 | 20 | 4 9.3 | 19.0 |
| 57665 2001 $UL_{24}$ | 14.3 | $X$ | 194.09819 | 61.64093 | 303.10367 | 8.39626 | 0.1012244 | 0.18431807 | 3.0579058 | 20 | 3 22.8 | 19.2 |
| 57666 2001 $UW_{24}$ | 14.4 | $X$ | 129.75446 | 146.72232 | 294.03002 | 8.66039 | 0.0603440 | 0.18410494 | 3.0602654 | 20 | 4 13.9 | 19.0 |
| 57667 2001 $UN_{25}$ | 14.8 | $X$ | 21.22981 | 45.55221 | 349.63192 | 8.89981 | 0.1809866 | 0.21498207 | 2.7597382 | 20 | — | — |
| 57668 2001 $UM_{27}$ | 16.0 | $X$ | 161.82665 | 70.25273 | 147.78950 | 2.52679 | 0.1213407 | 0.26552640 | 2.3973471 | 20 | 11 23.5 | 19.6 |
| 57669 2001 $UO_{29}$ | 14.7 | $X$ | 52.23942 | 55.41448 | 56.30246 | 14.77720 | 0.1583942 | 0.22914658 | 2.6448059 | 20 | 3 1.3 | 17.9 |
| 57670 2001 $UB_{30}$ | 14.8 | $X$ | 96.55251 | 302.49718 | 106.96852 | 7.91046 | 0.2410983 | 0.17563852 | 3.1578358 | 20 | 2 29.1 | 19.4 |
| 57671 2001 $UN_{31}$ | 14.5 | $X$ | 164.40558 | 337.58791 | 109.46288 | 7.80878 | 0.0850831 | 0.19008947 | 2.9956932 | 20 | 6 6.1 | 19.1 |
| 57672 2001 $UA_{33}$ | 14.4 | $X$ | 24.18715 | 272.44191 | 180.84962 | 13.84386 | 0.0823588 | 0.16990510 | 3.2284826 | 20 | — | — |
| 57673 2001 $UY_{33}$ | 14.4 | $X$ | 149.51750 | 9.67680 | 70.84167 | 14.21451 | 0.1161242 | 0.23936928 | 2.5689586 | 20 | 5 15.2 | 18.2 |
| 57674 2001 $UD_{35}$ | 13.9 | $X$ | 48.75904 | 14.39619 | 64.90750 | 17.00943 | 0.1187799 | 0.17066194 | 3.2189305 | 20 | 1 12.6 | 18.1 |
| 57675 2001 $UG_{36}$ | 14.8 | $X$ | 157.30619 | 260.55692 | 71.41755 | 11.33665 | 0.0494351 | 0.22718575 | 2.6600021 | 20 | — | — |
| 57676 2001 $UR_{36}$ | 14.9 | $X$ | 126.19629 | 117.40692 | 112.04446 | 6.48444 | 0.0519852 | 0.20610450 | 2.8384270 | 20 | 10 23.6 | 19.1 |
| 57677 2001 $UT_{41}$ | 15.1 | $X$ | 16.23071 | 23.17971 | 178.73142 | 4.31376 | 0.1829932 | 0.23833073 | 2.5764162 | 20 | 4 23.4 | 17.2 |
| 57678 2001 $UL_{44}$ | 15.0 | $X$ | 67.82369 | 65.75963 | 50.12735 | 5.42847 | 0.1554806 | 0.17819054 | 3.1276126 | 20 | 3 31.6 | 19.1 |
| 57679 2001 $UD_{46}$ | 15.7 | $X$ | 68.64720 | 256.16506 | 48.49388 | 7.85204 | 0.0992848 | 0.26285061 | 2.4135894 | 20 | 12 3.1 | 19.0 |
| 57680 2001 $UW_{47}$ | 14.9 | $X$ | 47.60490 | 239.85883 | 125.84981 | 6.07296 | 0.0907095 | 0.21454513 | 2.7634839 | 20 | — | — |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57681 2001 $UJ_{48}$ | 14.9 | X | 303.44635 | 208.95306 | 157.85814 | 2.94194 | 0.0631269 | 0.19837185 | 2.9117182 | 20 | 8 11.8 | 18.6 |
| 57682 2001 $UO_{48}$ | 14.0 | X | 136.09686 | 338.99489 | 67.23044 | 15.56900 | 0.0902540 | 0.23257280 | 2.6187664 | 20 | 3 22.2 | 18.1 |
| 57683 2001 $UK_{53}$ | 15.0 | X | 114.75691 | 206.30070 | 138.53043 | 2.97817 | 0.2144474 | 0.22192459 | 2.7018782 | 20 | — | — |
| 57684 2001 $UG_{58}$ | 15.2 | X | 134.78893 | 230.82785 | 339.25034 | 2.10364 | 0.1268587 | 0.25883965 | 2.4384593 | 20 | 10 15.1 | 19.0 |
| 57685 2001 $UK_{58}$ | 15.5 | X | 272.53051 | 144.86371 | 23.78999 | 7.54846 | 0.0670127 | 0.21917181 | 2.7244547 | 20 | — | — |
| 57686 2001 $UL_{65}$ | 14.7 | X | 267.12444 | 100.12747 | 22.17349 | 3.27494 | 0.1109040 | 0.20683592 | 2.8317316 | 20 | 11 14.1 | 18.4 |
| 57687 2001 $UL_{66}$ | 14.0 | X | 145.48379 | 80.01061 | 55.53113 | 11.56542 | 0.0559989 | 0.18985859 | 2.9981214 | 20 | 7 15.8 | 18.6 |
| 57688 2001 $UH_{73}$ | 14.3 | X | 354.00955 | 299.74376 | 64.93031 | 13.86107 | 0.1369912 | 0.20689758 | 2.8311689 | 20 | 11 4.3 | 17.6 |
| 57689 2001 $UM_{73}$ | 15.7 | X | 167.62085 | 152.05233 | 75.15853 | 2.71414 | 0.1588052 | 0.26555958 | 2.3971474 | 20 | 12 7.7 | 19.1 |
| 57690 2001 $UA_{74}$ | 14.9 | X | 224.54272 | 297.62598 | 138.65512 | 3.76012 | 0.1202813 | 0.19592045 | 2.9359560 | 20 | 7 23.4 | 19.3 |
| 57691 2001 $UH_{74}$ | 14.6 | X | 37.19940 | 15.48043 | 95.29831 | 2.04344 | 0.1456961 | 0.17235348 | 3.1978347 | 20 | 2 3.7 | 18.2 |
| 57692 2001 $UG_{75}$ | 16.3 | X | 195.00274 | 140.21491 | 154.74226 | 3.24996 | 0.1661822 | 0.28079222 | 2.3096491 | 20 | — | — |
| 57693 2001 $UD_{76}$ | 14.5 | X | 161.45309 | 272.80862 | 95.41193 | 3.39836 | 0.1977119 | 0.17903761 | 3.1177398 | 20 | 3 6.5 | 19.6 |
| 57694 2001 $UU_{76}$ | 15.0 | X | 309.17549 | 60.16129 | 170.14547 | 4.25678 | 0.0958512 | 0.23339869 | 2.6125850 | 20 | 2 12.1 | 18.3 |
| 57695 2001 $UK_{77}$ | 14.9 | X | 201.15015 | 314.59059 | 139.38546 | 2.16146 | 0.0563432 | 0.19367799 | 2.9585747 | 20 | 7 25.2 | 19.2 |
| 57696 2001 $UH_{83}$ | 15.3 | X | 153.68132 | 291.14153 | 145.66932 | 1.51406 | 0.1314232 | 0.18513011 | 3.0489573 | 20 | 5 14.9 | 20.0 |
| 57697 2001 $UJ_{83}$ | 15.2 | X | 71.67809 | 144.57422 | 143.22864 | 2.63177 | 0.0685316 | 0.20661003 | 2.8337952 | 20 | 11 2.1 | 19.1 |
| 57698 2001 $UC_{86}$ | 16.3 | X | 191.71392 | 40.57757 | 152.45832 | 2.35892 | 0.1353916 | 0.26242248 | 2.4162138 | 20 | 11 21.3 | 19.7 |
| 57699 2001 $US_{88}$ | 15.8 | X | 41.00488 | 356.48836 | 94.42579 | 7.17563 | 0.0574063 | 0.28261054 | 2.2997316 | 20 | — | — |
| 57700 2001 $US_{93}$ | 14.7 | X | 163.27932 | 333.63178 | 102.27992 | 10.60295 | 0.0410469 | 0.18758726 | 3.0222739 | 20 | 5 21.8 | 19.2 |
| 57701 2001 $UT_{94}$ | 14.3 | X | 89.81601 | 78.55455 | 102.63079 | 14.35330 | 0.0784582 | 0.19082018 | 2.9880407 | 20 | 7 9.3 | 18.6 |
| 57702 2001 $UV_{98}$ | 15.2 | X | 345.65212 | 132.40309 | 86.68767 | 5.50236 | 0.1658881 | 0.23541596 | 2.5976389 | 20 | 3 18.1 | 17.9 |
| 57703 2001 $UB_{109}$ | 14.9 | X | 216.11483 | 70.83842 | 87.16431 | 3.25312 | 0.0110544 | 0.20571529 | 2.8420061 | 20 | 11 9.2 | 18.7 |
| 57704 2001 $UV_{114}$ | 14.9 | X | 65.48283 | 74.88763 | 69.46599 | 1.78901 | 0.1349489 | 0.18121811 | 3.0926800 | 20 | 4 28.9 | 19.0 |
| 57705 2001 $UA_{115}$ | 15.7 | X | 118.43538 | 36.58364 | 209.13531 | 5.90494 | 0.0903278 | 0.26029500 | 2.4293616 | 20 | 11 13.0 | 19.2 |
| 57706 2001 $UJ_{116}$ | 15.5 | X | 343.60181 | 113.93275 | 57.41960 | 3.59391 | 0.0707433 | 0.22725823 | 2.6594366 | 20 | 1 20.3 | 18.9 |
| 57707 2001 $UG_{118}$ | 15.2 | X | 295.09242 | 244.13106 | 170.01610 | 1.86865 | 0.0470808 | 0.20353837 | 2.8622344 | 20 | 10 4.8 | 18.9 |
| 57708 2001 $UV_{119}$ | 14.1 | X | 51.93994 | 28.39444 | 76.21036 | 2.01272 | 0.1682912 | 0.17222128 | 3.1994709 | 20 | 2 23.1 | 17.8 |
| 57709 2001 $UW_{119}$ | 14.5 | X | 170.94788 | 131.04173 | 207.69415 | 2.54620 | 0.1007480 | 0.22820459 | 2.6520790 | 20 | 1 27.8 | 18.5 |
| 57710 2001 $UZ_{120}$ | 15.8 | X | 115.18720 | 116.70491 | 182.40753 | 3.89985 | 0.0948479 | 0.26785064 | 2.3834585 | 20 | — | — |
| 57711 2001 $UV_{121}$ | 14.7 | X | 92.65269 | 33.65976 | 85.16234 | 5.81081 | 0.1117560 | 0.18069306 | 3.0986681 | 20 | 4 30.4 | 19.1 |
| 57712 2001 $UJ_{123}$ | 14.9 | X | 264.88130 | 162.29461 | 136.51853 | 2.83850 | 0.1672271 | 0.23612913 | 2.5924059 | 20 | 3 9.4 | 18.8 |
| 57713 2001 $UN_{124}$ | 14.5 | X | 199.97270 | 288.97816 | 122.54017 | 12.24978 | 0.0740453 | 0.19074384 | 2.9888379 | 20 | 6 1.4 | 19.1 |
| 57714 2001 $UY_{124}$ | 11.7 | X | 155.51836 | 319.45089 | 126.42738 | 16.59646 | 0.0257036 | 0.08254958 | 5.2238753 | 20 | 5 27.0 | 18.9 |
| 57715 2001 $UR_{125}$ | 14.8 | X | 229.93646 | 82.45511 | 114.82395 | 13.42305 | 0.1059221 | 0.21557522 | 2.7546737 | 20 | — | — |
| 57716 2001 $UY_{126}$ | 14.6 | X | 79.07355 | 300.42207 | 143.31064 | 5.67604 | 0.1703547 | 0.17522538 | 3.1627974 | 20 | 3 8.5 | 18.8 |
| 57717 2001 $UE_{127}$ | 15.0 | X | 313.15403 | 155.15574 | 126.69183 | 5.70745 | 0.1737386 | 0.24238559 | 2.5476017 | 20 | 4 17.9 | 18.0 |
| 57718 2001 $UJ_{127}$ | 14.7 | X | 279.28123 | 75.24579 | 180.39641 | 8.36828 | 0.0654641 | 0.23102221 | 2.6304712 | 20 | 2 10.5 | 18.5 |
| 57719 2001 $UE_{132}$ | 14.5 | X | 77.80199 | 330.78497 | 147.55939 | 2.34532 | 0.1284222 | 0.17732821 | 3.1377440 | 20 | 4 12.4 | 18.6 |
| 57720 2001 $UM_{134}$ | 14.9 | X | 187.36691 | 24.96280 | 223.35222 | 4.30152 | 0.1112238 | 0.21801718 | 2.7340654 | 20 | — | — |
| 57721 2001 $UK_{139}$ | 16.4 | X | 190.54146 | 68.07298 | 168.62597 | 2.41041 | 0.1448036 | 0.27158040 | 2.3615860 | 20 | — | — |
| 57722 2001 $UG_{142}$ | 15.0 | X | 188.22438 | 33.95109 | 159.72284 | 3.74018 | 0.0766532 | 0.20939734 | 2.8085917 | 20 | 11 14.5 | 19.2 |
| 57723 2001 $UQ_{146}$ | 15.3 | X | 128.31788 | 89.27694 | 213.12047 | 1.17816 | 0.0587400 | 0.21645127 | 2.7472359 | 20 | — | — |
| 57724 2001 $UT_{148}$ | 15.3 | X | 358.02095 | 126.47515 | 61.32994 | 2.38711 | 0.0388921 | 0.23212711 | 2.6221175 | 20 | 3 5.3 | 18.5 |
| 57725 2001 $UN_{149}$ | 15.1 | X | 265.57722 | 259.92828 | 151.28568 | 2.91740 | 0.0610883 | 0.19811489 | 2.9142355 | 20 | 8 18.2 | 19.2 |
| 57726 2001 $UV_{149}$ | 15.2 | X | 292.46547 | 52.19047 | 188.48351 | 2.35334 | 0.1261171 | 0.28356123 | 2.2945885 | 20 | 1 23.7 | 18.1 |
| 57727 2001 $UX_{149}$ | 15.1 | X | 152.01857 | 78.45294 | 203.52760 | 3.48464 | 0.0575746 | 0.21613678 | 2.7499002 | 20 | — | — |
| 57728 2001 $UA_{151}$ | 15.3 | X | 301.21248 | 78.60416 | 93.84019 | 4.33231 | 0.0397937 | 0.22049249 | 2.7135647 | 20 | — | — |
| 57729 2001 $UB_{151}$ | 14.9 | X | 203.64589 | 209.87292 | 66.85063 | 12.60560 | 0.1632684 | 0.22400961 | 2.6850865 | 20 | — | — |
| 57730 2001 $UE_{151}$ | 15.2 | X | 194.72520 | 146.58102 | 107.61744 | 3.28642 | 0.1774176 | 0.27152925 | 2.3618826 | 20 | — | — |
| 57731 2001 $UN_{154}$ | 14.8 | X | 105.40206 | 327.19758 | 56.93456 | 3.09770 | 0.0624102 | 0.22304565 | 2.6928172 | 20 | 1 5.1 | 18.3 |
| 57732 2001 $UE_{158}$ | 15.4 | X | 359.31490 | 243.86141 | 73.49369 | 0.72492 | 0.0239415 | 0.19815663 | 2.9138262 | 20 | 8 28.7 | 19.4 |
| 57733 2001 $UU_{158}$ | 15.4 | X | 105.63449 | 108.52579 | 165.96165 | 3.39486 | 0.1673280 | 0.26229986 | 2.4169667 | 20 | 12 9.3 | 19.2 |
| 57734 2001 $UA_{159}$ | 15.5 | X | 96.99016 | 165.55794 | 118.10667 | 3.67809 | 0.1091295 | 0.26189479 | 2.4194583 | 20 | 12 9.2 | 18.9 |
| 57735 2001 $UQ_{159}$ | 15.0 | X | 52.25812 | 223.54502 | 74.34117 | 3.13436 | 0.0441885 | 0.20327294 | 2.8647255 | 20 | 10 17.8 | 19.0 |
| 57736 2001 $UW_{159}$ | 15.6 | X | 247.83581 | 178.87316 | 71.65587 | 7.14718 | 0.0718163 | 0.27790983 | 2.3255916 | 20 | — | — |
| 57737 2001 $UT_{160}$ | 15.5 | X | 155.37275 | 65.93571 | 209.96547 | 3.71789 | 0.0707047 | 0.21476721 | 2.7615785 | 20 | — | — |
| 57738 2001 $UZ_{160}$ | 15.1 | X | 302.57011 | 181.77661 | 104.88634 | 4.31837 | 0.1804215 | 0.24001972 | 2.5643154 | 20 | 4 7.1 | 18.3 |
| 57739 2001 $UF_{162}$ | 14.7 | X | 115.11366 | 244.76551 | 74.54657 | 8.03564 | 0.0785764 | 0.21509173 | 2.7588002 | 20 | — | — |
| 57740 2001 $UK_{162}$ | 15.1 | X | 44.52212 | 194.76960 | 86.12659 | 8.68568 | 0.1135860 | 0.25240325 | 2.4797397 | 20 | 10 8.1 | 18.4 |
| 57741 2001 $UN_{162}$ | 15.0 | X | 222.36323 | 207.23257 | 105.29677 | 4.17902 | 0.1631106 | 0.23131246 | 2.6282703 | 20 | 2 16.2 | 19.2 |
| 57742 2001 $UA_{163}$ | 15.7 | X | 124.70528 | 182.96951 | 86.84038 | 3.36170 | 0.1882310 | 0.26466942 | 2.4025192 | 20 | 12 20.5 | 19.5 |
| 57743 2001 $UB_{168}$ | 14.3 | X | 233.05413 | 85.06877 | 290.23067 | 11.93730 | 0.1784945 | 0.24231330 | 2.5481083 | 20 | 5 7.6 | 18.6 |
| 57744 2001 $UN_{170}$ | 15.7 | X | 298.17228 | 347.54428 | 238.93181 | 1.08676 | 0.0366815 | 0.23035468 | 2.6355506 | 20 | 2 2.5 | 19.1 |
| 57745 2001 $UT_{170}$ | 15.2 | X | 324.54480 | 232.82160 | 23.68319 | 4.85177 | 0.1511300 | 0.24005400 | 2.5640712 | 20 | 4 2.1 | 17.8 |
| 57746 2001 $UN_{172}$ | 16.3 | X | 262.16728 | 204.29909 | 35.89661 | 5.88755 | 0.1310007 | 0.28182480 | 2.3040041 | 20 | — | — |
| 57747 2001 $UY_{183}$ | 15.2 | X | 352.01765 | 359.82154 | 133.39401 | 8.78618 | 0.1290506 | 0.22225818 | 2.6991740 | 20 | — | — |
| 57748 2001 $UG_{219}$ | 15.4 | X | 246.73474 | 134.09576 | 118.20992 | 8.60660 | 0.1091344 | 0.28036222 | 2.3120101 | 20 | — | — |
| 57749 2001 $UD_{220}$ | 15.1 | X | 92.18038 | 341.61619 | 268.69657 | 10.89304 | 0.1503954 | 0.25588020 | 2.4572250 | 20 | 10 21.2 | 19.0 |
| 57750 2001 $VQ$ | 13.6 | X | 96.50510 | 276.52190 | 170.05277 | 22.87730 | 0.3383261 | 0.17473299 | 3.1687364 | 20 | 4 26.4 | 18.8 |
| 57751 2001 $VB_{1}$ | 14.7 | X | 115.86474 | 339.66330 | 88.18650 | 16.32803 | 0.1543325 | 0.23538829 | 2.5978425 | 20 | 4 3.5 | 18.8 |
| 57752 2001 $VX_{8}$ | 15.1 | X | 54.20069 | 257.95271 | 24.47151 | 3.58104 | 0.1165988 | 0.25449829 | 2.4661121 | 20 | 10 18.9 | 18.1 |
| 57753 2001 $VL_{12}$ | 14.6 | X | 89.82986 | 83.65120 | 0.31499 | 9.10627 | 0.0730449 | 0.17551897 | 3.1592695 | 20 | 3 8.9 | 19.0 |
| 57754 2001 $VW_{12}$ | 14.2 | X | 154.98826 | 19.56969 | 281.57667 | 12.15219 | 0.2114383 | 0.27397146 | 2.3478256 | 20 | — | — |
| 57755 2001 $VC_{13}$ | 14.4 | X | 169.52629 | 74.19295 | 290.62501 | 13.17294 | 0.1832022 | 0.23154811 | 2.6264868 | 20 | 2 26.4 | 18.9 |
| 57756 2001 $VQ_{16}$ | 14.3 | X | 193.59530 | 311.15819 | 126.38064 | 11.47582 | 0.0895121 | 0.19141656 | 2.9818312 | 20 | 6 24.7 | 18.9 |
| 57757 2001 $VT_{17}$ | 15.5 | X | 144.82852 | 117.34600 | 327.55938 | 1.22002 | 0.1486341 | 0.18493199 | 3.0511346 | 20 | 5 16.5 | 20.3 |
| 57758 2001 $VW_{20}$ | 14.8 | X | 163.21002 | 117.70591 | 49.75894 | 2.70972 | 0.0061982 | 0.20034045 | 2.8926127 | 20 | 9 15.9 | 18.8 |
| 57759 2001 $VW_{22}$ | 13.7 | X | 99.03044 | 36.01158 | 57.08845 | 3.74660 | 0.2007531 | 0.12455132 | 3.9710361 | 20 | 4 19.6 | 19.6 |
| 57760 2001 $VH_{23}$ | 14.7 | X | 99.03855 | 114.17918 | 9.70160 | 1.12336 | 0.1179200 | 0.18177886 | 3.0863165 | 20 | 5 13.2 | 19.0 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57761 2001 $VQ_{26}$ | 15.5 | $X$ | 221.14930 | 90.96323 | 314.74362 | 0.76366 | 0.0850310 | 0.18975970 | 2.9991629 | 20 | 6 14.1 | 19.9 |
| 57762 2001 $VK_{27}$ | 14.6 | $X$ | 106.18134 | 78.10753 | 77.90773 | 2.94577 | 0.0257562 | 0.18807444 | 3.0170525 | 20 | 6 19.8 | 18.9 |
| 57763 2001 $VF_{29}$ | 13.9 | $X$ | 88.57658 | 18.19240 | 64.55940 | 13.59227 | 0.1702431 | 0.17438382 | 3.1729648 | 20 | 3 25.9 | 18.5 |
| 57764 2001 $VE_{30}$ | 14.3 | $X$ | 228.27250 | 236.18350 | 66.62533 | 13.51490 | 0.0642189 | 0.17572863 | 3.1567561 | 20 | 2 25.4 | 19.3 |
| 57765 2001 $VR_{30}$ | 15.0 | $X$ | 176.55093 | 35.69623 | 273.95971 | 3.36454 | 0.1482675 | 0.27701057 | 2.3306219 | 20 | — | — |
| 57766 2001 $VC_{35}$ | 14.5 | $X$ | 99.72207 | 298.08861 | 42.88159 | 3.19217 | 0.1918090 | 0.21725241 | 2.7404779 | 20 | — | — |
| 57767 2001 $VX_{37}$ | 15.3 | $X$ | 5.19860 | 5.78191 | 319.43690 | 1.12683 | 0.0501839 | 0.20113430 | 2.8849965 | 20 | 9 17.7 | 19.1 |
| 57768 2001 $VO_{41}$ | 14.9 | $X$ | 183.11923 | 163.32351 | 265.67518 | 3.56473 | 0.0775949 | 0.18788022 | 3.0191313 | 20 | 6 2.3 | 19.4 |
| 57769 2001 $VH_{43}$ | 14.5 | $X$ | 148.29786 | 243.17848 | 104.62648 | 4.19618 | 0.2321512 | 0.22572950 | 2.6714303 | 20 | 1 29.1 | 18.8 |
| 57770 2001 $VA_{45}$ | 14.4 | $X$ | 87.66387 | 298.74371 | 73.26199 | 5.83183 | 0.1269209 | 0.21765105 | 2.7371307 | 20 | — | — |
| 57771 2001 $VK_{48}$ | 14.2 | $X$ | 23.61372 | 189.60570 | 76.44054 | 15.10964 | 0.1602405 | 0.24412674 | 2.5354739 | 20 | 8 22.2 | 17.3 |
| 57772 2001 $VM_{49}$ | 15.0 | $X$ | 221.61195 | 261.58051 | 276.78698 | 10.47198 | 0.0995444 | 0.26536053 | 2.3983460 | 20 | 12 12.3 | 18.0 |
| 57773 2001 $VG_{50}$ | 15.0 | $X$ | 286.51521 | 282.02095 | 318.91410 | 6.41536 | 0.1144840 | 0.28459916 | 2.2890062 | 20 | 1 19.8 | 18.1 |
| 57774 2001 $VH_{50}$ | 14.8 | $X$ | 225.51143 | 304.74570 | 274.88952 | 8.58747 | 0.1045489 | 0.21876534 | 2.7278283 | 20 | — | — |
| 57775 2001 $VS_{51}$ | 15.2 | $X$ | 154.46808 | 324.12001 | 287.11781 | 6.78686 | 0.0744754 | 0.26709285 | 2.3879646 | 20 | 12 30.2 | 18.4 |
| 57776 2001 $VD_{54}$ | 15.4 | $X$ | 347.84008 | 47.81265 | 269.94122 | 4.66562 | 0.1411329 | 0.25323343 | 2.4743171 | 20 | 8 20.4 | 17.7 |
| 57777 2001 $VO_{63}$ | 14.5 | $X$ | 329.05360 | 214.80897 | 41.91503 | 11.23771 | 0.0515778 | 0.18515638 | 3.0486690 | 20 | 4 26.2 | 18.5 |
| 57778 2001 $VJ_{64}$ | 15.4 | $X$ | 118.50360 | 260.15309 | 27.22329 | 6.30215 | 0.0958605 | 0.26567103 | 2.3964769 | 20 | — | — |
| 57779 2001 $VX_{73}$ | 14.4 | $X$ | 189.24829 | 12.64509 | 302.57056 | 12.41457 | 0.1324999 | 0.22945919 | 2.6424031 | 20 | 1 20.1 | 18.6 |
| 57780 2001 $VN_{77}$ | 15.0 | $X$ | 245.92090 | 321.11004 | 138.86921 | 6.78617 | 0.0897030 | 0.25632864 | 2.4543583 | 20 | 10 2.6 | 18.1 |
| 57781 2001 $VA_{79}$ | 15.8 | $X$ | 321.53642 | 9.43415 | 230.90790 | 4.69130 | 0.1500830 | 0.28879285 | 2.2667925 | 20 | 2 25.1 | 18.3 |
| 57782 2001 $VN_{79}$ | 15.1 | $X$ | 62.14239 | 169.39714 | 127.38259 | 6.09086 | 0.0366164 | 0.25794276 | 2.4441085 | 20 | 11 8.8 | 18.3 |
| 57783 2001 $VQ_{79}$ | 14.7 | $X$ | 250.57756 | 309.94719 | 78.93518 | 11.26444 | 0.0433976 | 0.19219121 | 2.9738133 | 20 | 7 2.6 | 18.9 |
| 57784 2001 $VW_{85}$ | 14.9 | $X$ | 72.26334 | 321.32615 | 227.66766 | 6.55049 | 0.1643487 | 0.24190112 | 2.5510020 | 20 | 7 11.2 | 18.3 |
| 57785 2001 $VY_{85}$ | 15.0 | $X$ | 259.02081 | 102.20967 | 13.89298 | 5.01459 | 0.0533896 | 0.20581162 | 2.8411192 | 20 | 11 2.7 | 18.8 |
| 57786 2001 $VB_{87}$ | 14.6 | $X$ | 277.12841 | 155.71625 | 179.13333 | 12.94079 | 0.1975022 | 0.24323881 | 2.5416406 | 20 | 5 6.1 | 18.2 |
| 57787 2001 $VX_{87}$ | 14.5 | $X$ | 102.66828 | 264.81791 | 140.33827 | 10.21101 | 0.0940813 | 0.17527374 | 3.1622156 | 20 | 2 8.4 | 19.0 |
| 57788 2001 $VE_{88}$ | 15.2 | $X$ | 160.16360 | 91.74581 | 94.79537 | 6.21085 | 0.0386580 | 0.25695258 | 2.4503835 | 20 | 10 16.9 | 18.6 |
| 57789 2001 $VW_{90}$ | 14.7 | $X$ | 227.38693 | 256.06809 | 109.71917 | 11.34611 | 0.0240597 | 0.18637688 | 3.0353448 | 20 | 5 11.4 | 19.2 |
| 57790 2001 $VO_{92}$ | 14.4 | $X$ | 200.06597 | 237.66541 | 103.83287 | 15.85181 | 0.0972078 | 0.23229963 | 2.6208190 | 20 | 3 6.9 | 18.6 |
| 57791 2001 $VK_{93}$ | 14.3 | $X$ | 51.80099 | 252.34855 | 111.82911 | 13.59634 | 0.1907451 | 0.21419019 | 2.7665361 | 20 | — | — |
| 57792 2001 $VQ_{94}$ | 14.5 | $X$ | 293.94466 | 177.55792 | 129.97778 | 14.62329 | 0.1762194 | 0.24121614 | 2.5558291 | 20 | 4 28.3 | 18.1 |
| 57793 2001 $VZ_{94}$ | 14.5 | $X$ | 50.17945 | 330.56198 | 194.72492 | 16.95358 | 0.1942012 | 0.17661403 | 3.1461970 | 20 | 5 13.5 | 18.5 |
| 57794 2001 $VK_{97}$ | 13.8 | $X$ | 144.73726 | 222.37063 | 122.86390 | 23.90865 | 0.0841694 | 0.16894230 | 3.2407370 | 20 | 1 15.8 | 18.6 |
| 57795 2001 $VM_{99}$ | 14.5 | $X$ | 42.46701 | 275.68002 | 134.22635 | 13.85286 | 0.1019298 | 0.21854446 | 2.7296660 | 20 | — | — |
| 57796 2001 $VO_{99}$ | 14.7 | $X$ | 177.81754 | 200.12905 | 178.64243 | 15.50743 | 0.1355932 | 0.23498707 | 2.6007987 | 20 | 3 26.2 | 18.7 |
| 57797 2001 $VX_{99}$ | 14.2 | $X$ | 73.81015 | 285.11264 | 132.78561 | 15.57665 | 0.1256971 | 0.22340191 | 2.6899537 | 20 | 1 12.3 | 17.4 |
| 57798 2001 $VM_{101}$ | 15.5 | $X$ | 154.67314 | 320.42814 | 291.95732 | 3.72574 | 0.0974691 | 0.21280296 | 2.7785461 | 20 | 12 18.7 | 19.6 |
| 57799 2001 $VJ_{102}$ | 15.2 | $X$ | 188.88244 | 257.00526 | 333.28134 | 2.09891 | 0.0301920 | 0.21350360 | 2.7724640 | 20 | — | — |
| 57800 2001 $VK_{104}$ | 14.5 | $X$ | 13.44811 | 124.36525 | 31.52577 | 7.78205 | 0.1040379 | 0.17389831 | 3.1788679 | 20 | 2 23.9 | 18.5 |
| 57801 2001 $VW_{107}$ | 15.2 | $X$ | 132.81285 | 71.32767 | 24.51924 | 1.38798 | 0.0605456 | 0.18464402 | 3.0543061 | 20 | 5 10.3 | 19.7 |
| 57802 2001 $VO_{108}$ | 14.6 | $X$ | 344.90823 | 156.87929 | 11.69099 | 4.96690 | 0.1084414 | 0.17108009 | 3.2136832 | 20 | 1 25.6 | 18.7 |
| 57803 2001 $VW_{108}$ | 15.4 | $X$ | 304.49222 | 110.03896 | 37.58205 | 2.74024 | 0.0138324 | 0.21791453 | 2.7349240 | 20 | — | — |
| 57804 2001 $VQ_{118}$ | 14.2 | $X$ | 166.67688 | 294.82292 | 59.46743 | 9.65317 | 0.2056360 | 0.22857308 | 2.6492280 | 20 | 2 23.1 | 18.7 |
| 57805 2001 $VA_{119}$ | 15.1 | $X$ | 236.68362 | 78.47246 | 51.81551 | 2.72143 | 0.0257658 | 0.20440790 | 2.8541115 | 20 | 10 28.3 | 18.8 |
| 57806 2001 $VR_{121}$ | 15.4 | $X$ | 229.49183 | 99.96282 | 112.42302 | 7.16238 | 0.0510375 | 0.26962992 | 2.3729613 | 20 | — | — |
| 57807 2001 $VV_{121}$ | 14.3 | $X$ | 143.75810 | 5.91597 | 56.79510 | 14.38987 | 0.1514431 | 0.23807405 | 2.5782677 | 20 | 4 21.1 | 18.3 |
| 57808 2001 $VF_{122}$ | 14.4 | $X$ | 131.42376 | 283.01417 | 132.79954 | 18.89704 | 0.0719525 | 0.18057633 | 3.1000034 | 20 | 3 27.7 | 19.2 |
| 57809 2001 $VS_{122}$ | 13.9 | $X$ | 193.51109 | 67.95937 | 70.48023 | 18.02440 | 0.1091894 | 0.19966587 | 2.8991242 | 20 | 9 18.6 | 18.7 |
| 57810 2001 $WC$ | 14.7 | $X$ | 114.59566 | 4.38938 | 13.78881 | 4.00840 | 0.1165916 | 0.22379591 | 2.6867955 | 20 | 1 17.9 | 18.3 |
| 57811 2001 $WE_{17}$ | 15.0 | $X$ | 130.69392 | 111.24865 | 358.73697 | 1.88178 | 0.1711256 | 0.18600402 | 3.0393998 | 20 | 6 4.5 | 19.8 |
| 57812 2001 $WH_{20}$ | 16.3 | $X$ | 212.11098 | 230.20586 | 319.04898 | 1.82948 | 0.0568504 | 0.26549456 | 2.3975388 | 20 | 12 20.7 | 19.3 |
| 57813 2001 $WZ_{21}$ | 14.5 | $X$ | 82.55622 | 75.32894 | 101.97439 | 11.08757 | 0.0111201 | 0.19028017 | 2.9936914 | 20 | 6 15.5 | 18.7 |
| 57814 2001 $WK_{25}$ | 14.8 | $X$ | 91.74633 | 190.29877 | 142.56453 | 5.78033 | 0.0548006 | 0.21613104 | 2.7499489 | 20 | — | — |
| 57815 2001 $WV_{25}$ | 15.2 | $X$ | 194.29186 | 141.35905 | 118.10304 | 5.83862 | 0.1317986 | 0.27327219 | 2.3518291 | 20 | — | — |
| 57816 2001 $WW_{26}$ | 15.0 | $X$ | 212.05310 | 221.58455 | 147.94861 | 2.39359 | 0.1003344 | 0.18558585 | 3.0439638 | 20 | 4 20.5 | 19.8 |
| 57817 2001 $WL_{27}$ | 15.0 | $X$ | 105.48845 | 181.42743 | 88.28784 | 10.97946 | 0.2225502 | 0.26186614 | 2.4196348 | 20 | 12 5.8 | 19.1 |
| 57818 2001 $WB_{28}$ | 15.5 | $X$ | 294.84530 | 171.11709 | 100.29002 | 6.43636 | 0.0872700 | 0.28841419 | 2.2687761 | 20 | 3 17.9 | 18.3 |
| 57819 2001 $WW_{28}$ | 14.8 | $X$ | 252.82209 | 219.84863 | 190.58184 | 7.59501 | 0.0942141 | 0.19490596 | 2.9461350 | 20 | 7 24.7 | 19.1 |
| 57820 2001 $WQ_{40}$ | 14.5 | $X$ | 277.71158 | 130.67095 | 215.52382 | 6.83290 | 0.2071728 | 0.24261751 | 2.5459779 | 20 | 5 18.6 | 18.0 |
| 57821 2001 $WD_{44}$ | 14.0 | $X$ | 67.43190 | 324.88643 | 105.93313 | 9.75669 | 0.1762180 | 0.17336771 | 3.1853506 | 20 | 2 6.4 | 18.0 |
| 57822 2001 $WV_{45}$ | 15.6 | $X$ | 174.74930 | 243.93061 | 354.42358 | 1.75170 | 0.1376630 | 0.26532864 | 2.3985381 | 20 | 12 30.3 | 19.0 |
| 57823 2001 $WD_{47}$ | 14.9 | $X$ | 11.06655 | 172.84072 | 54.47845 | 9.32793 | 0.1443034 | 0.23939608 | 2.5687669 | 20 | 5 18.9 | 17.4 |
| 57824 2001 $WT_{48}$ | 14.5 | $X$ | 187.08931 | 301.98149 | 133.46846 | 9.89408 | 0.0815558 | 0.18987064 | 2.9979945 | 20 | 6 15.7 | 19.2 |
| 57825 2001 $WP_{76}$ | 15.0 | $X$ | 340.08249 | 92.10774 | 68.11675 | 2.67437 | 0.0965821 | 0.17028154 | 3.2237227 | 20 | 1 8.8 | 19.2 |
| 57826 2001 $WB_{90}$ | 14.6 | $X$ | 100.20601 | 49.62259 | 6.29266 | 9.33019 | 0.0915745 | 0.17504364 | 3.1649863 | 20 | 2 21.1 | 19.1 |
| 57827 2001 $WM_{91}$ | 14.8 | $X$ | 325.46809 | 156.68433 | 30.40975 | 6.98991 | 0.0882929 | 0.22404719 | 2.6847863 | 20 | 1 14.2 | 18.3 |
| 57828 2001 $XZ_{4}$ | 14.6 | $X$ | 275.31936 | 203.18019 | 95.40002 | 12.78524 | 0.1152754 | 0.18243134 | 3.0789532 | 20 | 4 6.1 | 19.3 |
| 57829 2001 $XZ_{9}$ | 14.4 | $X$ | 237.81292 | 175.84294 | 65.87101 | 16.04528 | 0.1160062 | 0.21752748 | 2.7381672 | 20 | — | — |
| 57830 2001 $XW_{11}$ | 14.8 | $X$ | 82.12637 | 213.87103 | 6.49202 | 9.98026 | 0.0300869 | 0.19343289 | 2.9610734 | 20 | 8 16.5 | 19.0 |
| 57831 2001 $XX_{16}$ | 14.4 | $X$ | 242.22018 | 311.42626 | 46.34444 | 5.95907 | 0.2557929 | 0.24112809 | 2.5564512 | 20 | 4 21.9 | 18.5 |
| 57832 2001 $XL_{18}$ | 14.8 | $X$ | 21.61748 | 257.08640 | 15.99135 | 7.42774 | 0.2096034 | 0.29774826 | 2.2211091 | 20 | 9 12.0 | 16.7 |
| 57833 2001 $XD_{26}$ | 14.0 | $X$ | 338.93602 | 206.14915 | 104.69541 | 22.76157 | 0.0291609 | 0.23929757 | 2.5694718 | 20 | 7 25.8 | 17.3 |
| 57834 2001 $XE_{28}$ | 13.7 | $X$ | 8.20902 | 133.73878 | 105.44323 | 22.86484 | 0.1075812 | 0.17799835 | 3.1298635 | 20 | 6 4.6 | 17.8 |
| 57835 2001 $XO_{36}$ | 14.6 | $X$ | 218.38981 | 353.90586 | 18.45786 | 9.83210 | 0.1050971 | 0.18523549 | 3.0478008 | 20 | 4 27.4 | 19.4 |
| 57836 2001 $XL_{39}$ | 14.3 | $X$ | 201.37861 | 54.88056 | 9.59178 | 9.66735 | 0.1089741 | 0.18732516 | 3.0250924 | 20 | 6 14.2 | 19.1 |
| 57837 2001 $XZ_{39}$ | 13.6 | $X$ | 10.47657 | 179.82183 | 113.91263 | 10.90562 | 0.0635852 | 0.19149601 | 2.9810064 | 20 | 8 16.5 | 17.5 |
| 57838 2001 $XF_{49}$ | 14.8 | $X$ | 358.75534 | 65.09015 | 95.04334 | 0.88225 | 0.2658800 | 0.16906878 | 3.2391205 | 20 | 1 20.6 | 18.1 |
| 57839 2001 $XF_{50}$ | 15.9 | $X$ | 151.46522 | 190.18691 | 67.76267 | 2.27248 | 0.1501718 | 0.26446612 | 2.4037503 | 20 | 12 30.6 | 19.5 |
| 57840 2001 $XY_{52}$ | 15.0 | $X$ | 177.05956 | 147.33240 | 81.03765 | 5.39796 | 0.0308433 | 0.20925233 | 2.8098891 | 20 | 12 16.9 | 19.1 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57841 2001 $XG_{53}$ | 15.5 | $X$ | 9.19545 | 164.85786 | 85.54254 | 6.25777 | 0.1531887 | 0.29392979 | 2.2403041 | 20 | 6 23.9 | 17.0 |
| 57842 2001 $XQ_{53}$ | 14.9 | $X$ | 28.19618 | 45.13374 | 96.97706 | 6.06050 | 0.1080718 | 0.17232747 | 3.1981565 | 20 | 2 28.9 | 18.9 |
| 57843 2001 $XO_{59}$ | 14.5 | $X$ | 160.74069 | 215.88176 | 105.04221 | 7.85381 | 0.1270797 | 0.27423206 | 2.3463379 | 20 | — | — |
| 57844 2001 $XV_{60}$ | 15.4 | $X$ | 166.65274 | 350.77062 | 137.08488 | 2.19180 | 0.0229304 | 0.19172886 | 2.9785922 | 20 | 7 28.7 | 19.7 |
| 57845 2001 $XN_{71}$ | 14.7 | $X$ | 26.26151 | 112.03552 | 140.71439 | 9.61657 | 0.0504799 | 0.18981410 | 2.9985898 | 20 | 7 12.3 | 18.7 |
| 57846 2001 $XR_{72}$ | 14.4 | $X$ | 131.25634 | 48.32699 | 114.34691 | 11.16484 | 0.0398334 | 0.19186121 | 2.9772223 | 20 | 8 1.0 | 18.6 |
| 57847 2001 $XP_{80}$ | 14.4 | $X$ | 24.78216 | 34.13501 | 126.16362 | 10.29421 | 0.1718750 | 0.17309824 | 3.1886556 | 20 | 3 21.9 | 18.1 |
| 57848 2001 $XC_{81}$ | 14.9 | $X$ | 285.16852 | 162.03831 | 111.99861 | 13.41226 | 0.1406484 | 0.23178078 | 2.6247288 | 20 | 3 8.3 | 18.7 |
| 57849 2001 $XR_{86}$ | 13.6 | $X$ | 14.82196 | 86.99811 | 121.29311 | 16.25060 | 0.1857863 | 0.17349416 | 3.1838027 | 20 | 5 10.5 | 17.4 |
| 57850 2001 $XX_{89}$ | 15.9 | $X$ | 160.03089 | 218.93349 | 17.09136 | 2.22625 | 0.1598912 | 0.26262559 | 2.4149679 | 20 | 12 10.6 | 19.6 |
| 57851 2001 $XJ_{97}$ | 14.3 | $X$ | 66.59865 | 61.63616 | 51.94930 | 8.99151 | 0.0646208 | 0.17430472 | 3.1739247 | 20 | 3 17.5 | 18.7 |
| 57852 2001 $XM_{97}$ | 15.2 | $X$ | 249.95239 | 189.64741 | 79.03477 | 7.63730 | 0.1804049 | 0.27898171 | 2.3196310 | 20 | 1 12.2 | 18.8 |
| 57853 2001 $XG_{98}$ | 14.5 | $X$ | 207.80435 | 298.79340 | 43.82035 | 4.86996 | 0.2395624 | 0.23239988 | 2.6200653 | 20 | 3 10.4 | 19.1 |
| 57854 2001 $XD_{132}$ | 15.4 | $X$ | 169.89133 | 180.23816 | 84.41187 | 2.16503 | 0.0936906 | 0.21413625 | 2.7670006 | 20 | — | — |
| 57855 2001 $XT_{144}$ | 14.9 | $X$ | 334.86479 | 166.53475 | 90.53289 | 14.51237 | 0.1445970 | 0.23584543 | 2.5944845 | 20 | 4 29.1 | 18.0 |
| 57856 2001 $XE_{203}$ | 15.1 | $X$ | 263.03557 | 98.82768 | 89.11996 | 12.72815 | 0.1088353 | 0.21615006 | 2.7497875 | 20 | — | — |
| 57857 2001 $XJ_{203}$ | 15.4 | $X$ | 96.55278 | 160.13839 | 108.21768 | 7.20276 | 0.1206131 | 0.25888272 | 2.4381889 | 20 | 11 21.3 | 19.0 |
| 57858 2001 $XU_{204}$ | 15.1 | $X$ | 119.33898 | 179.46785 | 128.14945 | 7.05183 | 0.1360393 | 0.26782108 | 2.3836339 | 20 | — | — |
| 57859 2001 $XK_{207}$ | 14.6 | $X$ | 34.20515 | 116.87848 | 106.12790 | 12.13360 | 0.0867326 | 0.18571022 | 3.0426046 | 20 | 6 18.9 | 18.6 |
| 57860 2001 $XS_{214}$ | 14.6 | $X$ | 32.93848 | 185.26900 | 181.18351 | 3.99091 | 0.2046541 | 0.20969246 | 2.8059559 | 20 | — | — |
| 57861 2001 $XL_{221}$ | 15.1 | $X$ | 35.18214 | 93.87861 | 59.69300 | 1.95155 | 0.1122398 | 0.17730898 | 3.1379708 | 20 | 3 23.6 | 18.8 |
| 57862 2001 $XR_{226}$ | 15.7 | $X$ | 182.51139 | 317.58539 | 349.94189 | 3.00660 | 0.1545179 | 0.27764955 | 2.3270447 | 20 | — | — |
| 57863 2001 $XT_{227}$ | 14.4 | $X$ | 259.72478 | 39.89025 | 265.26955 | 12.58876 | 0.1665722 | 0.23552283 | 2.5968530 | 20 | 3 4.6 | 18.6 |
| 57864 2001 $XY_{229}$ | 14.8 | $X$ | 348.30109 | 267.40000 | 281.95567 | 0.20532 | 0.1173125 | 0.17330924 | 3.1860670 | 20 | 2 22.6 | 18.6 |
| 57865 2001 $XZ_{229}$ | 15.3 | $X$ | 69.52972 | 212.21223 | 71.86860 | 3.22507 | 0.0433894 | 0.20226837 | 2.8742028 | 20 | 10 21.7 | 19.2 |
| 57866 2001 $XU_{244}$ | 15.0 | $X$ | 250.79632 | 196.76570 | 55.66589 | 10.14357 | 0.1912031 | 0.22599369 | 2.6693479 | 20 | — | — |
| 57867 2001 $XS_{256}$ | 14.8 | $X$ | 24.39704 | 7.04870 | 171.41237 | 10.37926 | 0.1701158 | 0.22953233 | 2.6418418 | 20 | 4 6.4 | 17.3 |
| 57868 Pupin | 15.3 | $X$ | 106.86059 | 46.05599 | 287.62517 | 4.22909 | 0.2536242 | 0.26806547 | 2.3821849 | 20 | — | — |
| 57869 2001 $YM_{24}$ | 15.3 | $X$ | 16.80716 | 175.90649 | 48.95077 | 5.43920 | 0.2186963 | 0.23679422 | 2.5875494 | 20 | 6 2.1 | 17.2 |
| 57870 2001 $YG_{46}$ | 14.1 | $X$ | 183.80788 | 260.73531 | 78.37172 | 18.28250 | 0.1361574 | 0.17423566 | 3.1747633 | 20 | 2 24.6 | 19.5 |
| 57871 2001 $YB_{52}$ | 14.3 | $X$ | 244.00658 | 250.06824 | 69.40896 | 8.31838 | 0.1598811 | 0.18003515 | 3.1062127 | 20 | 3 22.4 | 19.3 |
| 57872 2001 $YU_{87}$ | 13.8 | $X$ | 254.77106 | 206.39302 | 98.52229 | 27.76066 | 0.1130317 | 0.17520474 | 3.1630458 | 20 | 3 29.8 | 19.1 |
| 57873 2001 $YF_{98}$ | 13.7 | $X$ | 28.91436 | 117.40458 | 50.98955 | 14.60083 | 0.2170611 | 0.17420139 | 3.1751797 | 20 | 4 14.3 | 17.1 |
| 57874 2001 $YR_{110}$ | 14.5 | $X$ | 235.49510 | 352.68602 | 267.52659 | 23.40960 | 0.1431116 | 0.27873585 | 2.3209948 | 20 | — | — |
| 57875 2001 $YV_{114}$ | 13.9 | $X$ | 319.14148 | 185.35652 | 152.96869 | 19.58061 | 0.2983495 | 0.19853272 | 2.9101452 | 20 | 6 28.2 | 17.3 |
| 57876 2001 $YB_{122}$ | 14.9 | $X$ | 279.32517 | 207.84690 | 53.40183 | 13.47342 | 0.1025438 | 0.22934287 | 2.6432965 | 20 | 2 21.5 | 18.9 |
| 57877 2001 $YT_{123}$ | 14.7 | $X$ | 152.75658 | 272.27986 | 42.08660 | 6.81451 | 0.1400549 | 0.27277703 | 2.3546743 | 20 | — | — |
| 57878 2001 $YZ_{148}$ | 15.2 | $X$ | 89.55913 | 174.25937 | 201.91446 | 7.77485 | 0.2964985 | 0.27129877 | 2.3632201 | 20 | — | — |
| 57879 Cesarechiosi | 15.0 | $X$ | 99.83636 | 169.05232 | 163.27236 | 9.45984 | 0.1493164 | 0.21553509 | 2.7550156 | 20 | — | — |
| 57880 2002 $AN_{3}$ | 14.4 | $X$ | 202.17146 | 304.85782 | 107.75431 | 15.28736 | 0.0985340 | 0.18501472 | 3.0502249 | 20 | 6 4.1 | 19.2 |
| 57881 2002 $AZ_{35}$ | 14.1 | $X$ | 176.91037 | 250.98317 | 88.50113 | 15.38075 | 0.1322958 | 0.22891271 | 2.6466069 | 20 | 2 9.6 | 18.4 |
| 57882 2002 $AB_{36}$ | 14.9 | $X$ | 195.84480 | 185.94024 | 86.51566 | 13.43641 | 0.1181299 | 0.21999405 | 2.7176619 | 20 | — | — |
| 57883 2002 $AR_{72}$ | 14.7 | $X$ | 217.83394 | 158.37156 | 78.17741 | 8.92730 | 0.1887246 | 0.21110657 | 2.7934113 | 20 | — | — |
| 57884 2002 $AU_{90}$ | 13.7 | $X$ | 101.32782 | 357.69958 | 121.59222 | 20.23919 | 0.1174561 | 0.18128864 | 3.0918778 | 20 | 5 17.7 | 18.6 |
| 57885 2002 $AU_{181}$ | 13.9 | $X$ | 318.13464 | 298.06952 | 297.65037 | 15.57878 | 0.0991834 | 0.17980423 | 3.1088716 | 20 | 3 1.8 | 18.4 |
| 57886 2002 $AL_{183}$ | 14.6 | $X$ | 38.03454 | 215.33698 | 25.14031 | 7.40519 | 0.0258709 | 0.19073510 | 2.9889293 | 20 | 7 11.9 | 18.7 |
| 57887 2002 $AR_{201}$ | 14.1 | $X$ | 313.13998 | 307.06226 | 356.06015 | 9.13466 | 0.1749071 | 0.18259748 | 3.0770852 | 20 | 5 13.8 | 18.0 |
| 57888 2002 $BS_{6}$ | 13.9 | $X$ | 300.91281 | 292.01033 | 318.56044 | 16.11543 | 0.1386011 | 0.17199738 | 3.2022471 | 20 | 2 25.7 | 18.4 |
| 57889 2002 $CN_{11}$ | 13.8 | $X$ | 39.55033 | 41.81254 | 116.53282 | 28.09345 | 0.1285450 | 0.17608198 | 3.1525315 | 20 | 4 20.2 | 18.3 |
| 57890 2002 $CJ_{26}$ | 14.7 | $X$ | 118.21359 | 122.79840 | 291.97040 | 13.94315 | 0.0484942 | 0.23034623 | 2.6356150 | 20 | 2 20.3 | 18.5 |
| 57891 2002 $CJ_{35}$ | 13.6 | $X$ | 189.44167 | 40.38047 | 0.37699 | 27.84368 | 0.0996094 | 0.17536177 | 3.1611573 | 20 | 4 22.4 | 18.9 |
| 57892 2002 $CH_{36}$ | 14.7 | $X$ | 113.10250 | 164.21233 | 136.75573 | 2.58668 | 0.0429957 | 0.20301368 | 2.8671639 | 20 | 12 30.8 | 18.8 |
| 57893 2002 $CJ_{95}$ | 16.1 | $X$ | 186.36255 | 265.72771 | 10.95420 | 1.15255 | 0.1663438 | 0.25923356 | 2.4359885 | 20 | — | — |
| 57894 2002 $CJ_{129}$ | 14.8 | $X$ | 306.73191 | 161.19621 | 166.02988 | 9.74943 | 0.1955243 | 0.23452510 | 2.6042129 | 20 | 6 6.9 | 17.9 |
| 57895 2002 $CX_{134}$ | 14.2 | $X$ | 178.05522 | 299.77855 | 109.57960 | 12.09217 | 0.1194452 | 0.18430007 | 3.0581049 | 20 | 5 8.7 | 19.2 |
| 57896 2002 $CN_{201}$ | 15.3 | $X$ | 336.06010 | 193.69436 | 135.69577 | 8.15679 | 0.3257787 | 0.23970899 | 2.5665309 | 20 | 8 4.5 | 16.2 |
| 57897 2002 $CV_{213}$ | 14.7 | $X$ | 300.36931 | 214.98769 | 148.93516 | 9.57576 | 0.1735459 | 0.23454109 | 2.6040946 | 20 | 7 21.4 | 17.6 |
| 57898 2002 $CF_{237}$ | 14.8 | $X$ | 307.24561 | 196.10741 | 162.08104 | 8.12265 | 0.2054800 | 0.23689857 | 2.5867895 | 20 | 7 20.3 | 17.4 |
| 57899 2002 $CU_{237}$ | 14.3 | $X$ | 16.29542 | 120.95755 | 138.49627 | 12.95371 | 0.1358862 | 0.22517743 | 2.6757948 | 20 | 7 16.4 | 17.3 |
| 57900 2002 $CY_{239}$ | 14.8 | $X$ | 2.18748 | 143.65962 | 197.39152 | 4.50214 | 0.2013354 | 0.24192056 | 2.5508653 | 20 | 11 1.1 | 17.2 |
| 57901 Hitchens | 13.7 | $X$ | 62.50485 | 117.06159 | 322.39843 | 12.20998 | 0.1492055 | 0.22508680 | 2.6765130 | 20 | 1 27.3 | 16.6 |
| 57902 2002 $CR_{307}$ | 15.2 | $X$ | 49.19848 | 253.92913 | 120.93303 | 13.10037 | 0.1842154 | 0.25693866 | 2.4504720 | 20 | — | — |
| 57903 2002 $EX_{16}$ | 15.0 | $X$ | 293.51997 | 146.22336 | 121.85555 | 10.93072 | 0.1907079 | 0.27291110 | 2.3539031 | 20 | 2 25.8 | 18.2 |
| 57904 2002 $ER_{25}$ | 12.2 | $X$ | 293.09257 | 223.39846 | 194.25031 | 1.99251 | 0.0713283 | 0.08191234 | 5.2509331 | 20 | 9 14.5 | 19.0 |
| 57905 2002 $EO_{30}$ | 15.5 | $X$ | 348.42118 | 313.53566 | 9.93992 | 8.25961 | 0.1912698 | 0.28826503 | 2.2695586 | 20 | 9 16.6 | 17.0 |
| 57906 2002 $EO_{31}$ | 14.9 | $X$ | 282.34442 | 216.88815 | 65.31054 | 4.95578 | 0.0554731 | 0.21976568 | 2.7195443 | 20 | 3 26.2 | 18.6 |
| 57907 2002 $EQ_{31}$ | 15.3 | $X$ | 270.56853 | 213.18400 | 85.07129 | 4.32034 | 0.1875685 | 0.27240832 | 2.3567986 | 20 | 3 10.8 | 18.8 |
| 57908 2002 $ER_{31}$ | 14.2 | $X$ | 76.88617 | 243.61432 | 195.55181 | 8.73447 | 0.1354708 | 0.21353569 | 2.7721862 | 20 | 2 14.7 | 17.7 |
| 57909 2002 $ED_{33}$ | 16.0 | $X$ | 190.35259 | 107.55356 | 3.89014 | 13.58460 | 0.1142656 | 0.23898768 | 2.5716925 | 20 | 8 10.1 | 20.1 |
| 57910 2002 $ED_{61}$ | 12.3 | $X$ | 266.12479 | 257.45573 | 200.99532 | 4.35312 | 0.0388383 | 0.08407709 | 5.1604109 | 20 | 10 3.4 | 19.1 |
| 57911 2002 $EE_{96}$ | 15.7 | $X$ | 7.05839 | 344.31199 | 343.63928 | 4.35961 | 0.1006717 | 0.29149332 | 2.2527707 | 20 | 10 16.7 | 18.1 |
| 57912 2002 $ES_{99}$ | 14.5 | $X$ | 333.61191 | 217.23209 | 5.68173 | 14.77675 | 0.0961807 | 0.22102679 | 2.7091899 | 20 | 3 13.3 | 17.7 |
| 57913 2002 $EJ_{107}$ | 15.2 | $X$ | 190.51837 | 121.27201 | 136.66774 | 14.93108 | 0.1013444 | 0.25571249 | 2.4582993 | 20 | — | — |
| 57914 2002 $EC_{109}$ | 16.1 | $X$ | 131.94879 | 300.84132 | 110.56656 | 4.05640 | 0.1809495 | 0.27515249 | 2.3411025 | 20 | 3 23.9 | 19.4 |
| 57915 2002 $EB_{110}$ | 12.4 | $X$ | 218.58916 | 129.91391 | 19.33741 | 14.88190 | 0.0376327 | 0.08233054 | 5.2331367 | 20 | 10 9.1 | 19.3 |
| 57916 2002 $EC_{111}$ | 15.2 | $X$ | 10.94956 | 183.51498 | 112.51693 | 4.92509 | 0.0664424 | 0.23496229 | 2.6009816 | 20 | 8 25.8 | 18.3 |
| 57917 2002 $EK_{111}$ | 14.8 | $X$ | 243.56496 | 219.94787 | 75.98379 | 6.82603 | 0.1251600 | 0.26774741 | 2.3840710 | 20 | 2 15.6 | 18.4 |
| 57918 2002 $EE_{120}$ | 16.2 | $X$ | 64.32632 | 332.76580 | 338.71983 | 3.09454 | 0.1550851 | 0.29669986 | 2.2263383 | 20 | 12 21.1 | 19.3 |
| 57919 2002 $EE_{129}$ | 16.3 | $X$ | 338.38099 | 249.40271 | 22.54343 | 0.51331 | 0.1750530 | 0.22405895 | 2.6846923 | 20 | 5 17.7 | 19.0 |
| 57920 2002 $EL_{153}$ | 12.4 | $X$ | 307.61653 | 240.23234 | 188.81630 | 4.62103 | 0.0367426 | 0.08189880 | 5.2515120 | 20 | 10 19.0 | 19.1 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 57921 2002 $EY_{154}$ | 15.3 | $X$ | 5.19493 | 196.07148 | 80.60289 | 4.31887 | 0.1290768 | 0.22880138 | 2.6474654 | 20 | 7 22.0 | 18.0 |
| 57922 2002 $FU_{8}$ | 14.2 | $X$ | 154.13545 | 194.84917 | 200.02743 | 10.68680 | 0.1293265 | 0.22007704 | 2.7169787 | 20 | 3 21.5 | 18.5 |
| 57923 2002 $FQ_{14}$ | 15.3 | $X$ | 59.08370 | 359.54604 | 263.41013 | 2.85234 | 0.0522760 | 0.23679498 | 2.5875439 | 20 | 9 14.7 | 18.7 |
| 57924 2002 $FO_{28}$ | 15.0 | $X$ | 75.63154 | 334.86226 | 63.48790 | 6.99423 | 0.3063834 | 0.26651364 | 2.3914231 | 20 | 1 4.8 | 16.7 |
| 57925 2002 $FQ_{30}$ | 15.3 | $X$ | 190.27852 | 151.84542 | 198.24312 | 5.62938 | 0.1968417 | 0.26838911 | 2.3802694 | 20 | 2 28.2 | 19.3 |
| 57926 2002 $FV_{34}$ | 14.2 | $X$ | 279.45115 | 105.52029 | 206.23443 | 11.87311 | 0.0480538 | 0.16816194 | 3.2507550 | 20 | 5 1.6 | 18.7 |
| 57927 2002 $GX_{37}$ | 14.9 | $X$ | 339.11566 | 2.56715 | 18.18890 | 5.39217 | 0.2251899 | 0.24013735 | 2.5634779 | 20 | 11 11.9 | 16.9 |
| 57928 2002 $GD_{77}$ | 14.9 | $X$ | 128.97989 | 4.79639 | 64.37739 | 6.49648 | 0.0503396 | 0.21873665 | 2.7280669 | 20 | 4 2.3 | 18.7 |
| 57929 2002 $GB_{86}$ | 15.8 | $X$ | 262.73641 | 247.71561 | 79.11174 | 7.22913 | 0.1560715 | 0.27336214 | 2.3513132 | 20 | 4 13.4 | 19.1 |
| 57930 2002 $GJ_{97}$ | 16.2 | $X$ | 271.78985 | 333.80790 | 34.86097 | 7.25928 | 0.1206401 | 0.28086531 | 2.3092484 | 20 | 6 24.9 | 19.0 |
| 57931 2002 $GX_{159}$ | 16.2 | $X$ | 68.16507 | 186.72481 | 142.37460 | 3.90684 | 0.2056872 | 0.29749415 | 2.2223738 | 20 | — | — |
| 57932 2002 $GA_{161}$ | 15.7 | $X$ | 41.46305 | 182.24200 | 120.07820 | 5.14075 | 0.1493551 | 0.29000561 | 2.2604685 | 20 | 11 12.3 | 18.5 |
| 57933 2002 $HH_{17}$ | 13.7 | $X$ | 99.66860 | 38.54515 | 137.11527 | 18.25605 | 0.1787969 | 0.17514613 | 3.1637514 | 20 | 7 25.1 | 18.6 |
| 57934 2002 $JZ_{7}$ | 15.4 | $X$ | 128.68357 | 207.91390 | 119.35561 | 7.35978 | 0.1449680 | 0.25329212 | 2.4739349 | 20 | — | — |
| 57935 2002 $JL_{17}$ | 15.1 | $X$ | 198.86558 | 300.89500 | 12.44472 | 2.34368 | 0.1824043 | 0.20473654 | 2.8510564 | 20 | 1 30.4 | 19.9 |
| 57936 2002 $JU_{23}$ | 16.2 | $X$ | 215.70396 | 166.04650 | 131.06988 | 3.12734 | 0.1997157 | 0.25886366 | 2.4383085 | 20 | 1 18.7 | 20.3 |
| 57937 2002 $JJ_{30}$ | 14.4 | $X$ | 21.64157 | 167.23173 | 152.32904 | 1.58105 | 0.2258457 | 0.17620759 | 3.1510332 | 20 | 10 23.4 | 18.1 |
| 57938 2002 $JT_{33}$ | 14.2 | $X$ | 198.48906 | 271.66654 | 219.17887 | 13.41421 | 0.1469352 | 0.23540710 | 2.5977041 | 20 | 8 30.8 | 18.5 |
| 57939 2002 $JY_{33}$ | 15.8 | $X$ | 223.90377 | 242.29023 | 159.14783 | 2.98113 | 0.0348189 | 0.27744618 | 2.3281818 | 20 | 6 18.8 | 18.8 |
| 57940 2002 $JJ_{38}$ | 14.5 | $X$ | 60.06257 | 56.58246 | 229.39646 | 12.64571 | 0.1030511 | 0.18134244 | 3.0912662 | 20 | 10 13.9 | 19.0 |
| 57941 2002 $JA_{40}$ | 14.5 | $X$ | 359.74492 | 169.28523 | 149.61023 | 12.45397 | 0.0762191 | 0.17917973 | 3.1160910 | 20 | 8 31.7 | 18.3 |
| 57942 2002 $JM_{40}$ | 14.9 | $X$ | 325.14739 | 328.58991 | 347.71671 | 5.71401 | 0.1519801 | 0.28108960 | 2.3080198 | 20 | 7 4.8 | 16.9 |
| 57943 2002 $JO_{41}$ | 15.2 | $X$ | 226.14263 | 247.50975 | 36.12620 | 6.95074 | 0.1071117 | 0.26127440 | 2.4232867 | 20 | 1 13.8 | 18.9 |
| 57944 2002 $JJ_{46}$ | 15.4 | $X$ | 181.27424 | 318.27386 | 32.61275 | 1.36668 | 0.0397701 | 0.21082908 | 2.7958618 | 20 | 2 22.8 | 19.3 |
| 57945 2002 $JG_{50}$ | 15.7 | $X$ | 63.88158 | 265.20533 | 11.80114 | 3.13264 | 0.0469990 | 0.28895212 | 2.2659594 | 20 | 10 19.9 | 18.3 |
| 57946 2002 $JG_{61}$ | 15.5 | $X$ | 102.10861 | 345.34270 | 87.38620 | 2.25967 | 0.0345612 | 0.26752157 | 2.3854126 | 20 | 2 22.6 | 18.3 |
| 57947 2002 $JB_{62}$ | 15.4 | $X$ | 193.08296 | 52.35129 | 146.74836 | 6.02561 | 0.0929539 | 0.24463996 | 2.5319266 | 20 | 12 1.9 | 19.0 |
| 57948 2002 $JO_{62}$ | 14.4 | $X$ | 76.10699 | 25.09755 | 176.29757 | 7.16507 | 0.0715051 | 0.17081887 | 3.2169587 | 20 | 7 14.8 | 19.0 |
| 57949 2002 $JV_{66}$ | 16.7 | $X$ | 266.83682 | 155.88958 | 125.89906 | 2.73446 | 0.1815674 | 0.26405639 | 2.4062363 | 20 | 2 14.6 | 20.2 |
| 57950 2002 $JV_{72}$ | 14.3 | $X$ | 5.68115 | 186.14958 | 130.85090 | 10.18387 | 0.0778366 | 0.17554577 | 3.1589479 | 20 | 9 8.7 | 18.4 |
| 57951 2002 $JJ_{91}$ | 15.3 | $X$ | 93.44878 | 162.23887 | 168.14169 | 1.06876 | 0.0592315 | 0.19207896 | 2.9749718 | 20 | — | — |
| 57952 2002 $JP_{93}$ | 15.5 | $X$ | 168.17749 | 107.47442 | 50.43245 | 4.53470 | 0.0280351 | 0.23287784 | 2.6164791 | 20 | 9 14.6 | 19.1 |
| 57953 2002 $JJ_{95}$ | 15.2 | $X$ | 191.16198 | 315.94134 | 307.36398 | 1.11040 | 0.0439879 | 0.19623037 | 2.9328639 | 20 | — | — |
| 57954 2002 $JA_{101}$ | 12.7 | $X$ | 190.91650 | 296.53586 | 44.86865 | 28.18092 | 0.2411139 | 0.16003182 | 3.3599424 | 20 | 3 15.6 | 19.0 |
| 57955 2002 $JV_{103}$ | 15.7 | $X$ | 67.74328 | 98.97919 | 150.21328 | 2.58926 | 0.0139591 | 0.23059075 | 2.6337515 | 20 | 9 2.9 | 19.1 |
| 57956 2002 $JL_{105}$ | 14.6 | $X$ | 55.49357 | 54.54948 | 185.50901 | 5.25603 | 0.1074686 | 0.17253480 | 3.1955939 | 20 | 8 11.4 | 18.9 |
| 57957 2002 $JZ_{105}$ | 15.1 | $X$ | 68.66096 | 129.03614 | 121.46367 | 0.55986 | 0.1391530 | 0.17536846 | 3.1610768 | 20 | 9 17.0 | 19.7 |
| 57958 2002 $JC_{118}$ | 14.1 | $X$ | 105.67465 | 158.35234 | 100.97397 | 17.98714 | 0.1591917 | 0.18480081 | 3.0525782 | 20 | 11 14.3 | 19.2 |
| 57959 2002 $JH_{118}$ | 15.1 | $X$ | 327.13494 | 173.54240 | 116.96583 | 13.35058 | 0.1421368 | 0.27966149 | 2.3158705 | 20 | 5 30.9 | 17.5 |
| 57960 2002 $JE_{129}$ | 15.5 | $X$ | 290.45534 | 282.93302 | 93.49686 | 4.55922 | 0.0273999 | 0.22913179 | 2.6449197 | 20 | 8 15.7 | 18.9 |
| 57961 2002 $JN_{133}$ | 15.2 | $X$ | 259.84173 | 300.01343 | 6.41926 | 5.35349 | 0.0670548 | 0.21379870 | 2.7699122 | 20 | 3 25.9 | 19.0 |
| 57962 2002 $JP_{133}$ | 16.1 | $X$ | 101.48457 | 347.84930 | 261.34857 | 5.94547 | 0.0831243 | 0.29082119 | 2.2562403 | 20 | 11 1.6 | 19.2 |
| 57963 2002 $LV_{3}$ | 14.6 | $X$ | 52.54844 | 172.72141 | 130.24018 | 2.82380 | 0.0865489 | 0.18168101 | 3.0874246 | 20 | 10 26.7 | 18.9 |
| 57964 2002 $LY_{28}$ | 15.6 | $X$ | 191.70906 | 43.19040 | 146.33075 | 6.59714 | 0.1394479 | 0.29213782 | 2.2494561 | 20 | 11 23.1 | 18.8 |
| 57965 2002 $LM_{32}$ | 15.6 | $X$ | 161.16899 | 292.11514 | 167.54620 | 8.96754 | 0.0477329 | 0.27623465 | 2.3349842 | 20 | 6 18.5 | 18.9 |
| 57966 2002 $LN_{39}$ | 16.6 | $X$ | 151.98994 | 93.82030 | 158.19101 | 5.82576 | 0.1426461 | 0.29731060 | 2.2232883 | 20 | 12 30.6 | 19.9 |
| 57967 2002 $LS_{45}$ | 15.9 | $X$ | 108.45892 | 359.98415 | 261.84685 | 6.62190 | 0.1032938 | 0.28765830 | 2.2727488 | 20 | 11 27.6 | 19.0 |
| 57968 2002 $LQ_{52}$ | 13.7 | $X$ | 15.74594 | 231.42846 | 118.33389 | 16.80787 | 0.1744517 | 0.17922645 | 3.1155494 | 20 | 11 20.1 | 17.9 |
| 57969 2002 $MT_{2}$ | 14.0 | $X$ | 36.73890 | 329.61630 | 80.53693 | 2.57602 | 0.1364698 | 0.18674376 | 3.0313679 | 20 | — | — |
| 57970 2002 $NT_{13}$ | 15.0 | $X$ | 90.90301 | 317.29142 | 157.02441 | 2.34919 | 0.0211305 | 0.20575942 | 2.8415997 | 20 | 4 6.7 | 18.8 |
| 57971 2002 $NJ_{41}$ | 16.2 | $X$ | 308.02598 | 344.60891 | 35.03263 | 3.76076 | 0.2771990 | 0.27499573 | 2.3419921 | 20 | 8 24.4 | 17.5 |
| 57972 2002 $NQ_{51}$ | 16.1 | $X$ | 67.16908 | 228.91277 | 100.83614 | 7.58249 | 0.1595983 | 0.28807303 | 2.2705670 | 20 | — | — |
| 57973 2002 $OW$ | 15.2 | $X$ | 151.81845 | 25.12712 | 213.69993 | 7.42658 | 0.1504549 | 0.23677098 | 2.5877187 | 20 | 12 3.1 | 19.4 |
| 57974 2002 $OX_{3}$ | 14.5 | $X$ | 321.36030 | 114.73984 | 297.89351 | 10.72429 | 0.1113871 | 0.22151900 | 2.7051751 | 20 | 11 8.6 | 17.7 |
| 57975 2002 $OO_{11}$ | 15.8 | $X$ | 32.08842 | 62.30190 | 343.74033 | 8.23389 | 0.1661437 | 0.23800514 | 2.5787653 | 20 | — | — |
| 57976 2002 $OJ_{16}$ | 15.9 | $X$ | 287.75289 | 183.83733 | 166.84452 | 7.33046 | 0.1293444 | 0.27098906 | 2.3650203 | 20 | 6 21.1 | 18.7 |
| 57977 2002 $PF_{17}$ | 15.3 | $X$ | 13.91160 | 355.60181 | 273.19832 | 0.62207 | 0.0274406 | 0.21737100 | 2.7394811 | 20 | 7 16.5 | 18.8 |
| 57978 2002 $PO_{35}$ | 15.5 | $X$ | 78.71661 | 110.12722 | 188.73251 | 0.54945 | 0.1870618 | 0.17530130 | 3.1618842 | 20 | 11 29.9 | 20.3 |
| 57979 2002 $PW_{49}$ | 14.4 | $X$ | 79.06682 | 199.07645 | 146.57262 | 1.93226 | 0.1778283 | 0.17613988 | 3.1518407 | 20 | — | — |
| 57980 2002 $PZ_{85}$ | 16.2 | $X$ | 194.91043 | 192.79387 | 49.72283 | 5.33754 | 0.0804572 | 0.29681325 | 2.2257712 | 20 | — | — |
| 57981 2002 $PF_{104}$ | 15.9 | $X$ | 169.07903 | 17.44679 | 190.88466 | 12.68559 | 0.0832474 | 0.23097725 | 2.6308126 | 20 | 11 15.9 | 19.9 |
| 57982 2002 $PB_{110}$ | 15.6 | $X$ | 195.86977 | 22.76222 | 19.62268 | 3.79623 | 0.1297838 | 0.26232481 | 2.4168135 | 20 | 5 10.4 | 19.4 |
| 57983 2002 $PT_{117}$ | 15.0 | $X$ | 273.11909 | 229.79133 | 300.30269 | 11.76041 | 0.1166984 | 0.24157613 | 2.5532894 | 20 | — | — |
| 57984 2002 $PG_{124}$ | 15.4 | $X$ | 235.73830 | 119.68565 | 168.59863 | 2.06113 | 0.0933719 | 0.19733672 | 2.9218917 | 20 | 2 5.2 | 19.8 |
| 57985 2002 $PL_{129}$ | 15.0 | $X$ | 52.98970 | 291.13240 | 149.54550 | 9.38646 | 0.1071219 | 0.19088410 | 2.9873737 | 20 | 1 14.0 | 18.7 |
| 57986 2002 $PA_{134}$ | 15.5 | $X$ | 327.50541 | 185.50829 | 170.52745 | 2.92907 | 0.0813236 | 0.22020847 | 2.7158975 | 20 | 9 5.2 | 18.7 |
| 57987 2002 $QQ_{6}$ | 15.5 | $X$ | 170.96111 | 358.46197 | 298.33115 | 9.31310 | 0.0609220 | 0.24141057 | 2.5544566 | 20 | — | — |
| 57988 2002 $RG_{27}$ | 14.7 | $X$ | 31.69376 | 179.45364 | 239.95505 | 6.57104 | 0.2987019 | 0.22801314 | 2.6535634 | 20 | — | — |
| 57989 2002 $RU_{32}$ | 15.1 | $X$ | 99.71064 | 352.31320 | 203.59867 | 3.82095 | 0.0151997 | 0.21343422 | 2.7730648 | 20 | 8 1.7 | 18.9 |
| 57990 2002 $RJ_{34}$ | 15.6 | $X$ | 63.74372 | 292.84734 | 45.47740 | 3.81901 | 0.1060526 | 0.23018536 | 2.6368429 | 20 | — | — |
| 57991 2002 $RF_{40}$ | 14.6 | $X$ | 131.90735 | 212.16311 | 91.55105 | 1.80773 | 0.2028298 | 0.18293412 | 3.0733091 | 20 | — | — |
| 57992 2002 $RX_{47}$ | 15.7 | $X$ | 264.50457 | 210.35276 | 124.77119 | 3.55548 | 0.1801689 | 0.26189812 | 2.4194378 | 20 | 4 22.3 | 19.1 |
| 57993 2002 $RX_{56}$ | 15.5 | $X$ | 289.53836 | 130.44376 | 223.24031 | 3.02757 | 0.2090355 | 0.21130641 | 2.7916498 | 20 | 6 12.9 | 19.0 |
| 57994 2002 $RR_{86}$ | 14.2 | $X$ | 256.68527 | 193.44839 | 357.95868 | 16.48947 | 0.0470492 | 0.17969751 | 3.1101023 | 20 | — | — |
| 57995 2002 $RJ_{102}$ | 15.4 | $X$ | 302.17218 | 40.40180 | 15.08234 | 3.50149 | 0.1040943 | 0.27310827 | 2.3527700 | 20 | 10 27.2 | 17.8 |
| 57996 2002 $RV_{107}$ | 15.3 | $X$ | 335.58507 | 305.18599 | 30.86416 | 6.16276 | 0.2201796 | 0.26829721 | 2.3808129 | 20 | 9 1.6 | 16.8 |
| 57997 2002 $RN_{110}$ | 15.9 | $X$ | 345.67953 | 197.25993 | 290.01887 | 5.54856 | 0.0819099 | 0.29406144 | 2.2396354 | 20 | — | — |
| 57998 2002 $SO_{9}$ | 14.8 | $X$ | 74.04847 | 358.85283 | 71.52617 | 2.63125 | 0.1062387 | 0.18653139 | 3.0336683 | 20 | 2 3.2 | 18.6 |
| 57999 2002 $TN_{52}$ | 14.5 | $X$ | 115.34210 | 43.46606 | 42.27977 | 2.37400 | 0.2239301 | 0.18918945 | 3.0051866 | 20 | 4 26.5 | 19.2 |
| 58000 2002 $TC_{103}$ | 14.1 | $X$ | 128.33048 | 263.91576 | 351.91012 | 9.29546 | 0.2232874 | 0.22845903 | 2.6501096 | 20 | 11 29.7 | 18.8 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 58001 2002 $TX_{126}$ | 14.9 | *X* | 7.09501 | 174.13202 | 102.89325 | 5.50929 | 0.0291200 | 0.21195062 | 2.7859902 | 20 | 7 17.9 | 18.5 |
| 58002 2002 $TM_{175}$ | 14.5 | *X* | 121.97364 | 149.39393 | 59.27101 | 13.06054 | 0.1190791 | 0.21687442 | 2.7436612 | 20 | 10 2.2 | 18.9 |
| 58003 2002 $TC_{180}$ | 14.4 | *X* | 153.07147 | 43.42711 | 285.41598 | 11.64946 | 0.1990147 | 0.23874270 | 2.5734514 | 20 | 1 5.9 | 18.3 |
| 58004 2002 $TG_{206}$ | 16.1 | *X* | 168.56982 | 293.26979 | 5.66834 | 5.49955 | 0.1860637 | 0.29513491 | 2.2342014 | 20 | — | — |
| 58005 2002 $TR_{207}$ | 15.6 | *X* | 139.34662 | 330.33552 | 222.96500 | 10.27564 | 0.0671629 | 0.26964934 | 2.3728474 | 20 | 9 26.3 | 19.1 |
| 58006 2002 $TD_{221}$ | 15.7 | *X* | 139.85346 | 172.03167 | 285.53377 | 11.31606 | 0.1345093 | 0.25537022 | 2.4604954 | 20 | 5 25.2 | 19.5 |
| 58007 2002 $TL_{234}$ | 13.8 | *X* | 206.80827 | 331.25422 | 297.89270 | 13.88792 | 0.1581915 | 0.18441981 | 3.0567811 | 20 | — | — |
| 58008 2002 $TW_{240}$ | 11.6 | *X* | 145.57625 | 341.19942 | 90.84704 | 17.35109 | 0.0417575 | 0.08361496 | 5.1794072 | 20 | 5 4.1 | 18.8 |
| 58009 2002 $TU_{262}$ | 16.4 | *X* | 204.21314 | 330.30419 | 155.58853 | 1.94083 | 0.0923060 | 0.26955159 | 2.3734210 | 20 | 9 13.6 | 19.6 |
| 58010 2002 $TB_{266}$ | 16.1 | *X* | 210.72158 | 45.56219 | 69.84473 | 5.23936 | 0.2533892 | 0.26207187 | 2.4183683 | 20 | 8 24.3 | 20.1 |
| 58011 2002 $TW_{280}$ | 14.0 | *X* | 59.54555 | 119.05338 | 251.34501 | 8.06488 | 0.0807737 | 0.17427088 | 3.1743356 | 20 | — | — |
| 58012 2002 $TM_{290}$ | 13.4 | *X* | 122.95438 | 9.41954 | 34.11401 | 13.88992 | 0.1646322 | 0.18541604 | 3.0458220 | 20 | 3 14.2 | 18.2 |
| 58013 2002 $TP_{293}$ | 15.2 | *X* | 327.59395 | 89.34945 | 289.54215 | 5.14277 | 0.2679772 | 0.26927217 | 2.3750627 | 20 | 10 21.3 | 16.4 |
| 58014 2002 $US_{28}$ | 15.0 | *X* | 19.86640 | 210.49032 | 289.34786 | 12.91795 | 0.1151109 | 0.24022488 | 2.5628552 | 20 | 1 26.1 | 17.7 |
| 58015 2002 $UG_{29}$ | 15.3 | *X* | 80.08700 | 165.80957 | 161.33891 | 10.64616 | 0.2252150 | 0.22869640 | 2.6482755 | 20 | — | — |
| 58016 2002 $UH_{29}$ | 14.7 | *X* | 3.57734 | 225.58030 | 133.77766 | 9.31191 | 0.1386892 | 0.21981941 | 2.7191011 | 20 | 11 16.8 | 18.0 |
| 58017 2002 $UC_{34}$ | 15.1 | *X* | 141.93381 | 271.77885 | 129.84344 | 15.92505 | 0.0551275 | 0.23842780 | 2.5757169 | 20 | 3 13.7 | 18.8 |
| 58018 2002 $UX_{37}$ | 14.6 | *X* | 349.62466 | 310.58425 | 232.37853 | 9.21511 | 0.0542154 | 0.18799632 | 3.0178882 | 20 | 2 15.8 | 18.8 |
| 58019 2002 $UV_{40}$ | 15.3 | *X* | 274.78799 | 112.12258 | 313.34545 | 2.42568 | 0.0757040 | 0.21333771 | 2.7739010 | 20 | 9 17.7 | 19.0 |
| 58020 2002 $VE_{17}$ | 14.2 | *X* | 64.64763 | 269.89764 | 198.20334 | 13.18742 | 0.2760355 | 0.18249484 | 3.0782389 | 20 | 4 1.5 | 17.8 |
| 58021 2002 $VD_{32}$ | 15.3 | *X* | 165.30419 | 115.42351 | 9.02210 | 1.72556 | 0.0242752 | 0.20316964 | 2.8656964 | 20 | 7 23.9 | 19.3 |
| 58022 2002 $VK_{36}$ | 14.6 | *X* | 144.22299 | 93.26852 | 95.59542 | 12.47607 | 0.2034236 | 0.25951765 | 2.4342104 | 20 | 10 5.5 | 18.9 |
| 58023 2002 $VR_{40}$ | 15.0 | *X* | 355.48429 | 246.78447 | 107.94074 | 11.51560 | 0.2961621 | 0.27422577 | 2.3463738 | 20 | 12 7.1 | 17.1 |
| 58024 2002 $VC_{48}$ | 14.2 | *X* | 83.00807 | 342.38082 | 88.37373 | 10.63612 | 0.0542952 | 0.18137370 | 3.0909111 | 20 | 2 11.5 | 18.5 |
| 58025 2002 $VW_{48}$ | 15.9 | *X* | 28.08041 | 22.34822 | 152.30754 | 2.98120 | 0.0775856 | 0.30325619 | 2.1941329 | 20 | 3 24.8 | 17.7 |
| 58026 2002 $VS_{55}$ | 15.6 | *X* | 319.02040 | 238.21707 | 349.36963 | 3.09500 | 0.0832614 | 0.30138569 | 2.2032019 | 20 | 2 15.4 | 17.9 |
| 58027 2002 $VH_{58}$ | 14.9 | *X* | 24.69480 | 5.69789 | 139.67456 | 4.39796 | 0.2181429 | 0.23791445 | 2.5794206 | 20 | 2 13.7 | 16.7 |
| 58028 2002 $VB_{63}$ | 15.1 | *X* | 65.31287 | 226.98118 | 70.57963 | 5.90151 | 0.0963083 | 0.21899374 | 2.7259314 | 20 | 11 12.5 | 18.9 |
| 58029 2002 $VH_{63}$ | 15.0 | *X* | 42.36666 | 5.28846 | 270.73510 | 7.66778 | 0.1168037 | 0.26735137 | 2.3864249 | 20 | 9 21.4 | 18.0 |
| 58030 2002 $VU_{67}$ | 15.2 | *X* | 338.49243 | 75.75508 | 5.25716 | 3.69963 | 0.0661728 | 0.22473815 | 2.6792805 | 20 | — | — |
| 58031 2002 $VH_{82}$ | 16.2 | *X* | 40.30600 | 251.33249 | 145.85222 | 4.18346 | 0.1438378 | 0.28361086 | 2.2943208 | 20 | — | — |
| 58032 2002 $VA_{86}$ | 13.9 | *X* | 274.10775 | 173.14870 | 355.47741 | 12.90643 | 0.0462788 | 0.17824624 | 3.1269610 | 20 | — | — |
| 58033 2002 $VB_{88}$ | 14.5 | *X* | 320.31042 | 169.16890 | 264.85619 | 11.31110 | 0.0837149 | 0.22052047 | 2.7133351 | 20 | 12 9.1 | 17.6 |
| 58034 2002 $VS_{101}$ | 15.5 | *X* | 104.47222 | 291.76512 | 121.64802 | 3.93945 | 0.1057650 | 0.23844976 | 2.5755587 | 20 | 2 14.7 | 18.7 |
| 58035 2002 $VK_{107}$ | 15.4 | *X* | 228.69715 | 299.28954 | 302.26061 | 4.21912 | 0.1228449 | 0.28944010 | 2.2634118 | 20 | — | — |
| 58036 2002 $VO_{108}$ | 14.3 | *X* | 0.79923 | 203.36152 | 50.34239 | 13.43432 | 0.0767558 | 0.19812212 | 2.9141645 | 20 | 6 4.9 | 18.0 |
| 58037 2002 $VL_{109}$ | 15.3 | *X* | 93.16285 | 320.66449 | 40.56775 | 6.15410 | 0.1886702 | 0.17671571 | 3.1449900 | 20 | — | — |
| 58038 2002 $VJ_{110}$ | 15.9 | *X* | 266.74478 | 105.24518 | 11.20749 | 2.60814 | 0.1551200 | 0.26898886 | 2.3767300 | 20 | 11 15.2 | 18.4 |
| 58039 2002 $VC_{113}$ | 15.6 | *X* | 13.06591 | 66.90396 | 197.80638 | 0.92841 | 0.1643960 | 0.26081007 | 2.4261621 | 20 | 7 25.3 | 17.7 |
| 58040 2002 $VU_{122}$ | 15.1 | *X* | 0.02668 | 164.17937 | 335.97474 | 7.11134 | 0.1440242 | 0.23536175 | 2.5980378 | 20 | — | — |
| 58041 2002 $VU_{127}$ | 13.5 | *X* | 148.90083 | 56.37243 | 322.28245 | 18.27351 | 0.0961472 | 0.17923574 | 3.1154418 | 20 | 2 24.7 | 18.3 |
| 58042 2002 $VV_{127}$ | 13.1 | *X* | 17.34241 | 39.71745 | 74.91197 | 14.05516 | 0.1242528 | 0.22839002 | 2.6506433 | 20 | — | — |
| 58043 2002 $VJ_{128}$ | 15.3 | *X* | 138.86421 | 202.42722 | 197.97059 | 1.79683 | 0.1190030 | 0.18722732 | 3.0261462 | 20 | 3 15.3 | 19.8 |
| 58044 2002 *WF* | 13.4 | *X* | 91.51267 | 66.87964 | 302.97187 | 15.77265 | 0.3592329 | 0.17972546 | 3.1097799 | 20 | 1 20.7 | 17.7 |
| 58045 2002 $WY_{16}$ | 14.4 | *X* | 128.39615 | 118.15952 | 201.74112 | 13.66442 | 0.1664876 | 0.23022999 | 2.6365021 | 20 | — | — |
| 58046 2002 $XA_{14}$ | 14.9 | *X* | 64.35323 | 259.26878 | 114.96684 | 21.28697 | 0.2942664 | 0.28345723 | 2.2951497 | 20 | — | — |
| 58047 2002 $XY_{21}$ | 15.1 | *X* | 328.80548 | 358.35474 | 44.74540 | 3.76896 | 0.1868861 | 0.21503198 | 2.7593112 | 20 | 11 11.4 | 17.6 |
| 58048 2002 $XJ_{78}$ | 14.7 | *X* | 235.21292 | 244.80480 | 69.02712 | 8.18375 | 0.1187013 | 0.29904746 | 2.2146714 | 20 | 2 28.6 | 18.0 |
| 58049 2002 $XY_{86}$ | 15.8 | *X* | 274.82017 | 180.14332 | 309.36806 | 6.31533 | 0.0470630 | 0.27487894 | 2.3426553 | 20 | — | — |
| 58050 2002 *YA* | 14.3 | *X* | 107.91162 | 64.41166 | 309.82961 | 28.76221 | 0.3751367 | 0.23202394 | 2.6228947 | 20 | 2 4.7 | 18.2 |
| 58051 2002 $YY_{2}$ | 15.3 | *X* | 275.26302 | 154.26555 | 296.40460 | 1.61796 | 0.1190944 | 0.26814758 | 2.3816985 | 20 | 10 28.3 | 17.6 |
| 58052 2003 $AN_{1}$ | 14.6 | *X* | 338.54329 | 64.02181 | 152.36470 | 10.03767 | 0.0167362 | 0.18264398 | 3.0765630 | 20 | 3 23.5 | 18.8 |
| 58053 2003 $AP_{5}$ | 15.0 | *X* | 77.99522 | 240.02276 | 134.40532 | 6.35666 | 0.1806120 | 0.28175875 | 2.3043641 | 20 | — | — |
| 58054 2003 $AR_{5}$ | 15.6 | *X* | 69.31968 | 257.12849 | 245.29081 | 4.83653 | 0.1319834 | 0.23997604 | 2.5646265 | 20 | 4 27.3 | 18.7 |
| 58055 2003 $AH_{6}$ | 15.3 | *X* | 335.01979 | 84.00745 | 294.10099 | 7.23396 | 0.2203373 | 0.26652662 | 2.3913455 | 20 | 11 5.9 | 17.2 |
| 58056 2003 $AJ_{41}$ | 16.4 | *X* | 334.38272 | 318.28970 | 179.49450 | 4.82024 | 0.1225323 | 0.28077953 | 2.3097187 | 20 | — | — |
| 58057 2003 $AG_{58}$ | 15.5 | *X* | 353.93902 | 357.45673 | 88.79463 | 6.44053 | 0.1950534 | 0.22168195 | 2.7038494 | 20 | — | — |
| 58058 2118 *P–L* | 16.2 | *X* | 32.73562 | 138.23686 | 212.40572 | 3.83996 | 0.1423317 | 0.23213016 | 2.6220945 | 20 | 12 18.2 | 19.6 |
| 58059 2690 *P–L* | 15.5 | *X* | 61.31053 | 73.44387 | 25.15782 | 4.71669 | 0.2022995 | 0.23713113 | 2.5850979 | 20 | 2 26.1 | 18.0 |
| 58060 2751 *P–L* | 14.4 | *X* | 104.99944 | 275.25343 | 125.60992 | 2.55538 | 0.2112440 | 0.17244326 | 3.1967247 | 20 | 2 22.5 | 18.9 |
| 58061 2769 *P–L* | 15.1 | *X* | 358.38733 | 96.40683 | 184.43854 | 11.96678 | 0.1043953 | 0.24387199 | 2.5372393 | 20 | 7 12.5 | 18.1 |
| 58062 4034 *P–L* | 16.5 | *X* | 269.21229 | 26.06746 | 344.94741 | 4.40433 | 0.2093808 | 0.30979426 | 2.1631525 | 20 | 6 10.2 | 19.0 |
| 58063 6024 *P–L* | 14.6 | *X* | 11.11851 | 272.05562 | 224.53078 | 3.80492 | 0.1254273 | 0.17111930 | 3.2131924 | 20 | 1 22.2 | 18.4 |
| 58064 6220 *P–L* | 15.6 | *X* | 91.95634 | 110.75093 | 327.80263 | 2.28843 | 0.1030311 | 0.23852403 | 2.5750241 | 20 | 2 29.4 | 18.9 |
| 58065 6814 *P–L* | 14.8 | *X* | 356.60295 | 315.62626 | 23.70632 | 1.97819 | 0.1175088 | 0.18079368 | 3.0975183 | 20 | 9 25.1 | 18.5 |
| 58066 7579 *P–L* | 15.5 | *X* | 212.01780 | 355.40042 | 24.71462 | 6.39553 | 0.1693264 | 0.22519859 | 2.6756272 | 20 | 4 27.3 | 19.9 |
| 58067 2269 *T–1* | 15.6 | *X* | 345.32139 | 96.67499 | 29.10679 | 6.26185 | 0.1248942 | 0.27720207 | 2.3295484 | 20 | — | — |
| 58068 3143 *T–1* | 14.5 | *X* | 111.81013 | 73.74763 | 2.73442 | 26.64584 | 0.1543224 | 0.24162513 | 2.5529441 | 20 | 3 28.2 | 18.1 |
| 58069 4310 *T–1* | 13.9 | *X* | 21.42938 | 68.04339 | 18.95180 | 13.96078 | 0.1702448 | 0.21720584 | 2.7408696 | 20 | — | — |
| 58070 1034 *T–2* | 16.4 | *X* | 308.30394 | 252.00352 | 189.90780 | 6.13462 | 0.3016722 | 0.27440021 | 2.3453793 | 20 | 12 22.8 | 17.2 |
| 58071 1308 *T–2* | 14.6 | *X* | 61.61933 | 214.77083 | 154.22676 | 2.83691 | 0.0935717 | 0.21499993 | 2.7595854 | 20 | — | — |
| 58072 1476 *T–2* | 14.9 | *X* | 79.40607 | 85.92747 | 356.12338 | 10.75058 | 0.1311137 | 0.17779313 | 3.1322715 | 20 | 3 1.6 | 19.1 |
| 58073 1514 *T–2* | 15.8 | *X* | 19.17762 | 164.23329 | 238.88223 | 0.50783 | 0.0504147 | 0.23550244 | 2.5970030 | 20 | — | — |
| 58074 1612 *T–2* | 15.7 | *X* | 110.06800 | 17.40401 | 348.58455 | 9.84641 | 0.2050702 | 0.23884447 | 2.5727204 | 20 | 1 7.8 | 19.2 |
| 58075 2205 *T–2* | 14.0 | *X* | 270.08464 | 90.17967 | 55.99742 | 1.84175 | 0.1470459 | 0.17164089 | 3.2066794 | 20 | 12 4.8 | 18.3 |
| 58076 2208 *T–2* | 16.1 | *X* | 168.75795 | 311.19864 | 12.93821 | 3.46491 | 0.1141194 | 0.28237605 | 2.3010046 | 20 | 1 1.6 | 19.4 |
| 58077 2209 *T–2* | 15.4 | *X* | 340.65072 | 210.28248 | 214.31454 | 2.93197 | 0.0801270 | 0.21298264 | 2.7769832 | 20 | 12 25.4 | 18.9 |
| 58078 3003 *T–2* | 14.9 | *X* | 78.36136 | 157.76429 | 174.47079 | 9.01416 | 0.1309926 | 0.21443075 | 2.7644665 | 20 | — | — |
| 58079 3244 *T–2* | 15.1 | *X* | 311.93680 | 281.38969 | 143.95001 | 3.94295 | 0.0660082 | 0.21171496 | 2.7880572 | 20 | 11 14.1 | 18.6 |
| 58080 4228 *T–2* | 15.2 | *X* | 146.43450 | 229.58821 | 36.07149 | 5.64881 | 0.0300058 | 0.21410255 | 2.7672909 | 20 | 12 28.4 | 19.1 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 58081 4817 *T–2* | 15.7 | *X* | 266.61283 | 208.54346 | 33.02668 | 6.25809 | 0.0764788 | 0.28341954 | 2.2953532 | 20 | 1 1.4 | 18.9 |
| 58082 5072 *T–2* | 14.5 | *X* | 171.25747 | 309.60009 | 335.74373 | 14.81063 | 0.1143474 | 0.21705651 | 2.7421266 | 20 | — | — |
| 58083 5459 *T–2* | 15.1 | *X* | 313.78212 | 319.28613 | 264.22222 | 6.45972 | 0.1390255 | 0.28498839 | 2.2869216 | 20 | 1 24.7 | 17.9 |
| 58084 Hiketaon | 12.6 | *X* | 220.10590 | 99.27198 | 266.89544 | 7.95409 | 0.1365636 | 0.08326526 | 5.1938988 | 20 | 4 22.8 | 20.0 |
| 58085 1199 *T–3* | 14.5 | *X* | 64.36251 | 87.27032 | 240.42933 | 7.84164 | 0.1682505 | 0.20970784 | 2.8058187 | 20 | 12 23.8 | 18.8 |
| 58086 2017 *T–3* | 15.2 | *X* | 207.48094 | 19.13020 | 4.35798 | 6.69673 | 0.2190035 | 0.24492567 | 2.5299572 | 20 | 4 24.3 | 19.5 |
| 58087 2156 *T–3* | 14.9 | *X* | 148.85287 | 242.61922 | 213.41175 | 12.61404 | 0.1628390 | 0.24454404 | 2.5325886 | 20 | 6 4.7 | 19.0 |
| 58088 2256 *T–3* | 15.7 | *X* | 289.90256 | 251.49516 | 356.92996 | 6.74323 | 0.0880391 | 0.28812038 | 2.2703182 | 20 | 2 7.2 | 18.6 |
| 58089 2352 *T–3* | 16.2 | *X* | 74.56201 | 71.40647 | 334.67466 | 2.87078 | 0.1378356 | 0.28347923 | 2.2950310 | 20 | — | — |
| 58090 3452 *T–3* | 16.0 | *X* | 99.05647 | 11.26931 | 44.15721 | 3.47317 | 0.1483104 | 0.23933817 | 2.5691812 | 20 | 2 17.4 | 19.2 |
| 58091 3768 *T–3* | 14.9 | *X* | 239.42507 | 219.73334 | 68.11545 | 1.45073 | 0.1920713 | 0.17293758 | 3.1906302 | 20 | 2 5.7 | 20.1 |
| 58092 4053 *T–3* | 14.2 | *X* | 106.27866 | 269.00761 | 154.13418 | 6.50717 | 0.1244472 | 0.17116043 | 3.2126775 | 20 | 3 10.5 | 18.9 |
| 58093 1934 *JP* | 15.9 | *X* | 249.85902 | 16.49242 | 138.54621 | 1.58347 | 0.2302767 | 0.28185142 | 2.3038590 | 20 | 12 4.6 | 18.3 |
| 58094 1972 *AP* | 14.8 | *X* | 273.43260 | 52.43963 | 77.67531 | 13.09186 | 0.1877030 | 0.26084490 | 2.4259461 | 20 | 12 10.5 | 16.9 |
| 58095 Oranienstein | 13.4 | *X* | 350.97523 | 318.65859 | 335.23734 | 2.39025 | 0.1193070 | 0.12219427 | 4.0219391 | 20 | 7 11.2 | 18.3 |
| 58096 Oineus | 12.7 | *X* | 295.42482 | 26.07731 | 41.25585 | 3.59140 | 0.1150348 | 0.08270202 | 5.2174542 | 20 | 9 24.7 | 19.3 |
| 58097 Alimov | 14.2 | *X* | 208.41507 | 11.17713 | 34.25952 | 12.92098 | 0.2604721 | 0.23963016 | 2.5670937 | 20 | 5 20.2 | 18.9 |
| 58098 Quirrenbach | 15.1 | *X* | 305.49861 | 1.40930 | 47.62570 | 22.83722 | 0.0823711 | 0.36923366 | 1.9242812 | 20 | 11 20.4 | 16.3 |
| 58099 1978 $RB_{10}$ | 16.1 | *X* | 329.50662 | 357.16164 | 341.62734 | 4.66340 | 0.1826025 | 0.30483370 | 2.1865566 | 20 | 8 26.6 | 17.2 |
| 58100 1978 $VQ_7$ | 14.7 | *X* | 345.42409 | 242.20403 | 251.14595 | 7.54458 | 0.0884565 | 0.21642111 | 2.7474912 | 20 | — | — |
| 58101 1979 $MV_4$ | 15.5 | *X* | 309.28162 | 325.04159 | 258.49074 | 3.43693 | 0.1565378 | 0.28213417 | 2.3023195 | 20 | 1 17.7 | 18.4 |
| 58102 1979 $MW_4$ | 14.8 | *X* | 74.87841 | 294.74300 | 125.09528 | 13.49742 | 0.1820838 | 0.22893598 | 2.6464276 | 20 | 1 23.5 | 17.5 |
| 58103 1979 $MQ_5$ | 14.8 | *X* | 200.78143 | 100.81775 | 265.14436 | 8.76643 | 0.0704069 | 0.18653681 | 3.0336096 | 20 | 3 31.4 | 19.6 |
| 58104 1979 $ML_7$ | 16.2 | *X* | 283.22187 | 158.81776 | 125.46699 | 3.23488 | 0.1592894 | 0.28377234 | 2.2934503 | 20 | 3 7.8 | 19.2 |
| 58105 1979 $MN_8$ | 14.9 | *X* | 10.79581 | 169.21074 | 199.88642 | 3.98801 | 0.1755277 | 0.17199094 | 3.2023270 | 20 | 11 29.7 | 18.7 |
| 58106 1979 $MO_8$ | 14.4 | *X* | 1.40258 | 10.63349 | 284.97454 | 9.37682 | 0.0756351 | 0.19269223 | 2.9686563 | 20 | 8 2.0 | 18.1 |
| 58107 1979 $OZ_{10}$ | 15.9 | *X* | 316.28090 | 29.98924 | 293.36221 | 17.18411 | 0.0660570 | 0.36019029 | 1.9563567 | 20 | 7 14.1 | 17.1 |
| 58108 1979 $QE_1$ | 15.5 | *X* | 337.81707 | 151.83836 | 154.83900 | 5.11944 | 0.2584429 | 0.23967024 | 2.5668076 | 20 | 7 3.7 | 17.2 |
| 58109 1980 *PQ* | 14.4 | *X* | 103.23436 | 189.99638 | 153.33156 | 14.95575 | 0.2442837 | 0.23084163 | 2.6318429 | 20 | — | — |
| 58110 1980 $UF_1$ | 15.6 | *X* | 245.80981 | 348.07722 | 6.73725 | 8.32539 | 0.1718933 | 0.28903152 | 2.2655444 | 20 | 4 23.9 | 18.9 |
| 58111 1981 $ER_2$ | 14.9 | *X* | 71.62248 | 334.08533 | 190.94371 | 21.30346 | 0.2182136 | 0.17919222 | 3.1159462 | 20 | 6 15.2 | 19.6 |
| 58112 1981 $EC_3$ | 15.7 | *X* | 226.53990 | 41.87114 | 233.36100 | 7.72960 | 0.2447040 | 0.27212477 | 2.3584355 | 20 | — | — |
| 58113 1981 $EV_4$ | 17.0 | *X* | 242.47825 | 276.29718 | 291.99004 | 5.10730 | 0.1171327 | 0.29509133 | 2.2344214 | 20 | — | — |
| 58114 1981 $EL_6$ | 14.6 | *X* | 5.99094 | 14.56685 | 236.73958 | 10.06327 | 0.0868365 | 0.18084710 | 3.0969084 | 20 | 6 11.7 | 18.4 |
| 58115 1981 $EB_7$ | 14.8 | *X* | 298.40802 | 331.18446 | 316.01290 | 8.47623 | 0.0522323 | 0.17873305 | 3.1212806 | 20 | 4 18.9 | 19.3 |
| 58116 1981 $EH_7$ | 15.5 | *X* | 70.68647 | 240.88958 | 202.71680 | 14.34838 | 0.0914815 | 0.22530157 | 2.6748119 | 20 | 2 1.7 | 19.1 |
| 58117 1981 $ER_7$ | 16.0 | *X* | 343.57631 | 43.94906 | 234.87801 | 4.11604 | 0.1012208 | 0.28178967 | 2.3041956 | 20 | 6 14.6 | 18.0 |
| 58118 1981 $EX_7$ | 15.0 | *X* | 220.88236 | 153.70173 | 193.06164 | 13.46920 | 0.1156853 | 0.22847267 | 2.6500041 | 20 | 3 27.9 | 19.1 |
| 58119 1981 $EJ_9$ | 15.7 | *X* | 216.90489 | 204.00704 | 312.29575 | 3.99127 | 0.1085544 | 0.24029186 | 2.5623789 | 20 | 10 30.3 | 19.3 |
| 58120 1981 $EU_{11}$ | 15.1 | *X* | 272.53804 | 308.44537 | 344.89312 | 11.17680 | 0.1898257 | 0.22679915 | 2.6630241 | 20 | 3 7.7 | 19.1 |
| 58121 1981 $EA_{13}$ | 15.5 | *X* | 105.83049 | 74.94534 | 249.94642 | 5.95897 | 0.1438175 | 0.26803825 | 2.3823462 | 20 | — | — |
| 58122 1981 $EW_{19}$ | 16.2 | *X* | 338.20179 | 268.43600 | 341.95409 | 7.91133 | 0.1085101 | 0.27946405 | 2.3169611 | 20 | 4 15.1 | 18.6 |
| 58123 1981 $EE_{22}$ | 14.5 | *X* | 66.55680 | 176.86311 | 12.94760 | 4.93886 | 0.0936864 | 0.18090857 | 3.0962068 | 20 | 6 22.0 | 18.7 |
| 58124 1981 $EK_{29}$ | 15.0 | *X* | 210.69337 | 232.38612 | 217.34601 | 5.73455 | 0.0303421 | 0.20957761 | 2.8069809 | 20 | 8 1.8 | 19.0 |
| 58125 1981 $EO_{31}$ | 15.8 | *X* | 333.64868 | 33.83572 | 175.42281 | 3.33892 | 0.1290497 | 0.22597515 | 2.6694938 | 20 | 2 15.5 | 19.0 |
| 58126 1981 $EJ_{32}$ | 15.7 | *X* | 46.85381 | 357.32211 | 270.98755 | 4.92606 | 0.1208423 | 0.23456238 | 2.6039370 | 20 | 9 14.3 | 19.1 |
| 58127 1981 $EG_{37}$ | 16.6 | *X* | 101.76725 | 244.67742 | 200.42408 | 7.28814 | 0.0477128 | 0.30293714 | 2.1956732 | 20 | 3 4.7 | 19.1 |
| 58128 1981 $EJ_{37}$ | 15.8 | *X* | 326.00148 | 108.04999 | 330.70157 | 6.63493 | 0.0920397 | 0.26824143 | 2.3811430 | 20 | — | — |
| 58129 1981 $EU_{37}$ | 15.7 | *X* | 27.81113 | 180.09646 | 261.52323 | 4.43462 | 0.0876029 | 0.22206643 | 2.7007275 | 20 | — | — |
| 58130 1981 $ER_{38}$ | 15.1 | *X* | 69.50262 | 267.68784 | 189.15019 | 11.52990 | 0.1628842 | 0.22662738 | 2.6643696 | 20 | 2 29.2 | 18.3 |
| 58131 1981 $EQ_{39}$ | 15.7 | *X* | 114.89801 | 336.67590 | 240.16682 | 0.46947 | 0.1516083 | 0.18672612 | 3.0315589 | 20 | 9 27.1 | 20.6 |
| 58132 1981 $EW_{39}$ | 14.8 | *X* | 298.93030 | 276.71117 | 358.16592 | 10.30131 | 0.1038352 | 0.17802018 | 3.1296076 | 20 | 3 30.5 | 19.2 |
| 58133 1981 $EN_{40}$ | 15.8 | *X* | 322.89875 | 264.50299 | 196.12063 | 2.18403 | 0.1259588 | 0.26963734 | 2.3729178 | 20 | — | — |
| 58134 1981 $EW_{40}$ | 15.0 | *X* | 125.47550 | 344.96847 | 353.18592 | 10.14390 | 0.1607210 | 0.27077153 | 2.3662868 | 20 | — | — |
| 58135 1981 $EK_{42}$ | 14.6 | *X* | 79.18879 | 304.53892 | 196.15375 | 4.93142 | 0.1057330 | 0.17874669 | 3.1211218 | 20 | 5 9.1 | 18.9 |
| 58136 1981 $EV_{42}$ | 15.5 | *X* | 201.82264 | 287.79074 | 358.98961 | 8.28948 | 0.1596185 | 0.27160359 | 2.3614516 | 20 | — | — |
| 58137 1981 $EJ_{44}$ | 14.5 | *X* | 244.10128 | 134.71519 | 193.02654 | 8.91956 | 0.0735747 | 0.17866263 | 3.1221006 | 20 | 4 5.1 | 19.0 |
| 58138 1981 $ET_{45}$ | 15.2 | *X* | 30.95691 | 274.91229 | 193.95480 | 12.93954 | 0.2792879 | 0.17515924 | 3.1635935 | 20 | 1 22.7 | 18.3 |
| 58139 1981 $EP_{46}$ | 15.3 | *X* | 44.34997 | 60.79622 | 353.67091 | 6.62212 | 0.3011480 | 0.22336062 | 2.6902851 | 20 | — | — |
| 58140 1981 *SN* | 14.0 | *X* | 314.73118 | 156.00323 | 215.79422 | 5.16968 | 0.1571752 | 0.25170908 | 2.4842967 | 20 | 9 3.3 | 16.4 |
| 58141 1981 $UW_{22}$ | 15.6 | *X* | 280.18872 | 218.81435 | 107.58032 | 5.15149 | 0.2556869 | 0.29747887 | 2.2224498 | 20 | 4 17.9 | 18.6 |
| 58142 1983 $RW_3$ | 15.5 | *X* | 199.66338 | 332.40216 | 352.29468 | 13.43245 | 0.1707226 | 0.28202972 | 2.3028879 | 20 | 2 9.1 | 19.3 |
| 58143 1983 $VD_7$ | 12.7 | *X* | 338.61853 | 302.96448 | 36.71138 | 12.26192 | 0.2903231 | 0.23853856 | 2.5749195 | 20 | 9 14.8 | 14.4 |
| 58144 1983 *WU* | 14.4 | *X* | 39.70461 | 9.31738 | 60.97444 | 10.99852 | 0.2601266 | 0.21910750 | 2.7249878 | 20 | — | — |
| 58145 1986 $PT_1$ | 15.6 | *X* | 224.81381 | 207.78846 | 128.86918 | 4.41178 | 0.2053285 | 0.28146786 | 2.3059516 | 20 | 3 13.7 | 19.2 |
| 58146 1986 *RU* | 15.0 | *X* | 13.27766 | 227.89870 | 189.70994 | 11.27407 | 0.2205487 | 0.26835082 | 2.3804959 | 20 | — | — |
| 58147 1986 *WK* | 14.3 | *X* | 111.74746 | 335.04452 | 33.35513 | 6.80622 | 0.3713746 | 0.21338808 | 2.7734645 | 20 | 2 7.7 | 18.7 |
| 58148 1987 $SH_4$ | 13.4 | *X* | 313.20884 | 314.08267 | 17.76661 | 13.87526 | 0.1988521 | 0.23546418 | 2.5972842 | 20 | 6 23.6 | 16.4 |
| 58149 1987 $SX_{11}$ | 15.0 | *X* | 159.25896 | 236.89715 | 172.92006 | 26.13274 | 0.3801256 | 0.22654737 | 2.6649969 | 20 | 4 29.3 | 20.4 |
| 58150 1988 $CY_4$ | 15.6 | *X* | 127.55417 | 26.78708 | 240.28270 | 6.14656 | 0.1366100 | 0.26348505 | 2.4097134 | 20 | 12 19.4 | 19.2 |
| 58151 1988 $CG_7$ | 14.6 | *X* | 78.99575 | 186.99313 | 223.46274 | 8.44809 | 0.1640012 | 0.21336475 | 2.7736667 | 20 | 1 16.1 | 18.0 |
| 58152 Natsöderblom | 15.4 | *X* | 3.43676 | 23.65039 | 271.88140 | 12.27353 | 0.2273601 | 0.24618044 | 2.5213532 | 20 | 8 21.6 | 17.8 |
| 58153 1988 $RH_{11}$ | 12.7 | *X* | 261.38903 | 130.92113 | 184.47107 | 1.91334 | 0.1084717 | 0.08366498 | 5.1773426 | 20 | 4 10.8 | 19.8 |
| 58154 1988 $RJ_{11}$ | 16.5 | *X* | 69.15807 | 136.90588 | 169.89598 | 4.23189 | 0.2308156 | 0.28358859 | 2.2944409 | 20 | 12 23.7 | 20.1 |
| 58155 1988 *VD* | 15.3 | *X* | 247.18268 | 80.65584 | 27.53561 | 22.26222 | 0.1334388 | 0.36931790 | 1.9239885 | 20 | 10 28.2 | 16.6 |
| 58156 1989 *GL* | 14.6 | *X* | 31.57546 | 156.62834 | 17.12678 | 21.40869 | 0.1904026 | 0.28661009 | 2.2782868 | 20 | 4 7.3 | 16.0 |
| 58157 1989 $GC_3$ | 15.6 | *X* | 252.93421 | 244.20501 | 10.20054 | 5.49061 | 0.1365169 | 0.27874304 | 2.3209549 | 20 | — | — |
| 58158 1989 *RA* | 15.7 | *X* | 178.31713 | 171.86089 | 175.97535 | 9.18757 | 0.2182971 | 0.27281325 | 2.3544659 | 20 | 2 15.9 | 19.6 |
| 58159 1989 $SL_4$ | 15.0 | *X* | 357.22935 | 282.88563 | 102.57445 | 3.40396 | 0.1999896 | 0.25740116 | 2.4475358 | 20 | 12 29.9 | 17.4 |
| 58160 1989 $SX_4$ | 14.0 | *X* | 73.41112 | 212.52761 | 182.71743 | 12.64755 | 0.1702241 | 0.23261456 | 2.6184530 | 20 | — | — |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 58161 1989 $SH_5$ | 15.4 | $X$ | 129.27199 | 230.55269 | 116.64454 | 3.38856 | 0.2046900 | 0.26685379 | 2.3893905 | 20 | — | — |
| 58162 1989 $TS_6$ | 15.3 | $X$ | 115.62280 | 56.44505 | 32.80005 | 14.32754 | 0.1309717 | 0.24077809 | 2.5589281 | 20 | 4 18.9 | 18.9 |
| 58163 Minnesang | 15.6 | $X$ | 40.48451 | 235.37370 | 176.84610 | 1.09317 | 0.1446453 | 0.26216237 | 2.4178117 | 20 | — | — |
| 58164 1989 $WV_3$ | 14.8 | $X$ | 315.81411 | 113.10090 | 282.79812 | 5.43696 | 0.1323707 | 0.25325508 | 2.4741761 | 20 | 10 14.2 | 17.3 |
| 58165 1990 $HQ_5$ | 14.5 | $X$ | 175.88028 | 346.25722 | 84.08882 | 6.36193 | 0.1293425 | 0.29346096 | 2.2426896 | 20 | 5 28.0 | 17.8 |
| 58166 1990 $OF_3$ | 14.2 | $X$ | 132.23449 | 39.97932 | 288.35192 | 11.68609 | 0.2787215 | 0.17708735 | 3.1405884 | 20 | 1 2.7 | 19.1 |
| 58167 1990 $QM_3$ | 15.4 | $X$ | 125.20841 | 10.04246 | 352.50787 | 7.18390 | 0.1464336 | 0.27775624 | 2.3264488 | 20 | 1 6.0 | 18.3 |
| 58168 1990 $QB_9$ | 15.2 | $X$ | 142.51884 | 241.09414 | 146.38754 | 6.90630 | 0.1911418 | 0.28135770 | 2.3065534 | 20 | 3 3.3 | 18.4 |
| 58169 1990 $SD_3$ | 15.3 | $X$ | 144.66776 | 333.52236 | 53.65423 | 5.10275 | 0.1993131 | 0.28025420 | 2.3126042 | 20 | 3 7.8 | 18.7 |
| 58170 1990 $SB_5$ | 15.5 | $X$ | 68.39961 | 210.37863 | 150.36647 | 4.89436 | 0.1769447 | 0.27180645 | 2.3602765 | 20 | — | — |
| 58171 1990 $SC_5$ | 15.8 | $X$ | 303.50712 | 271.03703 | 100.10380 | 2.33499 | 0.2038304 | 0.26080199 | 2.4262122 | 20 | 8 7.3 | 18.0 |
| 58172 1990 $SD_8$ | 14.7 | $X$ | 179.68806 | 269.47026 | 112.97329 | 4.55411 | 0.2093909 | 0.18474751 | 3.0531653 | 20 | 4 7.0 | 19.9 |
| 58173 1990 $SS_{10}$ | 15.0 | $X$ | 145.38528 | 22.82526 | 337.52766 | 10.02746 | 0.1472876 | 0.27907867 | 2.3190937 | 20 | 1 28.4 | 18.2 |
| 58174 1990 $SZ_{10}$ | 15.5 | $X$ | 15.63973 | 332.30829 | 356.44474 | 7.01506 | 0.1778927 | 0.26534999 | 2.3984095 | 20 | 11 6.2 | 18.3 |
| 58175 1990 $SE_{15}$ | 15.8 | $X$ | 318.44547 | 86.71219 | 234.77896 | 5.97006 | 0.2599066 | 0.29306023 | 2.2447335 | 20 | 6 9.3 | 17.4 |
| 58176 1990 $SN_{16}$ | 15.1 | $X$ | 168.84083 | 342.19894 | 28.01155 | 4.10970 | 0.2168642 | 0.28293241 | 2.2979871 | 20 | 3 8.6 | 18.8 |
| 58177 1990 $TB_6$ | 15.2 | $X$ | 165.17569 | 33.79188 | 332.31183 | 6.94918 | 0.1187055 | 0.28196709 | 2.3032289 | 20 | 2 20.9 | 18.5 |
| 58178 1990 $UY_1$ | 14.7 | $X$ | 72.66396 | 284.51211 | 107.07015 | 8.99871 | 0.1362348 | 0.27241356 | 2.3567684 | 20 | — | — |
| 58179 1990 $UN_3$ | 15.7 | $X$ | 74.92641 | 233.62636 | 156.48385 | 5.20566 | 0.2300101 | 0.27290099 | 2.3539613 | 20 | — | — |
| 58180 1990 $WG_6$ | 15.7 | $X$ | 110.25489 | 151.09003 | 207.06061 | 5.37776 | 0.2164031 | 0.27302466 | 2.3532504 | 20 | — | — |
| 58181 1991 $CG_1$ | 14.3 | $X$ | 75.87970 | 133.99826 | 346.61364 | 4.61467 | 0.1962731 | 0.24137192 | 2.5547293 | 20 | 4 16.4 | 17.4 |
| 58182 1991 $PX_2$ | 15.1 | $X$ | 219.60146 | 343.25280 | 332.79503 | 4.15095 | 0.1390705 | 0.22640054 | 2.6661489 | 20 | 2 18.1 | 19.4 |
| 58183 1991 $PH_9$ | 14.7 | $X$ | 193.22430 | 39.19015 | 326.23505 | 13.11683 | 0.2760927 | 0.22672971 | 2.6635678 | 20 | 3 19.8 | 19.7 |
| 58184 Masayukiyamamoto | 15.5 | $X$ | 301.66491 | 294.42117 | 31.94129 | 1.74168 | 0.1981169 | 0.26761460 | 2.3848597 | 20 | 5 25.6 | 18.0 |
| 58185 Rokkosan | 15.5 | $X$ | 73.77499 | 6.25802 | 359.01167 | 5.15690 | 0.2021320 | 0.28261757 | 2.2996934 | 20 | — | — |
| 58186 Langkavel | 16.1 | $X$ | 283.12245 | 77.32024 | 289.15515 | 2.04271 | 0.0253549 | 0.30150537 | 2.2026188 | 20 | 7 26.9 | 18.5 |
| 58187 1991 $TD$ | 14.8 | $X$ | 230.58288 | 318.98833 | 42.76098 | 14.47937 | 0.2003660 | 0.22930470 | 2.6435898 | 20 | 4 22.1 | 19.0 |
| 58188 1991 $TA_9$ | 14.1 | $X$ | 258.01751 | 328.14961 | 35.33189 | 5.00494 | 0.1704319 | 0.12638521 | 3.9325286 | 20 | 5 23.0 | 19.9 |
| 58189 1991 $VV_9$ | 16.5 | $X$ | 272.49691 | 198.65141 | 117.07160 | 2.35575 | 0.1849283 | 0.26114459 | 2.4240897 | 20 | 4 4.7 | 19.8 |
| 58190 1991 $VH_{12}$ | 16.1 | $X$ | 233.35514 | 231.04025 | 53.66876 | 6.00150 | 0.1539548 | 0.28785938 | 2.2716903 | 20 | 1 17.4 | 19.6 |
| 58191 Dolomiten | 15.2 | $X$ | 96.48965 | 160.78192 | 284.17339 | 6.54263 | 0.0722717 | 0.28572771 | 2.2829749 | 20 | 3 1.6 | 18.0 |
| 58192 1992 $AQ$ | 15.4 | $X$ | 43.97688 | 18.64134 | 105.64924 | 25.13025 | 0.2207804 | 0.28295478 | 2.2978659 | 20 | 2 24.4 | 17.5 |
| 58193 1992 $DL_6$ | 14.7 | $X$ | 6.08848 | 120.37563 | 119.14338 | 2.52923 | 0.0949626 | 0.18163368 | 3.0879609 | 20 | 5 27.7 | 18.5 |
| 58194 1992 $DR_6$ | 15.6 | $X$ | 356.24704 | 16.75647 | 98.23903 | 2.27128 | 0.0576050 | 0.23964278 | 2.5670037 | 20 | — | — |
| 58195 1992 $DH_7$ | 15.3 | $X$ | 29.35369 | 219.98732 | 137.68406 | 6.83245 | 0.1219581 | 0.26629689 | 2.3927206 | 20 | 12 28.9 | 18.3 |
| 58196 Ashleyess | 15.1 | $X$ | 306.67187 | 320.21315 | 190.73439 | 26.04634 | 0.2617270 | 0.23810199 | 2.5780660 | 20 | — | — |
| 58197 1992 $EH_2$ | 16.1 | $X$ | 34.65408 | 289.40530 | 137.12971 | 6.87406 | 0.1727642 | 0.27608305 | 2.3358389 | 20 | — | — |
| 58198 1992 $EU_2$ | 16.4 | $X$ | 120.38663 | 231.04418 | 8.51939 | 3.84621 | 0.1838903 | 0.29720421 | 2.2238189 | 20 | 11 13.9 | 20.0 |
| 58199 1992 $EC_5$ | 15.6 | $X$ | 14.10608 | 96.40437 | 0.82514 | 8.33022 | 0.1738023 | 0.27647433 | 2.3336345 | 20 | — | — |
| 58200 1992 $EV_6$ | 15.4 | $X$ | 202.33575 | 197.49706 | 91.45981 | 5.60670 | 0.2636924 | 0.27364869 | 2.3496714 | 20 | — | — |
| 58201 1992 $ED_7$ | 14.6 | $X$ | 144.69487 | 8.29903 | 120.14353 | 10.14571 | 0.0788414 | 0.18499455 | 3.0504466 | 20 | 7 5.5 | 19.2 |
| 58202 1992 $EO_7$ | 15.8 | $X$ | 359.31679 | 86.07569 | 59.66975 | 5.94832 | 0.1002537 | 0.27777184 | 2.3263617 | 20 | — | — |
| 58203 1992 $EC_9$ | 15.1 | $X$ | 64.68128 | 285.56181 | 119.97354 | 7.55927 | 0.1117380 | 0.27552803 | 2.3389747 | 20 | — | — |
| 58204 1992 $EK_{10}$ | 15.1 | $X$ | 176.14249 | 274.83391 | 163.52715 | 12.06916 | 0.2219321 | 0.18568459 | 3.0428846 | 20 | 6 8.7 | 20.6 |
| 58205 1992 $EX_{12}$ | 16.0 | $X$ | 202.49168 | 317.88672 | 222.81654 | 0.79388 | 0.1197191 | 0.26521823 | 2.3992038 | 20 | 11 19.1 | 19.1 |
| 58206 1992 $ER_{13}$ | 15.2 | $X$ | 62.13081 | 349.62048 | 194.10575 | 5.19762 | 0.1598266 | 0.18123157 | 3.0925269 | 20 | 6 18.1 | 19.4 |
| 58207 1992 $EF_{14}$ | 15.9 | $X$ | 68.73269 | 248.03904 | 178.28163 | 4.89460 | 0.1546900 | 0.27828291 | 2.3235126 | 20 | 1 4.7 | 17.9 |
| 58208 1992 $EX_{16}$ | 15.5 | $X$ | 220.79906 | 136.17570 | 173.38406 | 7.39628 | 0.1646619 | 0.27845474 | 2.3225566 | 20 | 2 4.1 | 19.2 |
| 58209 1992 $EH_{19}$ | 15.0 | $X$ | 37.11763 | 2.09324 | 114.37644 | 3.13323 | 0.2021999 | 0.17539012 | 3.1608166 | 20 | 2 14.5 | 18.3 |
| 58210 1992 $EW_{21}$ | 14.5 | $X$ | 52.52278 | 300.86034 | 128.59725 | 11.05217 | 0.1301348 | 0.17227193 | 3.1988439 | 20 | 1 5.8 | 18.4 |
| 58211 1992 $HF_4$ | 14.7 | $X$ | 127.93768 | 85.63574 | 206.95798 | 8.92885 | 0.2566268 | 0.26335961 | 2.4104786 | 20 | — | — |
| 58212 1992 $OQ_5$ | 14.5 | $X$ | 148.39519 | 263.16315 | 149.83543 | 13.04165 | 0.2038780 | 0.23416377 | 2.6068912 | 20 | 4 17.4 | 18.9 |
| 58213 1992 $QP$ | 15.0 | $X$ | 169.18471 | 171.13170 | 156.44990 | 10.90031 | 0.2607293 | 0.26484268 | 2.4014713 | 20 | 1 18.9 | 19.2 |
| 58214 Amorim | 14.3 | $X$ | 245.47463 | 50.87397 | 336.52226 | 14.38817 | 0.1588843 | 0.20516582 | 2.8470781 | 20 | 6 9.1 | 18.9 |
| 58215 von Klitzing | 15.0 | $X$ | 240.51233 | 348.59869 | 14.58825 | 6.83633 | 0.1141299 | 0.23764806 | 2.5813479 | 20 | 5 7.3 | 18.8 |
| 58216 1992 $SR_9$ | 15.7 | $X$ | 72.59782 | 335.73215 | 2.32173 | 8.07389 | 0.0151877 | 0.25407045 | 2.4688798 | 20 | — | — |
| 58217 Peterhebel | 15.1 | $X$ | 197.27040 | 19.74936 | 348.16395 | 2.80736 | 0.2118837 | 0.23385107 | 2.6092146 | 20 | 3 29.8 | 19.6 |
| 58218 1992 $UZ_7$ | 14.5 | $X$ | 140.11219 | 198.82099 | 151.05372 | 1.53841 | 0.1735467 | 0.22514568 | 2.6760464 | 20 | 1 17.7 | 18.5 |
| 58219 1992 $WZ_2$ | 13.9 | $X$ | 173.76139 | 315.85282 | 55.13695 | 15.27659 | 0.1246083 | 0.22849323 | 2.6498451 | 20 | 3 20.4 | 18.3 |
| 58220 1993 $BY_4$ | 16.4 | $X$ | 224.89608 | 165.93205 | 315.01212 | 1.64422 | 0.0611881 | 0.30987517 | 2.1627759 | 20 | 10 13.4 | 18.8 |
| 58221 Boston | 14.4 | $X$ | 350.23227 | 330.12301 | 142.25811 | 9.89187 | 0.1128477 | 0.21348971 | 2.7725843 | 20 | — | — |
| 58222 1993 $FA_{18}$ | 15.3 | $X$ | 107.81677 | 101.77191 | 103.21225 | 5.27936 | 0.0941149 | 0.30237638 | 2.1983869 | 20 | 9 16.7 | 18.2 |
| 58223 1993 $FO_{18}$ | 14.6 | $X$ | 326.37705 | 277.73696 | 36.14049 | 14.62994 | 0.1813683 | 0.18897792 | 3.0074287 | 20 | 6 22.4 | 18.2 |
| 58224 1993 $FM_{20}$ | 14.4 | $X$ | 73.79827 | 201.70102 | 196.64563 | 8.84595 | 0.0863561 | 0.17462411 | 3.1700535 | 20 | — | — |
| 58225 1993 $FY_{20}$ | 15.5 | $X$ | 21.40982 | 119.78556 | 29.62989 | 1.28015 | 0.1581492 | 0.18006920 | 3.1058211 | 20 | 2 25.0 | 18.9 |
| 58226 1993 $FW_{22}$ | 14.2 | $X$ | 118.99682 | 10.65769 | 340.72128 | 4.30797 | 0.1662457 | 0.17239740 | 3.1972915 | 20 | 1 5.1 | 18.9 |
| 58227 1993 $FB_{26}$ | 15.6 | $X$ | 42.19241 | 288.44817 | 323.79363 | 1.92939 | 0.1768841 | 0.29913920 | 2.2142186 | 20 | 9 6.2 | 18.0 |
| 58228 1993 $FL_{26}$ | 15.8 | $X$ | 23.97036 | 1.95137 | 315.66869 | 3.68983 | 0.1688262 | 0.30380163 | 2.1915059 | 20 | 11 12.4 | 18.2 |
| 58229 1993 $FZ_{27}$ | 15.5 | $X$ | 239.92525 | 232.77078 | 253.95137 | 2.56089 | 0.1271463 | 0.20079801 | 2.8882167 | 20 | 10 11.5 | 19.6 |
| 58230 1993 $FR_{39}$ | 16.2 | $X$ | 178.01775 | 56.60897 | 89.98385 | 1.06193 | 0.0778042 | 0.30432931 | 2.1889720 | 20 | 9 16.6 | 19.1 |
| 58231 1993 $FQ_{40}$ | 14.1 | $X$ | 61.94374 | 297.78895 | 79.51558 | 2.03054 | 0.1636864 | 0.17087568 | 3.2162457 | 20 | — | — |
| 58232 1993 $FD_{41}$ | 15.9 | $X$ | 209.07112 | 264.08199 | 171.37652 | 5.61158 | 0.0984875 | 0.30063253 | 2.2068801 | 20 | 7 11.8 | 18.8 |
| 58233 1993 $FN_{50}$ | 16.3 | $X$ | 42.98915 | 108.57948 | 190.98925 | 6.43419 | 0.1866785 | 0.30389890 | 2.1910383 | 20 | 11 18.1 | 19.0 |
| 58234 1993 $FY_{50}$ | 15.3 | $X$ | 188.44331 | 99.30258 | 236.61838 | 1.21179 | 0.0834209 | 0.21486161 | 2.7607696 | 20 | 2 12.4 | 19.3 |
| 58235 1993 $FW_{52}$ | 15.9 | $X$ | 359.27588 | 101.79847 | 140.86219 | 4.23544 | 0.1221802 | 0.29476118 | 2.2360896 | 20 | 5 18.9 | 17.8 |
| 58236 1993 $FK_{56}$ | 14.6 | $X$ | 33.16898 | 117.58949 | 27.27075 | 12.58410 | 0.0948323 | 0.18077593 | 3.0977211 | 20 | 3 12.0 | 18.6 |
| 58237 1993 $FR_{66}$ | 14.6 | $X$ | 152.17063 | 52.16864 | 346.21791 | 9.88660 | 0.0675121 | 0.18236584 | 3.0796903 | 20 | 3 21.4 | 19.3 |
| 58238 1993 $FH_{77}$ | 14.4 | $X$ | 130.43063 | 163.83729 | 197.41524 | 1.24250 | 0.0946368 | 0.17487716 | 3.1669946 | 20 | 1 19.1 | 19.1 |
| 58239 1993 $FS_{77}$ | 14.2 | $X$ | 106.52253 | 352.59810 | 350.28632 | 2.73958 | 0.1384918 | 0.16952812 | 3.2332669 | 20 | — | — |
| 58240 1993 $FV_{81}$ | 15.5 | $X$ | 193.68727 | 258.62814 | 85.12016 | 5.88483 | 0.1163413 | 0.25201926 | 2.4822579 | 20 | 2 27.4 | 19.3 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58241 1993 $HH_4$ | m 15.3 | $X$ | ° 320.08798 | ° 257.85846 | ° 30.01637 | ° 27.68800 | 0.0791479 | ° 0.22210749 | 2.7003947 | 20 | 5 11.2 | 18.9 |
| 58242 1993 $HJ_4$ | 14.2 | $X$ | 104.74181 | 4.72895 | 42.88595 | 12.61393 | 0.1293720 | 0.17813462 | 3.1282671 | 20 | 2 24.6 | 18.9 |
| 58243 1993 $NG_1$ | 15.2 | $X$ | 345.26003 | 171.48590 | 298.25566 | 5.99474 | 0.0807641 | 0.27323758 | 2.3520277 | 20 | — | — |
| 58244 1993 $OX_5$ | 14.9 | $X$ | 74.23736 | 134.26004 | 284.37087 | 5.21486 | 0.1000807 | 0.27558820 | 2.3386343 | 20 | — | — |
| 58245 1993 $OS_7$ | 15.2 | $X$ | 269.26888 | 205.99074 | 115.71078 | 7.08213 | 0.1584238 | 0.28634196 | 2.2797088 | 20 | 4 13.3 | 18.3 |
| 58246 1993 $OP_{12}$ | 15.4 | $X$ | 160.82998 | 197.59305 | 153.21406 | 2.41781 | 0.1577038 | 0.27765773 | 2.3269990 | 20 | 1 31.3 | 18.9 |
| 58247 1993 $PH_3$ | 16.1 | $X$ | 231.09617 | 185.01007 | 162.81933 | 6.39203 | 0.2453792 | 0.28287167 | 2.2983160 | 20 | 3 30.9 | 20.0 |
| 58248 1993 $PO_5$ | 14.7 | $X$ | 259.93134 | 20.92599 | 291.95731 | 5.90673 | 0.1641055 | 0.17313021 | 3.1882630 | 20 | 3 22.8 | 19.6 |
| 58249 1993 $PC_6$ | 15.0 | $X$ | 102.68212 | 182.12576 | 155.69901 | 25.05362 | 0.1971570 | 0.26868762 | 2.3785062 | 20 | — | — |
| 58250 1993 $QU_1$ | 15.2 | $X$ | 81.36100 | 183.72355 | 160.16858 | 6.32547 | 0.2568854 | 0.26641039 | 2.3920410 | 20 | — | — |
| 58251 1993 $QS_2$ | 16.1 | $X$ | 173.72409 | 333.10361 | 336.11150 | 1.94331 | 0.2324608 | 0.27371750 | 2.3492776 | 20 | — | — |
| 58252 1993 $QG_4$ | 15.8 | $X$ | 182.75020 | 204.71368 | 147.23302 | 2.46596 | 0.2383251 | 0.27718514 | 2.3296433 | 20 | 2 26.6 | 19.7 |
| 58253 1993 $QJ_5$ | 16.0 | $X$ | 52.01220 | 350.98143 | 299.36391 | 3.59548 | 0.1651779 | 0.29654629 | 2.2271068 | 20 | 11 9.5 | 18.8 |
| 58254 1993 $QN_5$ | 16.4 | $X$ | 163.45057 | 107.99881 | 238.45917 | 2.39309 | 0.2030679 | 0.31197109 | 2.1530783 | 20 | 1 27.8 | 19.5 |
| 58255 1993 $RS_5$ | 14.9 | $X$ | 211.70846 | 272.54252 | 204.40255 | 4.23079 | 0.0644893 | 0.29115401 | 2.2545205 | 20 | 9 15.4 | 17.8 |
| 58256 1993 $RL_7$ | 14.5 | $X$ | 18.70395 | 108.24790 | 159.65467 | 1.05087 | 0.1724458 | 0.17892771 | 3.1190164 | 20 | 8 1.8 | 17.9 |
| 58257 1993 $RN_9$ | 15.0 | $X$ | 339.18976 | 68.32194 | 313.38708 | 1.49842 | 0.2052136 | 0.25809178 | 2.4431677 | 20 | 11 19.4 | 16.8 |
| 58258 1993 $RU_{10}$ | 15.0 | $X$ | 128.74279 | 89.73365 | 225.51520 | 0.95951 | 0.0951514 | 0.19421061 | 2.9531630 | 20 | — | — |
| 58259 1993 $RA_{13}$ | 15.8 | $X$ | 81.76264 | 156.24984 | 183.37246 | 2.49404 | 0.2048708 | 0.22866198 | 2.6485412 | 20 | — | — |
| 58260 1993 $SO$ | 14.9 | $X$ | 106.84762 | 176.88038 | 167.89269 | 8.27651 | 0.0951254 | 0.26964091 | 2.3728968 | 20 | — | — |
| 58261 1993 $SD_1$ | 14.8 | $X$ | 115.34964 | 332.17301 | 39.19441 | 3.98480 | 0.1936891 | 0.27096239 | 2.3651755 | 20 | 1 12.9 | 17.6 |
| 58262 1993 $ST_2$ | 15.5 | $X$ | 282.22003 | 164.29664 | 190.47982 | 5.32102 | 0.2068050 | 0.28718511 | 2.2752447 | 20 | 6 5.8 | 18.2 |
| 58263 1993 $SO_4$ | 16.2 | $X$ | 334.05842 | 226.36693 | 152.07434 | 2.21134 | 0.2291555 | 0.29443785 | 2.2377262 | 20 | 11 21.5 | 17.4 |
| 58264 1993 $SW_7$ | 15.7 | $X$ | 147.78652 | 355.34449 | 351.46894 | 4.15859 | 0.2082936 | 0.23536452 | 2.5980174 | 20 | 1 24.8 | 19.7 |
| 58265 1993 $TJ_{12}$ | 15.0 | $X$ | 295.72300 | 43.12286 | 359.06492 | 4.54055 | 0.1855473 | 0.25364176 | 2.4716609 | 20 | 9 11.3 | 17.2 |
| 58266 1993 $TN_{15}$ | 15.8 | $X$ | 320.81010 | 16.85124 | 50.83527 | 2.02802 | 0.1594553 | 0.25901667 | 2.4373482 | 20 | 12 16.9 | 18.0 |
| 58267 1993 $TB_{16}$ | 14.5 | $X$ | 279.38811 | 287.83793 | 34.44342 | 2.49230 | 0.1715831 | 0.17288116 | 3.1913243 | 20 | 4 26.2 | 19.1 |
| 58268 1993 $TQ_{19}$ | 15.8 | $X$ | 354.14258 | 184.91897 | 192.16968 | 6.35498 | 0.1207794 | 0.25830261 | 2.4418380 | 20 | 12 2.0 | 18.4 |
| 58269 1993 $TG_{20}$ | 15.3 | $X$ | 101.75133 | 287.23785 | 55.57341 | 2.96489 | 0.2155384 | 0.26703619 | 2.3883023 | 20 | — | — |
| 58270 1993 $TK_{22}$ | 15.4 | $X$ | 327.97087 | 53.18650 | 40.24380 | 3.03875 | 0.1792509 | 0.26162449 | 2.4211245 | 20 | — | — |
| 58271 1993 $TT_{22}$ | 15.3 | $X$ | 233.06225 | 104.84436 | 187.22853 | 6.38229 | 0.1248936 | 0.27541840 | 2.3395953 | 20 | 1 26.1 | 18.9 |
| 58272 1993 $TZ_{27}$ | 15.7 | $X$ | 152.16685 | 299.13564 | 167.24252 | 4.75769 | 0.2030092 | 0.24388642 | 2.5371392 | 20 | 6 22.4 | 19.9 |
| 58273 1993 $TA_{31}$ | 15.9 | $X$ | 113.28348 | 296.11492 | 147.59772 | 4.28339 | 0.2345240 | 0.23773798 | 2.5806969 | 20 | 4 22.9 | 19.7 |
| 58274 1993 $TY_{31}$ | 14.4 | $X$ | 340.45651 | 230.27786 | 188.41228 | 11.53020 | 0.1857684 | 0.22260919 | 2.6963359 | 20 | 12 29.7 | 17.4 |
| 58275 1993 $TR_{32}$ | 16.0 | $X$ | 211.36079 | 256.09739 | 139.73715 | 3.87531 | 0.1008613 | 0.28182064 | 2.3040268 | 20 | 5 21.2 | 19.2 |
| 58276 1993 $TB_{33}$ | 16.1 | $X$ | 97.94973 | 235.09568 | 107.86705 | 3.37464 | 0.1930743 | 0.26621637 | 2.3932030 | 20 | — | — |
| 58277 1993 $TW_{33}$ | 14.7 | $X$ | 348.94492 | 236.79271 | 99.20390 | 5.24404 | 0.0521473 | 0.21632891 | 2.7482718 | 20 | 9 13.8 | 18.1 |
| 58278 1993 $TA_{34}$ | 15.8 | $X$ | 56.88082 | 4.74341 | 74.34928 | 4.63373 | 0.1963501 | 0.26900012 | 2.3766637 | 20 | 1 7.4 | 17.5 |
| 58279 Kamerlingh | 13.4 | $X$ | 40.32941 | 0.02638 | 125.93175 | 5.84063 | 0.1384358 | 0.12426543 | 3.9771242 | 20 | 3 6.7 | 18.4 |
| 58280 1993 $UC_2$ | 15.8 | $X$ | 153.76807 | 157.28426 | 14.56843 | 5.96562 | 0.0850810 | 0.25214845 | 2.4814099 | 20 | 9 16.6 | 19.4 |
| 58281 1993 $UR_5$ | 15.8 | $X$ | 241.01520 | 238.19695 | 80.12351 | 6.71700 | 0.1960572 | 0.27878251 | 2.3207358 | 20 | 3 7.6 | 19.5 |
| 58282 1993 $UB_6$ | 15.0 | $X$ | 152.54654 | 214.52943 | 108.73114 | 5.83130 | 0.1604415 | 0.26962361 | 2.3729984 | 20 | — | — |
| 58283 1993 $UO_7$ | 16.2 | $X$ | 179.58512 | 237.96485 | 84.95512 | 7.93294 | 0.1450346 | 0.27221199 | 2.3579316 | 20 | 1 15.6 | 19.7 |
| 58284 1993 $VW_3$ | 15.5 | $X$ | 113.11353 | 326.22601 | 30.91655 | 6.31909 | 0.2602385 | 0.26813339 | 2.3817826 | 20 | 1 1.6 | 18.5 |
| 58285 1993 $YN$ | 14.9 | $X$ | 71.46072 | 107.91462 | 219.01561 | 7.38548 | 0.3141994 | 0.26059795 | 2.4274785 | 20 | — | — |
| 58286 1993 $YO_1$ | 16.3 | $X$ | 70.75200 | 230.20644 | 231.30681 | 2.54373 | 0.1189544 | 0.23378814 | 2.6096828 | 20 | 3 2.1 | 19.2 |
| 58287 1994 $AE_1$ | 14.0 | $X$ | 290.49802 | 46.82259 | 291.57840 | 16.93470 | 0.2318895 | 0.24346518 | 2.5400649 | 20 | 5 17.7 | 17.6 |
| 58288 1994 $CF_{14}$ | 13.8 | $X$ | 326.71181 | 318.16856 | 11.96571 | 10.71258 | 0.1289034 | 0.23868232 | 2.5738854 | 20 | 8 1.4 | 16.7 |
| 58289 1994 $CC_{16}$ | 15.1 | $X$ | 119.19396 | 351.20964 | 103.59428 | 3.61084 | 0.1339991 | 0.23239769 | 2.6200817 | 20 | 5 1.7 | 18.8 |
| 58290 1994 $CH_{17}$ | 14.5 | $X$ | 64.00879 | 346.53811 | 87.27416 | 5.12460 | 0.0741925 | 0.22376706 | 2.6870265 | 20 | 1 13.0 | 17.6 |
| 58291 1994 $GA$ | 14.6 | $X$ | 67.09415 | 218.97192 | 229.77735 | 27.58744 | 0.1323226 | 0.22695211 | 2.6618274 | 20 | 1 31.7 | 18.5 |
| 58292 1994 $GC$ | 14.5 | $X$ | 243.57386 | 276.60295 | 109.53657 | 3.18837 | 0.0911353 | 0.19912750 | 2.9043473 | 20 | 6 14.5 | 18.7 |
| 58293 1994 $GQ_5$ | 14.8 | $X$ | 231.57171 | 288.14552 | 21.62655 | 14.94516 | 0.1202702 | 0.22274047 | 2.6952763 | 20 | 2 29.5 | 19.2 |
| 58294 1994 $JJ_5$ | 13.7 | $X$ | 189.20323 | 293.03781 | 45.22144 | 6.78684 | 0.1578545 | 0.21916653 | 2.7244984 | 20 | 2 20.9 | 18.2 |
| 58295 1994 $JJ_9$ | 15.1 | $X$ | 303.89050 | 67.30074 | 161.15570 | 8.24077 | 0.2250811 | 0.22084974 | 2.7106376 | 20 | 1 17.4 | 19.1 |
| 58296 1994 $LF_1$ | 14.2 | $X$ | 256.26814 | 54.66352 | 231.71272 | 33.99903 | 0.2512518 | 0.21848895 | 2.7301283 | 20 | 1 27.6 | 19.6 |
| 58297 1994 $PA_3$ | 14.5 | $X$ | 220.54093 | 179.83649 | 199.90913 | 1.44792 | 0.1468416 | 0.18044635 | 3.1014918 | 20 | 5 8.1 | 19.5 |
| 58298 1994 $PB_3$ | 15.1 | $X$ | 167.12104 | 301.98856 | 158.03240 | 6.11290 | 0.0940737 | 0.25972560 | 2.4329110 | 20 | 6 26.4 | 18.7 |
| 58299 1994 $PH_3$ | 13.7 | $X$ | 210.88834 | 92.10591 | 330.69580 | 9.63835 | 0.1062006 | 0.18315569 | 3.0708300 | 20 | 6 23.5 | 18.5 |
| 58300 1994 $PQ_5$ | 14.1 | $X$ | 163.24582 | 283.22997 | 170.74718 | 5.97654 | 0.1416340 | 0.18083864 | 3.0970049 | 20 | 6 14.4 | 19.1 |
| 58301 1994 $PB_8$ | 15.7 | $X$ | 138.84332 | 239.98429 | 335.65097 | 4.17254 | 0.0878820 | 0.30937590 | 2.1651022 | 20 | 11 2.4 | 18.6 |
| 58302 1994 $PX_8$ | 14.2 | $X$ | 145.58535 | 87.01983 | 16.24699 | 1.59624 | 0.1495589 | 0.18005369 | 3.1059994 | 20 | 6 8.9 | 19.2 |
| 58303 1994 $PY_9$ | 16.1 | $X$ | 237.41078 | 122.84348 | 222.68450 | 0.72703 | 0.1759014 | 0.29396390 | 2.2401308 | 20 | 4 4.6 | 19.4 |
| 58304 1994 $PP_{10}$ | 16.0 | $X$ | 225.71945 | 105.25139 | 162.51649 | 3.70062 | 0.1274112 | 0.28601902 | 2.2814245 | 20 | — | — |
| 58305 1994 $PM_{11}$ | 14.6 | $X$ | 333.18679 | 86.88448 | 239.78221 | 2.21588 | 0.1808441 | 0.18767573 | 3.0213240 | 20 | 7 24.9 | 17.8 |
| 58306 1994 $PA_{12}$ | 16.8 | $X$ | 112.57232 | 170.34592 | 172.28907 | 2.46409 | 0.1931013 | 0.24184118 | 2.5514235 | 20 | — | — |
| 58307 1994 $PM_{13}$ | 14.5 | $X$ | 157.08346 | 237.06676 | 163.68039 | 12.06553 | 0.0883580 | 0.17571834 | 3.1568794 | 20 | 4 4.4 | 19.3 |
| 58308 1994 $PE_{16}$ | 15.5 | $X$ | 47.41645 | 98.89190 | 311.35777 | 4.16792 | 0.1246589 | 0.24084748 | 2.5584365 | 20 | — | — |
| 58309 1994 $PV_{17}$ | 15.5 | $X$ | 96.92561 | 70.68705 | 156.30779 | 3.99135 | 0.0737872 | 0.30549853 | 2.1833832 | 20 | 9 30.9 | 18.1 |
| 58310 1994 $PT_{20}$ | 15.6 | $X$ | 109.37849 | 74.90461 | 313.91649 | 1.78742 | 0.2232823 | 0.24472512 | 2.5313393 | 20 | 2 4.9 | 18.9 |
| 58311 1994 $PA_{22}$ | 16.4 | $X$ | 16.69677 | 104.83561 | 317.26203 | 1.79901 | 0.1504812 | 0.27651797 | 2.3333890 | 20 | — | — |
| 58312 1994 $PO_{23}$ | 16.1 | $X$ | 184.63099 | 45.23869 | 333.41974 | 1.31188 | 0.1090464 | 0.29081645 | 2.2562648 | 20 | 3 27.4 | 19.3 |
| 58313 1994 $PX_{27}$ | 14.7 | $X$ | 139.79955 | 33.52218 | 71.76545 | 2.72164 | 0.1144354 | 0.18035973 | 3.1024848 | 20 | 6 3.6 | 19.4 |
| 58314 1994 $PE_{29}$ | 16.3 | $X$ | 334.08352 | 298.28095 | 82.57687 | 1.57397 | 0.2126424 | 0.26830848 | 2.3807463 | 20 | 11 11.8 | 17.8 |
| 58315 1994 $PV_{29}$ | 16.0 | $X$ | 196.72076 | 140.28140 | 219.03898 | 3.47012 | 0.1766785 | 0.29053096 | 2.2577427 | 20 | 3 14.6 | 19.5 |
| 58316 1994 $PR_{30}$ | 16.4 | $X$ | 39.79421 | 200.04861 | 176.38829 | 6.01827 | 0.1883489 | 0.27493462 | 2.3423391 | 20 | — | — |
| 58317 1994 $PB_{33}$ | 16.4 | $X$ | 345.91430 | 112.73071 | 203.85623 | 2.84355 | 0.1256754 | 0.30273986 | 2.1966269 | 20 | 8 23.7 | 18.0 |
| 58318 1994 $PW_{37}$ | 15.1 | $X$ | 266.81835 | 165.20935 | 162.77644 | 5.64263 | 0.1501224 | 0.18176266 | 3.0865000 | 20 | 4 23.1 | 19.6 |
| 58319 1994 $PZ_{37}$ | 14.4 | $X$ | 212.81491 | 234.59740 | 158.04056 | 15.67367 | 0.1467286 | 0.18068108 | 3.0988051 | 20 | 5 19.9 | 19.6 |
| 58320 1994 $PE_{38}$ | 14.3 | $X$ | 250.42511 | 23.74689 | 313.09731 | 6.00864 | 0.1789266 | 0.18073154 | 3.0982283 | 20 | 4 9.2 | 19.3 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 58321 1994 $PQ_{38}$ | 14.7 | X | 260.07120 | 200.91876 | 169.04493 | 0.42799 | 0.2214131 | 0.18322798 | 3.0700222 | 20 | 5 27.5 | 19.4 |
| 58322 1994 $PU_{38}$ | 16.1 | X | 267.62099 | 27.42990 | 306.57841 | 0.41314 | 0.1403936 | 0.29653000 | 2.2271884 | 20 | 4 26.3 | 18.9 |
| 58323 1994 $PK_{39}$ | 14.6 | X | 206.99038 | 192.92738 | 174.64879 | 2.20601 | 0.2250124 | 0.17792346 | 3.1307417 | 20 | 4 9.2 | 20.0 |
| 58324 1994 $RZ_{9}$ | 16.1 | X | 30.83440 | 69.76082 | 344.38852 | 4.91431 | 0.2244064 | 0.27571068 | 2.3379416 | 20 | — | — |
| 58325 1994 $RE_{11}$ | 16.3 | X | 128.03435 | 209.11043 | 172.28922 | 14.32862 | 0.3726890 | 0.24535405 | 2.5270116 | 20 | 3 1.2 | 20.7 |
| 58326 1994 $RQ_{16}$ | 14.8 | X | 137.98233 | 59.21707 | 181.88241 | 1.98531 | 0.0386195 | 0.19643758 | 2.9308010 | 20 | 11 15.4 | 19.1 |
| 58327 1994 $SC_{9}$ | 14.5 | X | 346.42369 | 187.97313 | 10.92552 | 5.06670 | 0.0847622 | 0.17230156 | 3.1984771 | 20 | 3 7.0 | 18.6 |
| 58328 1994 $ST_{9}$ | 16.2 | X | 6.80532 | 299.65595 | 175.68366 | 3.50601 | 0.1216810 | 0.27947967 | 2.3168748 | 20 | — | — |
| 58329 1994 $SD_{11}$ | 14.6 | X | 181.04792 | 321.40141 | 56.33756 | 2.19164 | 0.2037350 | 0.17391654 | 3.1786457 | 20 | 4 1.7 | 19.9 |
| 58330 1994 $TK$ | 14.2 | X | 351.86092 | 294.97780 | 123.49154 | 30.86016 | 0.2843076 | 0.23184356 | 2.6242549 | 20 | — | — |
| 58331 1994 $TQ_{10}$ | 16.1 | X | 168.31832 | 65.58660 | 203.10043 | 8.29981 | 0.1395330 | 0.23945061 | 2.5683769 | 20 | — | — |
| 58332 1994 $UR$ | 15.5 | X | 235.92603 | 351.50954 | 81.31063 | 4.14405 | 0.1579854 | 0.25779322 | 2.4450536 | 20 | 8 1.8 | 18.9 |
| 58333 1994 $UL_{1}$ | 15.9 | X | 138.88447 | 30.24270 | 356.14304 | 3.09762 | 0.2465112 | 0.28382542 | 2.2931644 | 20 | 3 3.2 | 19.2 |
| 58334 1994 $UJ_{6}$ | 16.7 | X | 120.28857 | 82.32279 | 282.39196 | 2.04368 | 0.1641429 | 0.28031954 | 2.3122447 | 20 | 1 3.4 | 19.2 |
| 58335 1994 $UN_{11}$ | 15.8 | X | 112.66736 | 114.05405 | 164.36386 | 3.85430 | 0.2223208 | 0.23287624 | 2.6164911 | 20 | 12 16.7 | 20.4 |
| 58336 1994 $VP$ | 15.8 | X | 210.35765 | 304.54443 | 33.71207 | 7.00680 | 0.2353962 | 0.28784606 | 2.2717604 | 20 | 3 4.5 | 19.7 |
| 58337 1994 $WV$ | 15.7 | X | 125.43487 | 2.95204 | 1.50321 | 1.51218 | 0.2453720 | 0.27956298 | 2.3164145 | 20 | 1 21.9 | 18.8 |
| 58338 1994 $WX_{4}$ | 15.0 | X | 281.90096 | 72.80125 | 91.53893 | 8.31820 | 0.1824525 | 0.26742909 | 2.3859625 | 20 | — | — |
| 58339 1994 $WB_{12}$ | 15.7 | X | 34.94611 | 85.75880 | 63.36604 | 5.06231 | 0.0705130 | 0.28153237 | 2.3055993 | 20 | 3 3.1 | 18.1 |
| 58340 1994 $YO_{1}$ | 14.6 | X | 98.90149 | 56.32274 | 309.56588 | 5.69044 | 0.0991002 | 0.27257641 | 2.3558296 | 20 | — | — |
| 58341 1994 $YP_{1}$ | 15.2 | X | 295.37851 | 71.32880 | 359.61971 | 2.55759 | 0.1928419 | 0.26219335 | 2.4176213 | 20 | 10 25.5 | 17.3 |
| 58342 1994 $YR_{1}$ | 14.9 | X | 359.43295 | 355.95677 | 80.19566 | 8.06554 | 0.0944372 | 0.26886063 | 2.3774857 | 20 | — | — |
| 58343 1995 $BG_{5}$ | 15.7 | X | 156.24579 | 271.12004 | 297.89932 | 6.16765 | 0.0701857 | 0.25923003 | 2.4360106 | 20 | 11 4.3 | 19.3 |
| 58344 1995 $BZ_{12}$ | 15.6 | X | 339.67719 | 219.99090 | 128.10037 | 10.92839 | 0.1347233 | 0.25518099 | 2.4617116 | 20 | 9 27.9 | 18.1 |
| 58345 Moomintroll | 16.4 | X | 64.37473 | 351.81973 | 280.26291 | 17.57094 | 0.0428396 | 0.36773122 | 1.9295190 | 20 | 10 21.3 | 18.9 |
| 58346 1995 $CV_{4}$ | 16.4 | X | 98.13554 | 167.07911 | 180.05863 | 1.76945 | 0.1789912 | 0.26800512 | 2.3825425 | 20 | — | — |
| 58347 1995 $CB_{8}$ | 16.1 | X | 20.34721 | 182.63770 | 278.04972 | 2.02740 | 0.0387382 | 0.23203657 | 2.6227995 | 20 | — | — |
| 58348 1995 $CE_{8}$ | 15.5 | X | 43.00334 | 7.27702 | 279.21924 | 1.83439 | 0.1538208 | 0.25307901 | 2.4753235 | 20 | 10 14.1 | 18.6 |
| 58349 1995 $DO_{5}$ | 15.7 | X | 33.33424 | 207.46509 | 193.30180 | 1.78839 | 0.1689233 | 0.26756573 | 2.3851501 | 20 | — | — |
| 58350 1995 $DN_{6}$ | 16.2 | X | 4.41255 | 146.24843 | 135.49615 | 2.36299 | 0.1477766 | 0.24521910 | 2.5279386 | 20 | 7 30.7 | 18.3 |
| 58351 1995 $DA_{8}$ | 15.7 | X | 211.19234 | 33.24845 | 160.53256 | 8.36134 | 0.0818394 | 0.25975961 | 2.4326986 | 20 | 12 20.6 | 19.0 |
| 58352 1995 $EX_{1}$ | 16.2 | X | 194.34454 | 225.83271 | 311.27193 | 1.19895 | 0.1579260 | 0.25756014 | 2.4465285 | 20 | 10 30.7 | 19.8 |
| 58353 1995 $EW_{4}$ | 14.3 | X | 155.41975 | 23.95514 | 32.92623 | 2.89323 | 0.1743598 | 0.12395239 | 3.9838176 | 20 | 4 26.0 | 20.6 |
| 58354 1995 $EH_{5}$ | 16.2 | X | 53.70576 | 295.34237 | 133.60897 | 3.29705 | 0.1697068 | 0.23134081 | 2.6280556 | 20 | — | — |
| 58355 1995 $FN$ | 14.4 | X | 309.49218 | 213.96269 | 13.06052 | 13.39453 | 0.1968507 | 0.23249092 | 2.6193813 | 20 | 1 30.4 | 18.2 |
| 58356 1995 $FR_{1}$ | 14.5 | X | 323.23738 | 84.48015 | 4.75218 | 13.44384 | 0.1555020 | 0.22372096 | 2.6873956 | 20 | — | — |
| 58357 1995 $HT_{1}$ | 14.9 | X | 129.24368 | 309.12147 | 94.10854 | 14.32717 | 0.1686765 | 0.23002222 | 2.6380894 | 20 | 3 18.0 | 19.1 |
| 58358 1995 $HS_{3}$ | 15.9 | X | 254.42950 | 215.17331 | 146.32041 | 3.83897 | 0.0708136 | 0.23931753 | 2.5693289 | 20 | 5 29.9 | 19.5 |
| 58359 1995 $KP_{4}$ | 15.6 | X | 140.60431 | 270.07790 | 217.44311 | 7.06983 | 0.1360299 | 0.24205579 | 2.5499152 | 20 | 7 4.5 | 19.6 |
| 58360 1995 $LM$ | 14.3 | X | 161.76677 | 107.24936 | 286.88862 | 9.40094 | 0.1269006 | 0.18446841 | 3.0562441 | 20 | 3 26.6 | 19.3 |
| 58361 1995 $MC_{3}$ | 15.2 | X | 271.15710 | 246.00828 | 100.82384 | 14.45447 | 0.2198361 | 0.23570329 | 2.5955274 | 20 | 5 14.4 | 19.1 |
| 58362 1995 $MJ_{4}$ | 15.3 | X | 332.23195 | 221.43690 | 168.91893 | 8.61550 | 0.0672851 | 0.20325349 | 2.8649082 | 20 | 10 28.7 | 18.9 |
| 58363 1995 $MP_{4}$ | 14.7 | X | 334.68903 | 278.23047 | 247.26980 | 7.48747 | 0.0295712 | 0.17978543 | 3.1090882 | 20 | 1 12.4 | 19.0 |
| 58364 Feierberg | 15.7 | X | 81.07993 | 325.43521 | 174.24154 | 7.72262 | 0.1424344 | 0.23633559 | 2.5908959 | 20 | 5 15.5 | 19.1 |
| 58365 Robmedrano | 15.1 | X | 343.30878 | 127.91099 | 170.57619 | 6.97477 | 0.1142751 | 0.23705793 | 2.5856301 | 20 | 7 11.2 | 17.9 |
| 58366 1995 $OD_{8}$ | 13.1 | X | 297.87102 | 258.92038 | 171.81669 | 10.70538 | 0.0667215 | 0.08372446 | 5.1748904 | 20 | 10 7.6 | 19.8 |
| 58367 1995 $QL$ | 15.3 | X | 314.12912 | 104.05114 | 238.41855 | 3.54326 | 0.2750092 | 0.23442495 | 2.6049546 | 20 | 6 28.6 | 17.8 |
| 58368 1995 $QK_{1}$ | 15.4 | X | 220.15076 | 129.38661 | 165.66157 | 5.91757 | 0.0609388 | 0.21910809 | 2.7249829 | 20 | 1 26.2 | 19.4 |
| 58369 1995 $QZ_{2}$ | 14.5 | X | 186.39353 | 340.02153 | 11.13708 | 1.20864 | 0.1586811 | 0.18157006 | 3.0886822 | 20 | 3 4.8 | 19.5 |
| 58370 1995 $QM_{5}$ | 14.5 | X | 36.83401 | 169.14705 | 256.37678 | 6.03192 | 0.1250855 | 0.17356927 | 3.1828841 | 20 | — | — |
| 58371 1995 $QD_{7}$ | 15.7 | X | 72.11796 | 28.16638 | 195.14602 | 14.52868 | 0.0388606 | 0.23439637 | 2.6051664 | 20 | 8 4.6 | 19.5 |
| 58372 1995 $SQ$ | 16.7 | X | 221.54236 | 271.06336 | 40.61089 | 1.95486 | 0.1986313 | 0.25936393 | 2.4351721 | 20 | 2 10.7 | 20.8 |
| 58373 Albertoalonso | 14.4 | X | 8.80506 | 71.68762 | 216.89015 | 26.42439 | 0.3142393 | 0.23662878 | 2.5887554 | 20 | 9 3.9 | 17.2 |
| 58374 1995 $SF_{5}$ | 15.9 | X | 220.69595 | 286.34694 | 85.56903 | 4.25473 | 0.2022958 | 0.30467953 | 2.1872942 | 20 | 4 23.2 | 19.2 |
| 58375 1995 $SD_{22}$ | 14.8 | X | 356.10573 | 129.79311 | 17.92091 | 9.62688 | 0.0419213 | 0.17467564 | 3.1694300 | 20 | 1 22.0 | 19.2 |
| 58376 1995 $SF_{25}$ | 15.3 | X | 196.98709 | 353.95941 | 114.74943 | 3.20661 | 0.0833292 | 0.19112386 | 2.9848748 | 20 | 8 6.9 | 19.8 |
| 58377 1995 $SC_{26}$ | 16.3 | X | 74.22918 | 242.74788 | 338.98249 | 1.50911 | 0.1591056 | 0.27192061 | 2.3596158 | 20 | 8 31.5 | 19.3 |
| 58378 1995 $SO_{27}$ | 15.1 | X | 156.69009 | 129.81711 | 191.24401 | 7.48096 | 0.2691481 | 0.21327378 | 2.7744553 | 20 | 1 7.7 | 19.9 |
| 58379 1995 $SY_{27}$ | 15.9 | X | 292.54486 | 132.20513 | 17.94504 | 7.14318 | 0.0485746 | 0.28645868 | 2.2790895 | 20 | — | — |
| 58380 1995 $SG_{32}$ | 15.3 | X | 185.76016 | 239.38976 | 176.68306 | 2.80578 | 0.0418509 | 0.18791210 | 3.0187899 | 20 | 5 21.0 | 19.6 |
| 58381 1995 $SJ_{37}$ | 14.9 | X | 181.70763 | 253.35153 | 178.19908 | 9.92043 | 0.0840532 | 0.18713210 | 3.0271727 | 20 | 6 5.2 | 19.7 |
| 58382 1995 $SB_{42}$ | 15.2 | X | 108.00390 | 334.60474 | 160.22615 | 4.44097 | 0.1540549 | 0.18357626 | 3.0661381 | 20 | 6 11.4 | 19.8 |
| 58383 1995 $SV_{47}$ | 15.4 | X | 166.54369 | 0.32308 | 43.74992 | 3.08283 | 0.1299240 | 0.18159326 | 3.0884191 | 20 | 4 17.6 | 20.3 |
| 58384 1995 $SR_{51}$ | 15.6 | X | 21.05401 | 230.65175 | 306.64537 | 0.36197 | 0.0800574 | 0.17904631 | 3.1176389 | 20 | 3 29.2 | 19.6 |
| 58385 1995 $SC_{53}$ | 15.5 | X | 42.33670 | 189.28722 | 176.67058 | 15.62235 | 0.1455935 | 0.20506799 | 2.8479835 | 20 | — | — |
| 58386 1995 $SM_{53}$ | 16.2 | X | 246.03697 | 150.55083 | 209.77743 | 4.01500 | 0.1434758 | 0.30482495 | 2.1865985 | 20 | 5 6.9 | 19.1 |
| 58387 1995 $SZ_{78}$ | 16.0 | X | 120.17382 | 75.41725 | 219.65262 | 1.24874 | 0.0349094 | 0.20443118 | 2.8538948 | 20 | 12 31.6 | 20.1 |
| 58388 1995 $TK$ | 15.0 | X | 271.60030 | 125.93347 | 168.91613 | 16.44818 | 0.1758658 | 0.22552542 | 2.6730416 | 20 | 3 10.8 | 19.1 |
| 58389 1995 $TG_{2}$ | 15.2 | X | 204.88213 | 113.81906 | 217.39999 | 2.55021 | 0.1998985 | 0.21739537 | 2.7392764 | 20 | 2 22.1 | 19.8 |
| 58390 1995 $TA_{7}$ | 15.7 | X | 39.27930 | 159.51191 | 351.31662 | 2.98260 | 0.1142033 | 0.17571065 | 3.1569714 | 20 | 3 25.5 | 19.5 |
| 58391 1995 $UV_{3}$ | 14.9 | X | 183.85881 | 305.05006 | 27.54768 | 7.55635 | 0.2241726 | 0.21596840 | 2.7513293 | 20 | 2 11.9 | 19.7 |
| 58392 1995 $UT_{10}$ | 15.2 | X | 79.51691 | 252.67959 | 359.34730 | 10.26363 | 0.0484677 | 0.19654097 | 2.9297731 | 20 | 9 22.2 | 19.2 |
| 58393 1995 $UU_{12}$ | 15.9 | X | 95.50649 | 84.84205 | 348.88216 | 0.61543 | 0.1643642 | 0.17498754 | 3.1656627 | 20 | 3 14.9 | 20.3 |
| 58394 1995 $UX_{20}$ | 14.9 | X | 55.60168 | 332.58980 | 216.61430 | 3.98076 | 0.2005133 | 0.22372246 | 2.6873836 | 20 | 6 23.5 | 18.1 |
| 58395 1995 $UW_{24}$ | 15.7 | X | 181.63611 | 4.52111 | 135.41482 | 2.77693 | 0.0756721 | 0.18986168 | 2.9980888 | 20 | 8 29.8 | 20.0 |
| 58396 1995 $US_{43}$ | 15.4 | X | 0.51844 | 169.81597 | 147.51879 | 3.02053 | 0.1311144 | 0.19228621 | 2.9728338 | 20 | 9 5.0 | 18.8 |
| 58397 1995 $VA_{4}$ | 14.4 | X | 231.84761 | 17.48867 | 62.83181 | 10.89591 | 0.1388919 | 0.18934522 | 3.0035381 | 20 | 8 6.8 | 19.1 |
| 58398 1995 $VY_{4}$ | 16.1 | X | 83.96944 | 103.76150 | 147.68898 | 3.93875 | 0.1206684 | 0.27497950 | 2.3420842 | 20 | 10 19.4 | 19.3 |
| 58399 1995 $VA_{5}$ | 16.4 | X | 193.91712 | 333.38167 | 94.74073 | 3.79208 | 0.1609347 | 0.30475512 | 2.1869325 | 20 | 6 11.9 | 19.5 |
| 58400 1995 $VR_{12}$ | 15.6 | X | 358.21916 | 249.98732 | 136.94359 | 3.00590 | 0.0903591 | 0.19955627 | 2.9001857 | 20 | 11 30.9 | 19.2 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 58401 1995 $VV_{13}$ | 15.5 | $X$ | 353.93517 | 150.48489 | 148.84210 | 4.10861 | 0.0862052 | 0.18989459 | 2.9977424 | 20 | 7 27.7 | 19.2 |
| 58402 1995 $VH_{16}$ | 16.2 | $X$ | 193.22103 | 340.27248 | 234.63657 | 7.84151 | 0.1183344 | 0.23942112 | 2.5685878 | 20 | 12 16.6 | 20.1 |
| 58403 1995 $WL_1$ | 14.3 | $X$ | 161.49365 | 44.88001 | 6.18150 | 4.99640 | 0.1444613 | 0.17852039 | 3.1237589 | 20 | 4 20.5 | 19.4 |
| 58404 1995 $WJ_7$ | 13.6 | $X$ | 221.91599 | 128.44067 | 254.17828 | 12.70248 | 0.2271748 | 0.18215498 | 3.0820666 | 20 | 5 6.5 | 18.9 |
| 58405 1995 $WN_9$ | 14.8 | $X$ | 157.14335 | 301.61287 | 37.90802 | 11.99184 | 0.1939752 | 0.21331517 | 2.7740965 | 20 | 1 28.6 | 19.5 |
| 58406 1995 $WN_{18}$ | 16.8 | $X$ | 327.50149 | 211.61320 | 162.68695 | 2.75929 | 0.2134992 | 0.27462586 | 2.3440944 | 20 | 10 17.2 | 18.2 |
| 58407 1995 $WT_{34}$ | 16.8 | $X$ | 72.47385 | 325.08971 | 220.26141 | 2.99451 | 0.0890321 | 0.29666018 | 2.2265368 | 20 | 6 27.5 | 19.3 |
| 58408 1995 $XU$ | 15.9 | $X$ | 271.97406 | 223.59870 | 186.43813 | 1.95708 | 0.2126546 | 0.26963491 | 2.3729320 | 20 | 8 8.2 | 18.8 |
| 58409 1995 $XH_4$ | 16.8 | $X$ | 143.66020 | 328.86366 | 134.68863 | 3.89066 | 0.0730362 | 0.30146490 | 2.2028160 | 20 | 6 3.7 | 19.6 |
| 58410 1995 $YS$ | 15.1 | $X$ | 23.25904 | 42.21911 | 69.90934 | 25.48667 | 0.1770373 | 0.28817097 | 2.2700525 | 20 | — | — |
| 58411 1995 $YA_2$ | 15.1 | $X$ | 121.91841 | 86.52789 | 237.96480 | 22.67151 | 0.2596370 | 0.28880176 | 2.2667458 | 20 | — | — |
| 58412 1995 $YX_2$ | 14.3 | $X$ | 155.01731 | 54.61647 | 94.71643 | 11.35729 | 0.1761584 | 0.18222217 | 3.0813089 | 20 | 8 16.7 | 19.5 |
| 58413 1995 $YC_8$ | 16.6 | $X$ | 108.70857 | 122.77630 | 216.13081 | 2.03907 | 0.1583430 | 0.28653668 | 2.2786759 | 20 | — | — |
| 58414 1995 $YS_{12}$ | 15.7 | $X$ | 112.91780 | 6.39965 | 285.98837 | 6.30213 | 0.1270902 | 0.27352209 | 2.3503964 | 20 | — | — |
| 58415 1996 $AM$ | 15.3 | $X$ | 254.81142 | 326.22821 | 94.39969 | 6.39502 | 0.1253075 | 0.30655565 | 2.1783609 | 20 | 8 20.6 | 17.7 |
| 58416 1996 $BT_1$ | 15.7 | $X$ | 148.08953 | 84.20477 | 9.42723 | 4.18774 | 0.1391073 | 0.29652321 | 2.2272224 | 20 | 5 29.1 | 19.0 |
| 58417 Belzoni | 15.8 | $X$ | 80.08203 | 240.11694 | 16.55020 | 1.70670 | 0.0420294 | 0.30615544 | 2.1802588 | 20 | 10 16.1 | 18.4 |
| 58418 Luguhu | 14.5 | $X$ | 167.75760 | 15.05256 | 20.73540 | 28.37703 | 0.1760246 | 0.17467022 | 3.1694955 | 20 | 4 10.4 | 19.8 |
| 58419 1996 $BD_4$ | 14.4 | $X$ | 34.87516 | 230.75192 | 274.60695 | 21.54633 | 0.2223264 | 0.28716492 | 2.2753513 | 20 | 2 12.6 | 16.4 |
| 58420 1996 $BU_4$ | 16.0 | $X$ | 120.37360 | 79.39337 | 63.53331 | 3.21595 | 0.0990695 | 0.29719261 | 2.2238767 | 20 | 7 2.9 | 18.8 |
| 58421 1996 $BG_5$ | 14.7 | $X$ | 293.30055 | 144.53581 | 102.07834 | 7.94710 | 0.0408751 | 0.16783629 | 3.2549586 | 20 | 3 3.3 | 19.3 |
| 58422 1996 $BS_9$ | 16.2 | $X$ | 95.34716 | 139.91088 | 177.11061 | 2.79915 | 0.2065773 | 0.23507138 | 2.6001768 | 20 | — | — |
| 58423 1996 $BW_{11}$ | 15.3 | $X$ | 9.30092 | 182.87828 | 88.89880 | 5.68780 | 0.1034349 | 0.29789273 | 2.2203909 | 20 | 7 27.9 | 17.3 |
| 58424 Jamesdunlop | 15.3 | $X$ | 22.02311 | 168.67533 | 317.07937 | 4.61369 | 0.1532374 | 0.24447236 | 2.5330837 | 20 | 1 9.7 | 17.7 |
| 58425 1996 $DR_1$ | 16.0 | $X$ | 33.39580 | 107.48085 | 5.41301 | 5.81202 | 0.1076560 | 0.28372894 | 2.2936842 | 20 | 1 3.9 | 18.2 |
| 58426 1996 $EA_2$ | 15.5 | $X$ | 0.87379 | 99.67939 | 182.28093 | 6.42943 | 0.2449264 | 0.29378729 | 2.2410285 | 20 | 8 8.3 | 16.7 |
| 58427 1996 $EV_7$ | 15.2 | $X$ | 263.16573 | 335.39568 | 0.13083 | 3.66142 | 0.1048419 | 0.21077523 | 2.7963380 | 20 | 4 30.2 | 19.3 |
| 58428 1996 $EC_8$ | 16.7 | $X$ | 205.88730 | 268.76277 | 38.44753 | 1.17852 | 0.1850348 | 0.28083637 | 2.3094070 | 20 | 1 20.6 | 20.5 |
| 58429 1996 $FH$ | 14.9 | $X$ | 30.74023 | 231.41890 | 6.72390 | 4.73747 | 0.0730282 | 0.29426073 | 2.2386241 | 20 | 7 9.0 | 17.3 |
| 58430 1996 $FZ_1$ | 15.0 | $X$ | 276.54413 | 97.26175 | 198.06496 | 4.94933 | 0.2108791 | 0.28628594 | 2.2800062 | 20 | 3 5.8 | 18.2 |
| 58431 1996 $FV_4$ | 15.1 | $X$ | 72.75071 | 57.23501 | 356.45082 | 7.12146 | 0.2002438 | 0.28112398 | 2.3078316 | 20 | — | — |
| 58432 1996 $FY_{17}$ | 15.4 | $X$ | 158.42716 | 108.39662 | 203.08231 | 6.06206 | 0.1284864 | 0.27292410 | 2.3538283 | 20 | — | — |
| 58433 1996 $FN_{18}$ | 15.0 | $X$ | 8.80360 | 150.30597 | 23.92325 | 4.82357 | 0.0799265 | 0.28350549 | 2.2948893 | 20 | 2 22.9 | 17.2 |
| 58434 1996 $FQ_{18}$ | 15.6 | $X$ | 290.32976 | 14.19402 | 243.36935 | 3.61258 | 0.1384534 | 0.28420731 | 2.2911097 | 20 | 2 9.8 | 18.8 |
| 58435 1996 $GD_5$ | 16.3 | $X$ | 294.53596 | 219.28398 | 139.87056 | 3.70566 | 0.0528525 | 0.25565349 | 2.4586775 | 20 | 7 25.5 | 19.2 |
| 58436 1996 $GM_5$ | 15.5 | $X$ | 3.13543 | 11.40616 | 132.46880 | 3.24813 | 0.1452995 | 0.28152253 | 2.3056530 | 20 | — | — |
| 58437 1996 $GK_{10}$ | 16.5 | $X$ | 20.43709 | 327.36879 | 176.35526 | 2.35125 | 0.1843206 | 0.28327689 | 2.2961237 | 20 | 1 19.1 | 18.2 |
| 58438 1996 $GR_{15}$ | 16.5 | $X$ | 334.90599 | 104.80679 | 112.12555 | 0.83737 | 0.1423338 | 0.28415071 | 2.2914139 | 20 | 2 17.4 | 18.8 |
| 58439 1996 $GF_{20}$ | 15.9 | $X$ | 25.80902 | 315.45310 | 207.83910 | 3.34503 | 0.1236455 | 0.28447377 | 2.2896788 | 20 | 3 3.7 | 17.8 |
| 58440 1996 $HV$ | 15.1 | $X$ | 64.13068 | 169.62727 | 61.04504 | 9.16043 | 0.1613190 | 0.21230834 | 2.7828599 | 20 | 8 29.3 | 19.1 |
| 58441 1996 $HO_1$ | 14.9 | $X$ | 96.65984 | 134.83418 | 156.68634 | 4.96925 | 0.0685439 | 0.22395723 | 2.6855052 | 20 | 12 8.3 | 18.8 |
| 58442 1996 $HR_9$ | 16.5 | $X$ | 313.58191 | 32.96632 | 206.90544 | 6.72473 | 0.2107172 | 0.28280009 | 2.2987038 | 20 | 2 4.0 | 19.4 |
| 58443 1996 $HO_{12}$ | 15.7 | $X$ | 151.64559 | 109.98364 | 207.04679 | 8.17158 | 0.2464053 | 0.27064877 | 2.3670023 | 20 | — | — |
| 58444 1996 $HR_{12}$ | 16.5 | $X$ | 310.79013 | 128.69591 | 79.11239 | 0.42721 | 0.1530415 | 0.27977919 | 2.3152210 | 20 | — | — |
| 58445 1996 $HU_{16}$ | 15.8 | $X$ | 180.95150 | 17.98721 | 172.64356 | 0.96729 | 0.0940501 | 0.26325531 | 2.4111151 | 20 | 11 10.1 | 19.1 |
| 58446 1996 $HN_{22}$ | 14.8 | $X$ | 359.26279 | 262.95699 | 51.36879 | 8.35405 | 0.2354833 | 0.21215751 | 2.7841787 | 20 | 9 16.6 | 17.4 |
| 58447 1996 $HF_{24}$ | 15.9 | $X$ | 232.37054 | 58.53569 | 114.85769 | 3.01316 | 0.1138369 | 0.26728473 | 2.3868215 | 20 | 12 18.5 | 18.6 |
| 58448 1996 $HQ_{25}$ | 15.5 | $X$ | 170.62893 | 152.83999 | 215.44832 | 9.53121 | 0.1340520 | 0.27993222 | 2.3143771 | 20 | 2 27.1 | 19.1 |
| 58449 1996 $HC_{26}$ | 15.2 | $X$ | 202.04558 | 201.57245 | 80.74167 | 3.32891 | 0.2171537 | 0.27285640 | 2.3542177 | 20 | — | — |
| 58450 1996 $JB_1$ | 14.8 | $X$ | 309.58043 | 336.46301 | 229.95976 | 23.39143 | 0.1857342 | 0.27910429 | 2.3189517 | 20 | — | — |
| 58451 1996 $JF_3$ | 14.5 | $X$ | 156.78798 | 306.01980 | 69.17631 | 7.29138 | 0.1467361 | 0.28042966 | 2.3116394 | 20 | 3 1.1 | 18.0 |
| 58452 1996 $JG_3$ | 16.2 | $X$ | 126.60092 | 169.23055 | 125.18217 | 3.14651 | 0.0721857 | 0.26762909 | 2.3847737 | 20 | — | — |
| 58453 1996 $JB_5$ | 15.9 | $X$ | 309.83148 | 7.02227 | 109.09569 | 7.88412 | 0.0766002 | 0.26901434 | 2.3765799 | 20 | — | — |
| 58454 1996 $JD_9$ | 15.3 | $X$ | 248.21620 | 41.11595 | 164.21163 | 6.42196 | 0.0645859 | 0.27140729 | 2.3625901 | 20 | — | — |
| 58455 1996 $JZ_{11}$ | 16.3 | $X$ | 262.06143 | 155.18867 | 108.50435 | 3.12690 | 0.2377292 | 0.27852192 | 2.3221831 | 20 | 1 12.9 | 19.9 |
| 58456 1996 $JT_{14}$ | 16.0 | $X$ | 310.10776 | 4.22081 | 105.83705 | 3.28137 | 0.1249727 | 0.26909566 | 2.3761011 | 20 | — | — |
| 58457 1996 $JX_{14}$ | 15.1 | $X$ | 68.41375 | 215.25582 | 158.54529 | 6.93571 | 0.1207378 | 0.26871885 | 2.3783218 | 20 | — | — |
| 58458 1996 $KP$ | 15.2 | $X$ | 84.17181 | 225.81725 | 124.14738 | 10.38168 | 0.2340570 | 0.26452338 | 2.4034034 | 20 | — | — |
| 58459 1996 $KK_8$ | 15.8 | $X$ | 311.72823 | 349.53598 | 224.44238 | 6.86144 | 0.2183805 | 0.28026730 | 2.3125321 | 20 | — | — |
| 58460 Le Mouelic | 15.1 | $X$ | 271.87259 | 256.98683 | 66.62187 | 21.47580 | 0.2285668 | 0.28369945 | 2.2938432 | 20 | 4 17.4 | 18.7 |
| 58461 1996 $ML$ | 15.2 | $X$ | 150.83455 | 126.81539 | 33.04804 | 1.30026 | 0.0836125 | 0.21362089 | 2.7714491 | 20 | 8 23.9 | 19.3 |
| 58462 1996 $NR$ | 14.4 | $X$ | 179.94899 | 109.27289 | 105.03476 | 13.29003 | 0.2653257 | 0.18017053 | 3.1046564 | 20 | 11 18.6 | 20.0 |
| 58463 1996 $NT_1$ | 15.2 | $X$ | 316.07301 | 11.43597 | 305.79233 | 9.21889 | 0.1910695 | 0.24436444 | 2.5338294 | 20 | 6 8.2 | 18.0 |
| 58464 1996 $NQ_2$ | 16.2 | $X$ | 160.08964 | 100.99319 | 195.50835 | 1.57682 | 0.1835733 | 0.26502201 | 2.4003878 | 20 | — | — |
| 58465 1996 $NY_3$ | 15.1 | $X$ | 319.44155 | 212.38746 | 146.81447 | 9.76100 | 0.0660562 | 0.24753971 | 2.5121147 | 20 | 9 2.7 | 17.9 |
| 58466 Santoka | 17.0 | $X$ | 185.26396 | 146.55450 | 145.49592 | 2.75045 | 0.1977670 | 0.26865177 | 2.3787177 | 20 | — | — |
| 58467 1996 $PW_2$ | 15.7 | $X$ | 131.09360 | 218.20518 | 85.27527 | 2.12165 | 0.2039121 | 0.26196579 | 2.4190212 | 20 | — | — |
| 58468 1996 $QA$ | 15.9 | $X$ | 165.75063 | 109.97579 | 319.35276 | 19.50693 | 0.0588208 | 0.36274054 | 1.9471765 | 20 | 4 29.6 | 18.8 |
| 58469 1996 $RC$ | 15.8 | $X$ | 87.05466 | 21.17308 | 163.97392 | 3.05530 | 0.0510948 | 0.28265820 | 2.2994730 | 20 | 7 11.5 | 18.5 |
| 58470 1996 $RA_1$ | 15.2 | $X$ | 78.42324 | 17.34298 | 3.63364 | 6.44095 | 0.0977398 | 0.26128916 | 2.4231955 | 20 | — | — |
| 58471 1996 $RS_3$ | 15.3 | $X$ | 220.35244 | 10.90507 | 6.31809 | 2.63226 | 0.0734398 | 0.23567673 | 2.5957224 | 20 | 5 7.4 | 19.1 |
| 58472 1996 $RV_3$ | 16.2 | $X$ | 109.87472 | 317.73093 | 357.78063 | 10.41417 | 0.2674534 | 0.25962315 | 2.4335510 | 20 | — | — |
| 58473 1996 $RN_7$ | 12.9 | $X$ | 165.00805 | 15.38820 | 175.15084 | 5.08864 | 0.0460396 | 0.08271865 | 5.2167546 | 20 | 9 29.4 | 19.9 |
| 58474 1996 $RU_{10}$ | 15.5 | $X$ | 186.77467 | 201.00978 | 156.00839 | 5.75063 | 0.2549971 | 0.27174468 | 2.3606341 | 20 | 3 7.9 | 19.6 |
| 58475 1996 $RE_{11}$ | 13.1 | $X$ | 196.13847 | 150.31840 | 9.67700 | 3.67980 | 0.0353651 | 0.08457163 | 5.1402737 | 20 | 9 27.6 | 20.1 |
| 58476 1996 $RQ_{13}$ | 14.4 | $X$ | 35.08378 | 9.90005 | 338.87660 | 1.54307 | 0.1985374 | 0.16939242 | 3.2349935 | 20 | 12 11.1 | 18.7 |
| 58477 1996 $RB_{26}$ | 15.3 | $X$ | 107.57296 | 92.71585 | 193.13990 | 4.98666 | 0.1862657 | 0.29700698 | 2.2248032 | 20 | 12 30.8 | 18.8 |
| 58478 1996 $RC_{29}$ | 12.5 | $X$ | 322.31599 | 179.82684 | 205.45258 | 2.61566 | 0.0687196 | 0.08168303 | 5.2607560 | 20 | 9 14.2 | 19.2 |
| 58479 1996 $RJ_{29}$ | 12.5 | $X$ | 33.12871 | 189.65622 | 140.77272 | 8.36647 | 0.0358847 | 0.08276119 | 5.2149671 | 20 | 10 13.5 | 19.3 |
| 58480 1996 $RJ_{33}$ | 12.3 | $X$ | 334.04020 | 337.60180 | 51.38471 | 7.01480 | 0.0267263 | 0.08363676 | 5.1785072 | 20 | 10 8.2 | 19.0 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 58481 1996 $ST_4$ | 16.0 | X | 335.48588 | 289.41018 | 22.72249 | 3.05699 | 0.1566011 | 0.24088602 | 2.5581636 | 20 | 7 16.7 | 18.4 |
| 58482 1996 $TX_1$ | 15.2 | X | 163.85500 | 202.56385 | 182.28195 | 10.77992 | 0.1462722 | 0.22863209 | 2.6487721 | 20 | 3 20.4 | 19.4 |
| 58483 1996 $TB_2$ | 15.3 | X | 215.51823 | 149.67516 | 161.89991 | 3.77086 | 0.0841727 | 0.22732410 | 2.6589228 | 20 | 2 9.3 | 19.4 |
| 58484 1996 $TO_3$ | 14.0 | X | 262.95787 | 24.40704 | 300.47053 | 9.06663 | 0.0650663 | 0.19376938 | 2.9576444 | 20 | 4 19.1 | 18.5 |
| 58485 1996 $TH_{13}$ | 15.6 | X | 260.79730 | 78.25459 | 259.02597 | 2.29070 | 0.2110407 | 0.23544169 | 2.5974496 | 20 | 4 16.2 | 19.6 |
| 58486 1996 $TP_{13}$ | 15.5 | X | 320.56242 | 128.79936 | 203.35366 | 4.75703 | 0.2420013 | 0.24203253 | 2.5500785 | 20 | 7 2.9 | 17.7 |
| 58487 1996 $TQ_{29}$ | 16.0 | X | 84.24944 | 159.53351 | 222.22463 | 0.86847 | 0.1726797 | 0.21733468 | 2.7397863 | 20 | — | — |
| 58488 1996 $TV_{33}$ | 15.2 | X | 152.90782 | 82.55383 | 3.42125 | 2.41195 | 0.0321072 | 0.19001517 | 2.9964742 | 20 | 5 18.6 | 19.6 |
| 58489 1996 $TF_{34}$ | 15.2 | X | 54.12009 | 77.18663 | 300.11933 | 0.85832 | 0.0633852 | 0.21292585 | 2.7774769 | 20 | — | — |
| 58490 1996 $TZ_{35}$ | 15.1 | X | 231.29375 | 168.17707 | 316.75234 | 1.07738 | 0.0408454 | 0.20348499 | 2.8627349 | 20 | 10 11.6 | 19.0 |
| 58491 1996 $TG_{38}$ | 15.8 | X | 268.87387 | 284.97697 | 28.82863 | 5.31344 | 0.1999141 | 0.27728811 | 2.3290665 | 20 | 3 26.4 | 19.1 |
| 58492 1996 $TC_{44}$ | 15.7 | X | 329.66191 | 86.24404 | 351.46208 | 4.10157 | 0.1550906 | 0.21028067 | 2.8007208 | 20 | 12 29.2 | 18.6 |
| 58493 1996 $TJ_{52}$ | 15.5 | X | 276.35451 | 272.83343 | 118.60275 | 1.51698 | 0.1919181 | 0.24253961 | 2.5465230 | 20 | 7 20.6 | 18.4 |
| 58494 1996 $UF_1$ | 13.8 | X | 144.67522 | 168.59663 | 219.75138 | 9.01172 | 0.0992919 | 0.18353902 | 3.0665528 | 20 | 3 2.6 | 18.5 |
| 58495 1996 $US_1$ | 14.4 | X | 156.46490 | 342.71469 | 9.77770 | 13.59711 | 0.1730178 | 0.22433996 | 2.6824499 | 20 | 2 11.2 | 18.8 |
| 58496 1996 $UY_3$ | 15.3 | X | 182.59868 | 97.96195 | 272.84018 | 5.95965 | 0.1082729 | 0.27098490 | 2.3650445 | 20 | 3 13.4 | 18.8 |
| 58497 1996 $UK_4$ | 16.3 | X | 211.56339 | 281.75380 | 43.75623 | 3.21135 | 0.1190807 | 0.31101185 | 2.1575031 | 20 | 2 15.1 | 19.3 |
| 58498 Octaviopaz | 15.4 | X | 19.96202 | 158.38100 | 310.57857 | 3.89899 | 0.0722428 | 0.21823342 | 2.7322590 | 20 | — | — |
| 58499 Stüber | 15.3 | X | 41.14750 | 54.32714 | 220.80167 | 12.87943 | 0.1438663 | 0.24237086 | 2.5477048 | 20 | 9 19.2 | 18.6 |
| 58500 1996 $VU_1$ | 15.0 | X | 274.61985 | 24.11220 | 344.66606 | 1.26524 | 0.0853231 | 0.19653422 | 2.9298402 | 20 | 7 1.6 | 18.8 |
| 58501 1996 $VQ_2$ | 15.6 | X | 269.17429 | 302.03871 | 46.46068 | 1.00090 | 0.2382947 | 0.27798652 | 2.3251638 | 20 | 5 5.9 | 18.8 |
| 58502 1996 $VH_3$ | 14.8 | X | 251.27594 | 2.36456 | 223.74197 | 3.00190 | 0.1091798 | 0.21716181 | 2.7412401 | 20 | — | — |
| 58503 1996 $VJ_3$ | 14.9 | X | 128.97870 | 31.76132 | 50.04913 | 11.73745 | 0.0405916 | 0.18599430 | 3.0395057 | 20 | 4 18.9 | 19.3 |
| 58504 1996 $VZ_3$ | 14.7 | X | 5.99948 | 53.71274 | 53.41844 | 15.58761 | 0.0771237 | 0.21487794 | 2.7606297 | 20 | — | — |
| 58505 1996 $VU_{15}$ | 15.3 | X | 262.81785 | 208.85051 | 50.85926 | 14.86550 | 0.1490997 | 0.22350970 | 2.6890887 | 20 | 1 25.5 | 19.7 |
| 58506 1996 $VJ_{22}$ | 14.9 | X | 75.67812 | 59.41423 | 16.50626 | 21.90390 | 0.0524537 | 0.22257285 | 2.6966293 | 20 | 2 9.9 | 18.9 |
| 58507 1996 $VX_{32}$ | 15.8 | X | 232.18875 | 222.58499 | 63.02153 | 2.48784 | 0.1710864 | 0.26577238 | 2.3958676 | 20 | 1 19.1 | 19.6 |
| 58508 1996 $WA_2$ | 14.8 | X | 133.10487 | 340.11465 | 63.18214 | 15.91707 | 0.1001339 | 0.22388974 | 2.6860448 | 20 | 3 17.1 | 19.0 |
| 58509 1996 $XB_1$ | 14.4 | X | 186.52068 | 322.54662 | 54.52706 | 10.32689 | 0.0953374 | 0.18388726 | 3.0626800 | 20 | 4 7.1 | 19.2 |
| 58510 1996 $XH_2$ | 14.9 | X | 252.03940 | 95.67573 | 249.08499 | 13.05123 | 0.1486370 | 0.23090888 | 2.6313319 | 20 | 4 21.8 | 18.9 |
| 58511 1996 $XB_4$ | 14.7 | X | 270.79746 | 0.67754 | 53.96858 | 4.03785 | 0.1748375 | 0.19827590 | 2.9126575 | 20 | 8 14.3 | 18.6 |
| 58512 1996 $XR_4$ | 14.9 | X | 306.61202 | 172.05145 | 31.90147 | 13.70871 | 0.0612167 | 0.22023537 | 2.7156763 | 20 | 1 17.3 | 18.8 |
| 58513 1996 $XW_{11}$ | 15.2 | X | 293.44856 | 337.88278 | 69.98833 | 3.06704 | 0.1055526 | 0.19634894 | 2.9316830 | 20 | 9 17.4 | 18.9 |
| 58514 1996 $XK_{12}$ | 14.7 | X | 109.94549 | 124.27998 | 99.05794 | 13.88321 | 0.0962140 | 0.19295144 | 2.9659970 | 20 | 10 3.8 | 19.4 |
| 58515 1996 $XY_{12}$ | 14.9 | X | 244.95435 | 337.48925 | 80.24508 | 11.84789 | 0.0752966 | 0.19530368 | 2.9421339 | 20 | 7 31.1 | 19.2 |
| 58516 1996 $XT_{14}$ | 16.3 | X | 55.52794 | 265.44778 | 83.43707 | 24.74226 | 0.0936036 | 0.37542089 | 1.9030802 | 20 | — | — |
| 58517 1997 $AJ$ | 14.8 | X | 45.36443 | 106.66155 | 306.87634 | 8.38813 | 0.2878478 | 0.21215877 | 2.7841677 | 20 | — | — |
| 58518 1997 $AC_2$ | 13.9 | X | 90.91252 | 180.04113 | 332.98624 | 7.80440 | 0.1812382 | 0.18127630 | 3.0920181 | 20 | 6 18.3 | 18.6 |
| 58519 1997 $AU_2$ | 14.5 | X | 131.59291 | 358.16636 | 101.45058 | 15.79583 | 0.1425183 | 0.18249948 | 3.0781867 | 20 | 5 25.3 | 19.4 |
| 58520 1997 $AP_3$ | 15.8 | X | 49.85161 | 254.20609 | 111.51140 | 7.86468 | 0.1138809 | 0.24723077 | 2.5142070 | 20 | — | — |
| 58521 1997 $AC_8$ | 14.2 | X | 281.91378 | 110.14420 | 293.36034 | 8.19337 | 0.0762231 | 0.19266142 | 2.9689728 | 20 | 8 24.6 | 18.3 |
| 58522 1997 $AW_{19}$ | 15.1 | X | 126.15342 | 194.79640 | 307.03017 | 6.91207 | 0.0777569 | 0.18386330 | 3.0629460 | 20 | 7 2.2 | 19.6 |
| 58523 1997 $BU$ | 14.6 | X | 89.09872 | 13.48328 | 140.99649 | 15.36558 | 0.1429711 | 0.18083861 | 3.0970053 | 20 | 6 14.8 | 19.3 |
| 58524 1997 $BE_1$ | 14.8 | X | 222.53228 | 335.99733 | 84.41320 | 0.71385 | 0.1537743 | 0.18871949 | 3.0101737 | 20 | 6 28.3 | 19.6 |
| 58525 1997 $BX_3$ | 15.0 | X | 81.07726 | 129.11639 | 27.42905 | 0.48954 | 0.1185881 | 0.18099927 | 3.0951723 | 20 | 6 1.9 | 19.2 |
| 58526 1997 $BD_4$ | 15.2 | X | 342.04286 | 283.98275 | 316.79624 | 1.97895 | 0.0598448 | 0.17993135 | 3.1074071 | 20 | 4 21.9 | 19.2 |
| 58527 1997 $BF_4$ | 15.4 | X | 152.75390 | 129.24404 | 24.85763 | 0.39573 | 0.1321691 | 0.18950949 | 3.0018022 | 20 | 8 17.4 | 20.2 |
| 58528 1997 $BH_7$ | 14.6 | X | 51.43696 | 7.52842 | 118.87476 | 2.32404 | 0.1372708 | 0.17409538 | 3.1764685 | 20 | 3 17.3 | 18.5 |
| 58529 1997 $CX$ | 15.6 | X | 317.38317 | 86.48868 | 109.38376 | 4.28342 | 0.1424176 | 0.29518728 | 2.2339372 | 20 | — | — |
| 58530 1997 $CU_2$ | 14.5 | X | 332.54953 | 81.22169 | 144.55851 | 10.57110 | 0.1618573 | 0.17367536 | 3.1815878 | 20 | 3 12.2 | 18.4 |
| 58531 1997 $CS_4$ | 14.0 | X | 90.96847 | 164.62607 | 320.39247 | 19.67065 | 0.1155246 | 0.17912464 | 3.1167299 | 20 | 4 25.2 | 18.8 |
| 58532 1997 $CY_9$ | 16.7 | X | 82.41981 | 241.53023 | 124.75424 | 4.64656 | 0.2485102 | 0.29457286 | 2.2370425 | 20 | — | — |
| 58533 1997 $CD_{12}$ | 15.1 | X | 54.53384 | 4.14427 | 145.37000 | 5.69635 | 0.0031823 | 0.21814672 | 2.7329830 | 20 | 4 2.7 | 18.7 |
| 58534 Logos | 6.6 | X | 65.06723 | 336.05894 | 132.63839 | 2.90076 | 0.1167855 | 0.00325054 | 45.1335158 | 20 | 3 27.8 | 23.0 |
| 58535 Pattillo | 14.9 | X | 147.43837 | 203.96659 | 199.44307 | 6.68549 | 0.1350016 | 0.17585897 | 3.1551961 | 20 | 3 29.4 | 19.9 |
| 58536 1997 $EQ_8$ | 15.6 | X | 163.12617 | 135.54372 | 186.25933 | 3.36637 | 0.0865164 | 0.21064989 | 2.7974471 | 20 | 1 1.1 | 19.8 |
| 58537 1997 $EG_{14}$ | 15.6 | X | 28.80700 | 189.17036 | 323.98631 | 3.78123 | 0.1061200 | 0.17205512 | 3.2015305 | 20 | 3 11.2 | 19.7 |
| 58538 1997 $EN_{15}$ | 15.1 | X | 264.10508 | 320.52715 | 14.99344 | 2.65891 | 0.0040716 | 0.17682413 | 3.1437044 | 20 | 5 16.9 | 19.5 |
| 58539 1997 $ET_{16}$ | 15.4 | X | 277.66122 | 139.81673 | 171.54898 | 1.29864 | 0.1642645 | 0.17437609 | 3.1730586 | 20 | 4 12.0 | 19.8 |
| 58540 1997 $ET_{17}$ | 15.0 | X | 151.43345 | 164.14203 | 251.29544 | 1.27306 | 0.1521754 | 0.30411813 | 2.1899852 | 20 | 4 11.7 | 17.9 |
| 58541 1997 $EA_{18}$ | 14.3 | X | 71.70878 | 148.60558 | 22.43654 | 1.57144 | 0.1088780 | 0.17820666 | 3.1274239 | 20 | 6 6.7 | 18.6 |
| 58542 1997 $EQ_{22}$ | 14.5 | X | 343.91176 | 139.63371 | 160.79223 | 0.74257 | 0.1246551 | 0.18049365 | 3.1009500 | 20 | 7 11.3 | 18.0 |
| 58543 1997 $ET_{32}$ | 15.0 | X | 190.35594 | 188.87360 | 188.11017 | 4.76964 | 0.1665089 | 0.17395673 | 3.1781561 | 20 | 4 7.7 | 20.3 |
| 58544 1997 $EK_{42}$ | 14.2 | X | 323.84712 | 272.17011 | 319.01183 | 5.02440 | 0.0863190 | 0.17315647 | 3.1879407 | 20 | 3 12.2 | 18.3 |
| 58545 1997 $EG_{43}$ | 14.7 | X | 287.54794 | 209.07371 | 170.37709 | 10.29709 | 0.0508879 | 0.18802187 | 3.0176149 | 20 | 8 5.1 | 18.9 |
| 58546 1997 $FQ_2$ | 14.6 | X | 19.07435 | 31.11490 | 189.05758 | 13.32228 | 0.0577167 | 0.17576009 | 3.1563794 | 20 | 5 22.1 | 18.9 |
| 58547 1997 $FZ_2$ | 14.5 | X | 337.70379 | 249.93026 | 339.35909 | 3.71429 | 0.1633905 | 0.17140781 | 3.2095858 | 20 | 3 22.3 | 18.2 |
| 58548 1997 $GK_{12}$ | 14.8 | X | 345.56759 | 57.46633 | 174.69407 | 4.25686 | 0.0634087 | 0.17304326 | 3.1893310 | 20 | 4 18.0 | 19.0 |
| 58549 1997 $GM_{14}$ | 15.9 | X | 191.26712 | 0.65319 | 250.23463 | 3.28650 | 0.1439379 | 0.24056023 | 2.5604728 | 20 | — | — |
| 58550 1997 $GN_{19}$ | 14.0 | X | 186.88529 | 175.71762 | 198.09367 | 22.46372 | 0.1285785 | 0.17132119 | 3.2106675 | 20 | 3 30.9 | 19.2 |
| 58551 1997 $GP_{28}$ | 15.3 | X | 6.52074 | 71.95044 | 128.93964 | 12.63162 | 0.0524414 | 0.17039983 | 3.2222305 | 20 | 4 13.2 | 19.8 |
| 58552 1997 $GH_{32}$ | 14.3 | X | 119.15421 | 236.64394 | 199.64110 | 1.09886 | 0.1741945 | 0.17226718 | 3.1989026 | 20 | 4 14.2 | 19.1 |
| 58553 1997 $GK_{43}$ | 14.1 | X | 54.85412 | 3.65866 | 204.80976 | 19.04447 | 0.1611390 | 0.17717770 | 3.1395207 | 20 | 7 6.8 | 18.6 |
| 58554 1997 $HX$ | 14.9 | X | 31.02200 | 80.84183 | 81.69255 | 0.78077 | 0.0847998 | 0.16891390 | 3.2411001 | 20 | 3 27.1 | 19.0 |
| 58555 1997 $HA_3$ | 16.3 | X | 319.93506 | 262.12581 | 203.06270 | 5.52617 | 0.1963378 | 0.28558572 | 2.2837316 | 20 | — | — |
| 58556 1997 $HH_7$ | 14.7 | X | 315.96589 | 52.01193 | 220.34550 | 4.41671 | 0.1430055 | 0.17159216 | 3.2072865 | 20 | 4 15.6 | 18.8 |
| 58557 1997 $KE_3$ | 15.3 | X | 328.93128 | 144.32389 | 220.94285 | 12.41747 | 0.2079460 | 0.22278712 | 2.6949001 | 20 | 9 12.5 | 17.9 |
| 58558 1997 $LE_4$ | 13.2 | X | 260.15984 | 96.19862 | 237.42648 | 21.17411 | 0.0841956 | 0.17063660 | 3.2192492 | 20 | 4 28.2 | 18.0 |
| 58559 1997 $LT_5$ | 15.4 | X | 203.76989 | 263.05920 | 197.74164 | 11.52494 | 0.1931110 | 0.26535267 | 2.3983933 | 20 | 7 29.0 | 19.5 |
| 58560 1997 $LK_{11}$ | 14.6 | X | 127.19967 | 95.48692 | 99.61361 | 3.10294 | 0.1049463 | 0.18302562 | 3.0722847 | 20 | 9 10.9 | 19.3 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| | Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | m | | ° | ° | ° | ° | | ° | | | | |
| 58561 | 1997 $ME_9$ | 15.8 | X | 95.05424 | 23.70307 | 258.08172 | 1.93351 | 0.0296488 | 0.22367836 | 2.6877368 | 20 | 11 19.9 | 19.4 |
| 58562 | 1997 $NG_1$ | 15.3 | X | 186.32231 | 295.60272 | 190.49504 | 2.49323 | 0.0258046 | 0.21564212 | 2.7541039 | 20 | 8 21.3 | 19.0 |
| 58563 | 1997 $NE_5$ | 15.4 | X | 100.10826 | 323.98733 | 304.79509 | 3.80634 | 0.1662026 | 0.31012783 | 2.1616011 | 20 | 12 4.6 | 18.7 |
| 58564 | 1997 $NQ_6$ | 14.9 | X | 177.71749 | 77.60850 | 306.62069 | 4.36986 | 0.1227343 | 0.28700723 | 2.2761847 | 20 | 3 26.3 | 18.2 |
| 58565 | 1997 $OC_2$ | 16.2 | X | 202.64635 | 86.77007 | 248.60454 | 1.29422 | 0.0487340 | 0.28568755 | 2.2831889 | 20 | 2 18.3 | 19.2 |
| 58566 | 1997 $PN_3$ | 14.7 | X | 245.34733 | 313.85675 | 25.19483 | 2.38960 | 0.0639730 | 0.20227553 | 2.8741349 | 20 | 4 20.0 | 18.9 |
| 58567 | 1997 $QB$ | 15.4 | X | 77.51305 | 123.67089 | 264.22133 | 5.08442 | 0.0647592 | 0.23236803 | 2.6203047 | 20 | — | — |
| 58568 | 1997 $QM_1$ | 16.3 | X | 323.97630 | 46.80407 | 19.35797 | 6.85916 | 0.1094299 | 0.26472390 | 2.4021896 | 20 | 12 19.6 | 18.8 |
| 58569 | Eboshiyamakouen | 15.6 | X | 97.89230 | 30.09791 | 327.47070 | 5.22173 | 0.2413731 | 0.27270616 | 2.3550823 | 20 | — | — |
| 58570 | 1997 $RD_4$ | 15.6 | X | 268.59989 | 304.95320 | 17.38574 | 7.32583 | 0.1387731 | 0.28755021 | 2.2733184 | 20 | 4 11.7 | 18.3 |
| 58571 | 1997 $RB_5$ | 15.9 | X | 265.92295 | 265.20924 | 289.76879 | 2.43959 | 0.1934234 | 0.27522915 | 2.3406677 | 20 | — | — |
| 58572 | Romanella | 15.2 | X | 300.69604 | 280.32362 | 327.46464 | 6.86335 | 0.0689068 | 0.28612380 | 2.2808675 | 20 | 2 21.3 | 17.7 |
| 58573 | Serpieri | 16.4 | X | 79.74239 | 356.21340 | 16.21595 | 0.94960 | 0.2627238 | 0.27203969 | 2.3589272 | 20 | — | — |
| 58574 | 1997 $RD_8$ | 16.1 | X | 21.16609 | 28.32040 | 206.11832 | 1.37470 | 0.1701006 | 0.29449919 | 2.2374155 | 20 | 6 26.1 | 17.7 |
| 58575 | 1997 $RK_9$ | 15.0 | X | 271.11787 | 114.34709 | 345.15691 | 6.33873 | 0.1736351 | 0.25961780 | 2.4335843 | 20 | 10 21.5 | 17.6 |
| 58576 | 1997 $RQ_9$ | 16.1 | X | 137.66785 | 0.06370 | 315.14958 | 2.86603 | 0.0899907 | 0.27391147 | 2.3481684 | 20 | — | — |
| 58577 | 1997 $SV$ | 14.8 | X | 98.87229 | 344.13644 | 32.65648 | 7.13537 | 0.1202402 | 0.27065444 | 2.3669692 | 20 | — | — |
| 58578 | Žídek | 15.8 | X | 107.92823 | 301.09313 | 31.29134 | 2.50423 | 0.2383856 | 0.27194147 | 2.3594951 | 20 | — | — |
| 58579 | Ehrenberg | 16.8 | X | 10.66516 | 281.68654 | 18.54955 | 2.18101 | 0.1864936 | 0.29961023 | 2.2118973 | 20 | 9 28.3 | 18.3 |
| 58580 | 1997 $SW_2$ | 15.6 | X | 292.85588 | 304.70756 | 106.41661 | 7.16210 | 0.1208678 | 0.30087882 | 2.2056756 | 20 | 10 13.9 | 17.6 |
| 58581 | 1997 $SB_3$ | 15.5 | X | 198.10627 | 205.47824 | 199.28358 | 4.81216 | 0.1409012 | 0.28815219 | 2.2701511 | 20 | 5 16.7 | 18.9 |
| 58582 | 1997 $SF_3$ | 15.2 | X | 194.46080 | 23.29621 | 346.99801 | 6.86754 | 0.1292221 | 0.28615486 | 2.2807024 | 20 | 3 26.2 | 18.6 |
| 58583 | 1997 $SV_4$ | 15.1 | X | 337.72382 | 196.26657 | 344.98752 | 6.48544 | 0.1049398 | 0.27978098 | 2.3152111 | 20 | 1 10.0 | 17.8 |
| 58584 | 1997 $SE_{11}$ | 14.9 | X | 51.25910 | 283.63337 | 35.91280 | 4.19435 | 0.2434973 | 0.22036756 | 2.7145902 | 20 | 12 11.5 | 18.9 |
| 58585 | 1997 $SX_{11}$ | 16.1 | X | 153.08603 | 68.17072 | 309.37452 | 2.64854 | 0.1390788 | 0.27963588 | 2.3160119 | 20 | 2 24.1 | 19.3 |
| 58586 | 1997 $SG_{23}$ | 15.5 | X | 211.77088 | 236.23835 | 13.26449 | 4.38390 | 0.0973479 | 0.27114555 | 2.3641103 | 20 | — | — |
| 58587 | 1997 $SK_{23}$ | 16.6 | X | 349.82524 | 27.89978 | 352.18346 | 1.38112 | 0.1523109 | 0.25956354 | 2.4339235 | 20 | 12 2.3 | 19.0 |
| 58588 | 1997 $SV_{23}$ | 15.8 | X | 269.12030 | 79.91438 | 17.08025 | 2.68435 | 0.1470324 | 0.25707943 | 2.4495774 | 20 | 10 20.7 | 18.4 |
| 58589 | 1997 $SF_{25}$ | 14.8 | X | 18.21132 | 11.89917 | 19.55325 | 6.65754 | 0.1310468 | 0.26528046 | 2.3988286 | 20 | — | — |
| 58590 | 1997 $SX_{30}$ | 15.7 | X | 29.93745 | 0.34619 | 42.03995 | 7.37140 | 0.1014703 | 0.26821409 | 2.3813048 | 20 | — | — |
| 58591 | 1997 $SV_{31}$ | 15.8 | X | 310.01425 | 218.65802 | 104.98929 | 2.15264 | 0.1910443 | 0.29425682 | 2.2386440 | 20 | 6 7.7 | 17.8 |
| 58592 | 1997 $SB_{35}$ | 14.6 | X | 59.87205 | 206.84599 | 238.60776 | 8.49258 | 0.0067593 | 0.19259868 | 2.9696175 | 20 | 1 19.3 | 18.9 |
| 58593 | 1997 $TD_2$ | 16.1 | X | 197.92091 | 275.02747 | 211.36088 | 7.45247 | 0.1252644 | 0.25311972 | 2.4750581 | 20 | 8 30.0 | 19.8 |
| 58594 | 1997 $TF_9$ | 15.9 | X | 238.05263 | 229.32797 | 249.40377 | 2.22083 | 0.1318518 | 0.25606695 | 2.4560302 | 20 | 10 7.3 | 19.2 |
| 58595 | Joepollock | 15.6 | X | 329.67196 | 240.87768 | 43.04209 | 6.38707 | 0.1853645 | 0.29172203 | 2.2515930 | 20 | 5 13.9 | 17.2 |
| 58596 | 1997 $TC_{10}$ | 16.5 | X | 325.31951 | 8.58792 | 40.28009 | 2.16826 | 0.1668427 | 0.25833564 | 2.4416299 | 20 | 11 27.8 | 18.3 |
| 58597 | 1997 $TH_{10}$ | 15.7 | X | 121.68984 | 231.90510 | 221.10078 | 3.42037 | 0.1338501 | 0.23788533 | 2.5796311 | 20 | 4 30.6 | 19.5 |
| 58598 | 1997 $TX_{11}$ | 15.6 | X | 283.25602 | 110.79001 | 148.37013 | 3.80294 | 0.1492879 | 0.28358901 | 2.2944386 | 20 | 2 3.6 | 18.6 |
| 58599 | 1997 $TK_{13}$ | 15.6 | X | 250.10741 | 127.04825 | 175.68867 | 5.80277 | 0.0579534 | 0.19877379 | 2.9077918 | 20 | 3 12.0 | 19.6 |
| 58600 | Iwamuroonsen | 15.6 | X | 319.70532 | 149.30214 | 188.35077 | 1.82142 | 0.1817203 | 0.29629411 | 2.2283704 | 20 | 7 25.8 | 17.1 |
| 58601 | 1997 $TW_{18}$ | 15.3 | X | 267.82592 | 68.90166 | 81.89590 | 3.13519 | 0.1035638 | 0.26563180 | 2.3967129 | 20 | — | — |
| 58602 | 1997 $TG_{25}$ | 16.1 | X | 65.28537 | 58.52558 | 325.98234 | 0.66500 | 0.1916616 | 0.26895280 | 2.3769425 | 20 | — | — |
| 58603 | 1997 $TM_{25}$ | 15.7 | X | 243.60655 | 321.52748 | 35.74916 | 7.13005 | 0.2409151 | 0.28945827 | 2.2633171 | 20 | 4 21.5 | 19.0 |
| 58604 | 1997 $TT_{26}$ | 14.6 | X | 26.20711 | 34.76033 | 37.70447 | 8.89425 | 0.2859026 | 0.22272073 | 2.6954356 | 20 | — | — |
| 58605 | Liutungsheng | 15.0 | X | 80.70075 | 75.28656 | 305.75944 | 1.28261 | 0.2244504 | 0.26921246 | 2.3754138 | 20 | — | — |
| 58606 | 1997 $TF_{27}$ | 15.5 | X | 117.19797 | 295.43381 | 35.97721 | 7.13071 | 0.1171879 | 0.26918186 | 2.3755938 | 20 | — | — |
| 58607 | Wenzel | 15.7 | X | 321.66247 | 218.96651 | 65.68889 | 6.47691 | 0.0897789 | 0.29093904 | 2.2556310 | 20 | 5 15.1 | 17.8 |
| 58608 | Geroldrichter | 15.2 | X | 19.71356 | 318.29092 | 315.09784 | 6.05802 | 0.1508416 | 0.20962832 | 2.8065283 | 20 | 8 12.5 | 18.2 |
| 58609 | 1997 $UZ_1$ | 15.5 | X | 205.73751 | 266.97518 | 25.27539 | 7.32311 | 0.1196006 | 0.27608887 | 2.3358061 | 20 | 1 1.3 | 19.1 |
| 58610 | 1997 $UN_3$ | 15.1 | X | 147.51102 | 204.91783 | 227.29534 | 4.11329 | 0.2025595 | 0.23828564 | 2.5767412 | 20 | 5 6.0 | 19.3 |
| 58611 | 1997 $UC_4$ | 15.4 | X | 170.15015 | 224.63735 | 195.37461 | 3.94573 | 0.0495453 | 0.29013946 | 2.2597732 | 20 | 5 5.1 | 18.2 |
| 58612 | 1997 $UA_5$ | 15.4 | X | 141.05232 | 303.98003 | 36.83786 | 6.92315 | 0.2275591 | 0.27565810 | 2.3382389 | 20 | 1 7.3 | 18.8 |
| 58613 | 1997 $UN_7$ | 15.7 | X | 241.92270 | 259.18418 | 111.20343 | 3.04387 | 0.1227029 | 0.24536549 | 2.5269330 | 20 | 5 19.9 | 19.4 |
| 58614 | 1997 $UO_7$ | 15.4 | X | 311.50272 | 222.93266 | 170.75446 | 4.18882 | 0.1461515 | 0.25590640 | 2.4570573 | 20 | 10 6.2 | 17.7 |
| 58615 | 1997 $UP_{13}$ | 15.1 | X | 151.52034 | 116.95290 | 215.92763 | 3.87933 | 0.1416368 | 0.27420093 | 2.3465155 | 20 | — | — |
| 58616 | 1997 $UT_{17}$ | 15.0 | X | 124.21193 | 234.01354 | 73.00755 | 6.13503 | 0.1308696 | 0.17906672 | 3.1174019 | 20 | — | — |
| 58617 | 1997 $UC_{21}$ | 15.0 | X | 76.36444 | 353.36129 | 11.00735 | 7.02468 | 0.1300638 | 0.26846963 | 2.3797935 | 20 | — | — |
| 58618 | 1997 $UU_{21}$ | 15.4 | X | 77.98426 | 319.50552 | 60.99416 | 3.50886 | 0.1732764 | 0.26922486 | 2.3753409 | 20 | — | — |
| 58619 | 1997 $UF_{22}$ | 15.2 | X | 340.75750 | 255.23964 | 158.21921 | 3.59408 | 0.0854133 | 0.26142184 | 2.4223755 | 20 | 12 26.8 | 18.0 |
| 58620 | 1997 $UG_{22}$ | 15.1 | X | 41.44200 | 15.94224 | 60.01118 | 7.56170 | 0.0835959 | 0.27105140 | 2.3646577 | 20 | — | — |
| 58621 | 1997 $UR_{23}$ | 15.5 | X | 79.17724 | 351.12204 | 2.91563 | 2.59880 | 0.1825187 | 0.26731741 | 2.3866270 | 20 | — | — |
| 58622 | Setoguchi | 14.9 | X | 55.45010 | 241.09809 | 210.59449 | 13.81155 | 0.0927577 | 0.23008591 | 2.6376027 | 20 | 1 19.7 | 18.4 |
| 58623 | 1997 $VZ_1$ | 14.3 | X | 308.02747 | 141.27444 | 247.75563 | 6.17455 | 0.1371952 | 0.25353967 | 2.4723243 | 20 | 9 17.5 | 17.0 |
| 58624 | 1997 $VC_2$ | 14.3 | X | 92.18208 | 195.38029 | 235.37456 | 9.65385 | 0.0949147 | 0.18820470 | 3.0156602 | 20 | 2 20.7 | 18.7 |
| 58625 | 1997 $VE_2$ | 14.5 | X | 116.27918 | 298.28297 | 196.39812 | 5.02413 | 0.2631238 | 0.23919026 | 2.5702403 | 20 | 6 30.3 | 18.7 |
| 58626 | 1997 $VF_5$ | 14.2 | X | 46.61491 | 9.08251 | 27.30800 | 11.77492 | 0.1473180 | 0.26705001 | 2.3882199 | 20 | — | — |
| 58627 | Rieko | 15.4 | X | 169.14422 | 312.94222 | 60.51579 | 7.38184 | 0.1752243 | 0.28027334 | 2.3124989 | 20 | 3 13.3 | 19.0 |
| 58628 | 1997 $VP_7$ | 15.1 | X | 264.36332 | 179.86050 | 261.26597 | 6.08285 | 0.1225767 | 0.20900101 | 2.8121412 | 20 | 9 13.7 | 19.0 |
| 58629 | 1997 $VL_8$ | 15.7 | X | 108.34356 | 28.84939 | 21.57780 | 4.40530 | 0.2617544 | 0.23131136 | 2.6282787 | 20 | 3 10.2 | 19.5 |
| 58630 | 1997 $WC$ | 15.4 | X | 240.86858 | 105.94032 | 248.98684 | 6.14229 | 0.1457389 | 0.28532217 | 2.2851377 | 20 | 4 22.2 | 18.6 |
| 58631 | 1997 $WE_2$ | 14.7 | X | 120.70148 | 294.74066 | 74.86014 | 9.72780 | 0.2145284 | 0.27228165 | 2.3575295 | 20 | 1 20.9 | 17.8 |
| 58632 | 1997 $WM_2$ | 14.9 | X | 144.67143 | 43.24569 | 45.75010 | 2.54690 | 0.0458883 | 0.19418923 | 2.9533797 | 20 | 5 14.0 | 19.1 |
| 58633 | 1997 $WY_2$ | 15.2 | X | 334.86891 | 35.95157 | 37.79669 | 2.84493 | 0.0473640 | 0.21573731 | 2.7532937 | 20 | 12 27.7 | 18.6 |
| 58634 | 1997 $WF_3$ | 15.9 | X | 112.86782 | 6.56461 | 339.41387 | 0.86752 | 0.2043752 | 0.26840778 | 2.3801591 | 20 | — | — |
| 58635 | 1997 $WQ_6$ | 15.8 | X | 79.43713 | 85.49150 | 76.17367 | 6.54396 | 0.0935289 | 0.23997046 | 2.5646663 | 20 | 6 2.9 | 18.9 |
| 58636 | 1997 $WQ_{13}$ | 15.0 | X | 330.12158 | 344.90754 | 26.45564 | 10.06349 | 0.2031060 | 0.21285780 | 2.7780689 | 20 | 9 30.3 | 17.5 |
| 58637 | 1997 $WT_{14}$ | 15.1 | X | 106.50307 | 328.19312 | 40.11656 | 7.60055 | 0.1302997 | 0.27191357 | 2.3596565 | 20 | — | — |
| 58638 | 1997 $WA_{17}$ | 14.8 | X | 123.67412 | 213.43873 | 236.25438 | 12.07038 | 0.0641642 | 0.19608677 | 2.9342956 | 20 | 4 20.3 | 19.2 |
| 58639 | 1997 $WZ_{17}$ | 15.7 | X | 73.31361 | 100.16962 | 29.63141 | 11.48783 | 0.2368237 | 0.23478999 | 2.6022539 | 20 | 5 2.7 | 18.8 |
| 58640 | 1997 $WH_{18}$ | 15.1 | X | 130.33155 | 262.18945 | 19.57728 | 7.15520 | 0.0931106 | 0.26419946 | 2.4053674 | 20 | — | — |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 58641 1997 $WX_{20}$ | 14.4 | $X$ | 125.69604 | 318.01203 | 64.13876 | 33.00611 | 0.1895260 | 0.23122222 | 2.6289541 | 20 | 2 29.0 | 19.1 |
| 58642 1997 $WL_{24}$ | 15.7 | $X$ | 184.51584 | 234.13571 | 157.29962 | 0.60970 | 0.2183446 | 0.24012525 | 2.5635640 | 20 | 4 17.6 | 20.1 |
| 58643 1997 $WO_{25}$ | 16.2 | $X$ | 229.80901 | 294.80423 | 211.42232 | 4.66379 | 0.1028064 | 0.29998086 | 2.2100750 | 20 | 11 18.2 | 18.5 |
| 58644 1997 $WU_{31}$ | 15.7 | $X$ | 133.95018 | 206.98879 | 236.16816 | 3.20008 | 0.2004728 | 0.23723744 | 2.5843256 | 20 | 5 7.1 | 19.8 |
| 58645 1997 $WT_{33}$ | 14.9 | $X$ | 316.59573 | 353.10897 | 37.39881 | 2.13603 | 0.1441846 | 0.25444284 | 2.4664703 | 20 | 10 11.1 | 17.0 |
| 58646 1997 $WD_{35}$ | 14.9 | $X$ | 229.28269 | 281.51373 | 73.35224 | 13.95364 | 0.1527776 | 0.24067622 | 2.5596501 | 20 | 4 19.2 | 19.1 |
| 58647 1997 $WW_{35}$ | 15.1 | $X$ | 7.72108 | 111.25825 | 297.64863 | 2.67308 | 0.1306277 | 0.26226642 | 2.4171722 | 20 | — | — |
| 58648 1997 $WZ_{36}$ | 15.8 | $X$ | 77.52210 | 204.26250 | 177.24336 | 2.77193 | 0.1762607 | 0.26856117 | 2.3792527 | 20 | — | — |
| 58649 1997 $WL_{38}$ | 14.9 | $X$ | 3.15507 | 110.54602 | 247.18572 | 4.01600 | 0.1246669 | 0.25650415 | 2.4532386 | 20 | 11 18.5 | 17.4 |
| 58650 1997 $WR_{39}$ | 15.6 | $X$ | 231.48279 | 247.57187 | 88.91973 | 6.38904 | 0.2062384 | 0.28302600 | 2.2974804 | 20 | 3 21.1 | 19.4 |
| 58651 1997 $WL_{42}$ | 15.1 | $X$ | 170.73758 | 37.81726 | 61.84537 | 5.67818 | 0.1882985 | 0.24198655 | 2.5504016 | 20 | 6 29.9 | 19.4 |
| 58652 1997 $WD_{43}$ | 14.6 | $X$ | 62.78453 | 256.70748 | 233.68083 | 10.49458 | 0.3103067 | 0.23101692 | 2.6305114 | 20 | 5 1.0 | 17.4 |
| 58653 1997 $WV_{45}$ | 15.4 | $X$ | 219.40269 | 311.71123 | 85.29544 | 4.17649 | 0.1745734 | 0.24321584 | 2.5418006 | 20 | 5 26.1 | 19.4 |
| 58654 1997 $WA_{48}$ | 15.8 | $X$ | 143.24328 | 358.21815 | 47.04428 | 6.56554 | 0.2364410 | 0.23503485 | 2.6004462 | 20 | 4 3.6 | 20.0 |
| 58655 1997 $WU_{49}$ | 15.0 | $X$ | 124.82778 | 298.03157 | 137.59276 | 2.25848 | 0.1869833 | 0.23512771 | 2.5997615 | 20 | 4 18.6 | 18.9 |
| 58656 1997 $WT_{50}$ | 15.2 | $X$ | 77.96714 | 235.98821 | 97.10877 | 2.78489 | 0.1653010 | 0.26407007 | 2.4061531 | 20 | — | — |
| 58657 1997 $WG_{54}$ | 15.9 | $X$ | 20.62086 | 310.21602 | 99.93293 | 2.33451 | 0.0922169 | 0.26467880 | 2.4024624 | 20 | — | — |
| 58658 1997 $WY_{57}$ | 15.8 | $X$ | 359.83370 | 197.12822 | 173.22097 | 6.54604 | 0.1286372 | 0.25934090 | 2.4353163 | 20 | 12 3.6 | 18.5 |
| 58659 1997 $WZ_{57}$ | 15.3 | $X$ | 68.10269 | 191.18808 | 178.32499 | 3.99341 | 0.2208367 | 0.26787203 | 2.3833316 | 20 | — | — |
| 58660 1997 $XR$ | 15.4 | $X$ | 291.82668 | 94.95568 | 278.57152 | 6.64300 | 0.1462148 | 0.29078634 | 2.2564206 | 20 | 7 30.4 | 17.5 |
| 58661 1997 $XU$ | 14.9 | $X$ | 213.89762 | 117.39764 | 288.99410 | 7.56655 | 0.0792898 | 0.24176745 | 2.5519422 | 20 | 6 7.7 | 18.6 |
| 58662 1997 $XJ_{2}$ | 15.1 | $X$ | 178.95845 | 51.00636 | 342.65471 | 1.46298 | 0.1520284 | 0.23701652 | 2.5859312 | 20 | 4 13.9 | 19.1 |
| 58663 1997 $XZ_{10}$ | 15.0 | $X$ | 192.85816 | 168.73094 | 289.67565 | 2.19949 | 0.1425865 | 0.24447067 | 2.5330954 | 20 | 7 20.0 | 18.7 |
| 58664 IYAMMIX | 15.7 | $X$ | 125.05272 | 139.18416 | 198.83764 | 4.12611 | 0.2447684 | 0.26997315 | 2.3709497 | 20 | — | — |
| 58665 1997 $YO_{1}$ | 15.8 | $X$ | 12.28806 | 262.66090 | 152.09002 | 8.16096 | 0.2507169 | 0.21758137 | 2.7377151 | 20 | — | — |
| 58666 1997 $YJ_{2}$ | 14.4 | $X$ | 42.87926 | 165.87298 | 287.52807 | 10.81718 | 0.0813619 | 0.22373714 | 2.6872660 | 20 | 1 6.9 | 17.5 |
| 58667 1997 $YS_{2}$ | 15.7 | $X$ | 342.09221 | 312.67856 | 75.52167 | 6.83498 | 0.1182393 | 0.25596326 | 2.4566934 | 20 | 11 25.8 | 18.3 |
| 58668 1997 $YJ_{3}$ | 14.7 | $X$ | 194.97108 | 269.92060 | 70.32773 | 7.49255 | 0.1662482 | 0.28121971 | 2.3073079 | 20 | 2 23.5 | 18.4 |
| 58669 1997 $YF_{5}$ | 15.9 | $X$ | 315.35423 | 151.21855 | 235.05994 | 5.06121 | 0.1538740 | 0.29748690 | 2.2224098 | 20 | 10 11.5 | 17.4 |
| 58670 1997 $YA_{6}$ | 14.7 | $X$ | 161.70159 | 16.03974 | 38.73872 | 3.82882 | 0.1714255 | 0.23490041 | 2.6014383 | 20 | 4 25.7 | 18.8 |
| 58671 Diplodocus | 15.4 | $X$ | 34.27421 | 127.22043 | 193.60961 | 6.57392 | 0.1000481 | 0.25492916 | 2.4633325 | 20 | 11 11.6 | 18.4 |
| 58672 Remigio | 14.5 | $X$ | 136.09219 | 144.34788 | 257.26924 | 12.20768 | 0.2460407 | 0.23240453 | 2.6200304 | 20 | 3 16.8 | 19.0 |
| 58673 1997 $YA_{9}$ | 14.7 | $X$ | 170.98489 | 349.85333 | 87.19896 | 11.04326 | 0.1381304 | 0.24063113 | 2.5599698 | 20 | 6 1.5 | 18.6 |
| 58674 1997 $YG_{12}$ | 15.3 | $X$ | 112.51349 | 266.98196 | 108.56297 | 3.51027 | 0.2315306 | 0.22560893 | 2.6723819 | 20 | 1 27.1 | 19.0 |
| 58675 1997 $YD_{14}$ | 14.1 | $X$ | 27.20237 | 147.89828 | 308.70003 | 7.72472 | 0.2102072 | 0.17726812 | 3.1384530 | 20 | — | — |
| 58676 1997 $YN_{16}$ | 14.9 | $X$ | 264.26970 | 22.81432 | 130.61689 | 3.05623 | 0.1628219 | 0.25629459 | 2.4545756 | 20 | 12 29.2 | 17.3 |
| 58677 1997 $YJ_{17}$ | 16.0 | $X$ | 162.86178 | 272.01754 | 286.00242 | 1.31204 | 0.0413564 | 0.29426655 | 2.2385946 | 20 | 11 7.8 | 18.6 |
| 58678 1997 $YE_{18}$ | 13.8 | $X$ | 227.26322 | 1.71563 | 312.98166 | 9.24876 | 0.0350469 | 0.18360565 | 3.0658108 | 20 | 3 1.5 | 18.4 |
| 58679 Brenig | 14.9 | $X$ | 131.93881 | 67.69086 | 12.82122 | 4.05380 | 0.2800552 | 0.23468786 | 2.6030088 | 20 | 5 7.5 | 19.3 |
| 58680 1998 $AO_{5}$ | 14.3 | $X$ | 318.34349 | 343.98917 | 326.08309 | 7.87326 | 0.1217433 | 0.23493686 | 2.6011692 | 20 | 6 11.8 | 17.3 |
| 58681 1998 $AJ_{7}$ | 14.9 | $X$ | 159.68668 | 88.44099 | 319.65659 | 3.53961 | 0.1733801 | 0.23415581 | 2.6069503 | 20 | 4 13.9 | 19.1 |
| 58682 Alenašolcová | 15.1 | $X$ | 42.64686 | 60.24126 | 74.65653 | 2.00762 | 0.1619974 | 0.22776419 | 2.6554966 | 20 | 3 9.0 | 17.8 |
| 58683 1998 $AJ_{10}$ | 15.3 | $X$ | 272.19043 | 257.67926 | 99.67573 | 4.51141 | 0.2845721 | 0.29148376 | 2.2528199 | 20 | 5 16.1 | 18.4 |
| 58684 1998 $AA_{11}$ | 15.9 | $X$ | 357.38451 | 324.72113 | 122.29686 | 3.48306 | 0.1598718 | 0.26169787 | 2.4206719 | 20 | — | — |
| 58685 1998 $BP$ | 15.9 | $X$ | 130.67456 | 96.10640 | 27.79515 | 4.89414 | 0.0982570 | 0.27985365 | 2.3148103 | 20 | 6 17.5 | 19.1 |
| 58686 1998 $BB_{1}$ | 13.8 | $X$ | 295.05658 | 345.61105 | 324.52922 | 13.55544 | 0.1332451 | 0.23378651 | 2.6096950 | 20 | 4 27.2 | 17.5 |
| 58687 1998 $BJ_{3}$ | 15.8 | $X$ | 317.01095 | 340.66177 | 301.85339 | 2.74407 | 0.2279689 | 0.27659750 | 2.3329417 | 20 | 4 8.4 | 18.3 |
| 58688 1998 $BJ_{4}$ | 13.6 | $X$ | 355.01645 | 140.63456 | 314.53806 | 10.54463 | 0.2794699 | 0.21712926 | 2.7415141 | 20 | — | — |
| 58689 1998 $BY_{9}$ | 15.5 | $X$ | 66.85082 | 320.94538 | 103.30689 | 6.77221 | 0.0953826 | 0.22743086 | 2.6580907 | 20 | 1 5.7 | 18.5 |
| 58690 1998 $BP_{10}$ | 15.9 | $X$ | 144.57635 | 303.51037 | 120.74786 | 6.74710 | 0.1700971 | 0.27674066 | 2.3321371 | 20 | 4 22.8 | 19.5 |
| 58691 1998 $BG_{14}$ | 15.3 | $X$ | 202.99739 | 318.09598 | 124.96206 | 4.82868 | 0.0677061 | 0.24082975 | 2.5585621 | 20 | 7 15.0 | 18.9 |
| 58692 1998 $BF_{17}$ | 15.4 | $X$ | 263.39426 | 223.31184 | 117.16776 | 2.78012 | 0.1153777 | 0.23327288 | 2.6135243 | 20 | 5 7.0 | 19.0 |
| 58693 1998 $BG_{25}$ | 14.5 | $X$ | 270.08385 | 136.26625 | 120.65455 | 7.66312 | 0.0867637 | 0.22234484 | 2.6984726 | 20 | 2 2.1 | 18.2 |
| 58694 1998 $BQ_{25}$ | 15.0 | $X$ | 211.91086 | 256.48949 | 84.09380 | 14.53172 | 0.1024717 | 0.23118068 | 2.6292690 | 20 | 3 19.9 | 19.3 |
| 58695 1998 $BJ_{26}$ | 15.7 | $X$ | 38.56794 | 107.10095 | 26.15790 | 1.64512 | 0.1259698 | 0.26607453 | 2.3940535 | 20 | 2 17.6 | 17.9 |
| 58696 1998 $BW_{26}$ | 14.9 | $X$ | 174.13007 | 288.27084 | 144.83521 | 3.45491 | 0.1247459 | 0.24142206 | 2.5543755 | 20 | 5 30.1 | 18.9 |
| 58697 1998 $BL_{27}$ | 15.3 | $X$ | 269.86711 | 114.75008 | 348.02170 | 1.22452 | 0.1021474 | 0.20676612 | 2.8323688 | 20 | 10 25.3 | 19.0 |
| 58698 1998 $BE_{31}$ | 16.0 | $X$ | 317.24220 | 159.77259 | 161.76385 | 0.77043 | 0.0258594 | 0.23859026 | 2.5745475 | 20 | 7 8.1 | 19.3 |
| 58699 1998 $BK_{42}$ | 14.9 | $X$ | 256.91478 | 352.75959 | 84.08745 | 15.13089 | 0.1605265 | 0.25233513 | 2.4801859 | 20 | 9 9.3 | 18.4 |
| 58700 1998 $BQ_{42}$ | 15.7 | $X$ | 48.15005 | 6.37765 | 150.56340 | 2.47544 | 0.1478880 | 0.27349722 | 2.3505389 | 20 | 4 14.3 | 17.7 |
| 58701 1998 $BR_{42}$ | 13.7 | $X$ | 1.54183 | 202.46438 | 296.98318 | 21.07079 | 0.0384136 | 0.17809605 | 3.1287188 | 20 | 1 16.3 | 17.9 |
| 58702 1998 $BX_{43}$ | 14.8 | $X$ | 78.33557 | 43.88133 | 66.54719 | 4.91035 | 0.1802725 | 0.22916740 | 2.6446457 | 20 | 4 8.3 | 18.1 |
| 58703 1998 $BH_{44}$ | 14.6 | $X$ | 1.62023 | 247.23685 | 113.31988 | 3.07428 | 0.2475440 | 0.25516011 | 2.4618459 | 20 | 12 9.8 | 16.9 |
| 58704 1998 $BA_{46}$ | 14.3 | $X$ | 17.67157 | 173.79423 | 283.44396 | 0.40419 | 0.1624560 | 0.17567685 | 3.1573764 | 20 | — | — |
| 58705 1998 $BN_{47}$ | 15.3 | $X$ | 342.02983 | 42.66805 | 114.82747 | 9.70982 | 0.2158163 | 0.22021808 | 2.7158185 | 20 | — | — |
| 58706 1998 $CD$ | 15.8 | $X$ | 24.06979 | 74.65646 | 63.27006 | 5.09857 | 0.1030848 | 0.26699103 | 2.3885716 | 20 | 1 28.9 | 18.2 |
| 58707 Kyoshi | 14.7 | $X$ | 334.43182 | 310.37887 | 325.84536 | 12.87449 | 0.0368985 | 0.23473396 | 2.6026679 | 20 | 5 26.8 | 18.3 |
| 58708 1998 $CX_{1}$ | 16.1 | $X$ | 112.70690 | 90.42099 | 53.57934 | 5.40637 | 0.0719918 | 0.28011208 | 2.3133863 | 20 | 6 20.4 | 19.0 |
| 58709 Zenocolò | 14.4 | $X$ | 23.89178 | 218.24791 | 191.48820 | 4.61464 | 0.1198802 | 0.16946764 | 3.2340361 | 20 | — | — |
| 58710 1998 $CH_{3}$ | 14.6 | $X$ | 72.06350 | 160.69266 | 354.87292 | 3.38576 | 0.1073715 | 0.18562335 | 3.0435537 | 20 | 5 16.9 | 18.7 |
| 58711 1998 $CM_{3}$ | 14.2 | $X$ | 288.16257 | 129.78839 | 149.65448 | 5.73160 | 0.0698365 | 0.22679751 | 2.6630370 | 20 | 3 26.5 | 17.7 |
| 58712 1998 $CX_{4}$ | 14.3 | $X$ | 308.05697 | 155.48244 | 323.49803 | 7.51831 | 0.0339252 | 0.25523316 | 2.4613762 | 20 | — | — |
| 58713 1998 $DS$ | 16.0 | $X$ | 328.95303 | 186.29124 | 74.39198 | 3.75047 | 0.1493212 | 0.27410177 | 2.3470814 | 20 | 4 14.2 | 18.2 |
| 58714 1998 $DS_{2}$ | 15.4 | $X$ | 85.81922 | 308.17563 | 98.82514 | 7.55196 | 0.1989912 | 0.27303830 | 2.3531720 | 20 | 1 17.4 | 17.6 |
| 58715 1998 $DK_{3}$ | 15.3 | $X$ | 181.80587 | 273.21280 | 176.58360 | 4.32281 | 0.2585358 | 0.23975219 | 2.5662226 | 20 | 6 25.9 | 19.9 |
| 58716 1998 $DU_{4}$ | 15.1 | $X$ | 15.22082 | 322.82775 | 149.27530 | 10.53175 | 0.2430042 | 0.22054172 | 2.7131608 | 20 | — | — |
| 58717 1998 $DE_{8}$ | 15.3 | $X$ | 329.38706 | 128.92888 | 34.16517 | 3.59515 | 0.1298558 | 0.21946181 | 2.7220541 | 20 | — | — |
| 58718 1998 $DN_{9}$ | 14.2 | $X$ | 290.70361 | 161.32672 | 55.93907 | 10.45174 | 0.1254501 | 0.21756649 | 2.7378399 | 20 | 1 3.6 | 18.2 |
| 58719 1998 $DY_{10}$ | 14.6 | $X$ | 83.16955 | 342.82946 | 26.02865 | 5.23263 | 0.1706933 | 0.21700838 | 2.7425321 | 20 | — | — |
| 58720 1998 $DD_{11}$ | 14.8 | $X$ | 302.50616 | 81.55891 | 144.58511 | 9.55933 | 0.1771201 | 0.22052821 | 2.7132717 | 20 | 1 19.7 | 18.7 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 58721 1998 $DX_{14}$ | 13.0 | $X$ | 40.15879 | 117.85037 | 359.77821 | 14.61243 | 0.0981202 | 0.17826842 | 3.1267016 | 20 | 2 17.6 | 17.0 |
| 58722 1998 $DN_{17}$ | 14.5 | $X$ | 40.55200 | 256.43695 | 163.51159 | 11.88822 | 0.1954750 | 0.21895229 | 2.7262754 | 20 | — | — |
| 58723 1998 $DU_{17}$ | 15.9 | $X$ | 131.43765 | 350.85908 | 47.74580 | 3.33121 | 0.2415373 | 0.22384841 | 2.6863755 | 20 | 3 16.6 | 20.1 |
| 58724 1998 $DY_{17}$ | 15.3 | $X$ | 236.76721 | 289.62700 | 97.52573 | 3.26907 | 0.0929735 | 0.18872856 | 3.0100772 | 20 | 6 7.6 | 19.8 |
| 58725 1998 $DZ_{18}$ | 15.7 | $X$ | 260.76849 | 177.79928 | 128.38232 | 3.97700 | 0.2714031 | 0.22555445 | 2.6728122 | 20 | 3 6.0 | 20.1 |
| 58726 1998 $DG_{19}$ | 14.8 | $X$ | 264.87000 | 53.62759 | 115.97669 | 3.00770 | 0.0322604 | 0.21135049 | 2.7912617 | 20 | — | — |
| 58727 1998 $DA_{21}$ | 16.1 | $X$ | 62.62385 | 315.07611 | 130.46378 | 1.76958 | 0.2527821 | 0.26805409 | 2.3822523 | 20 | 2 8.2 | 17.8 |
| 58728 1998 $DR_{23}$ | 15.4 | $X$ | 133.80810 | 289.57751 | 226.12443 | 1.43864 | 0.0443863 | 0.19185368 | 2.9773002 | 20 | 7 25.4 | 19.7 |
| 58729 1998 $DJ_{24}$ | 14.6 | $X$ | 224.87432 | 275.23157 | 149.75623 | 13.70407 | 0.1621843 | 0.23984047 | 2.5655929 | 20 | 7 7.2 | 18.7 |
| 58730 1998 $DR_{28}$ | 14.7 | $X$ | 7.40286 | 349.43706 | 101.42009 | 3.33075 | 0.1944598 | 0.21482737 | 2.7610630 | 20 | — | — |
| 58731 1998 $DE_{32}$ | 15.1 | $X$ | 231.36896 | 122.56767 | 174.13384 | 4.67580 | 0.0677048 | 0.22190289 | 2.7020544 | 20 | 2 8.8 | 19.1 |
| 58732 1998 $DL_{34}$ | 14.2 | $X$ | 299.07729 | 141.32373 | 357.08463 | 11.96554 | 0.0831416 | 0.21103948 | 2.7940032 | 20 | — | — |
| 58733 1998 $DH_{35}$ | 14.0 | $X$ | 148.57109 | 160.24356 | 356.38750 | 13.73686 | 0.0909290 | 0.23843073 | 2.5756957 | 20 | 8 23.3 | 17.9 |
| 58734 1998 $EP$ | 15.9 | $X$ | 239.20689 | 190.66309 | 191.30982 | 5.32602 | 0.1413327 | 0.27898078 | 2.3196361 | 20 | 5 30.1 | 19.3 |
| 58735 1998 $EP_{2}$ | 15.3 | $X$ | 310.15135 | 174.16132 | 1.98657 | 2.28650 | 0.1495234 | 0.25830399 | 2.4418293 | 20 | — | — |
| 58736 1998 $EO_{6}$ | 14.4 | $X$ | 266.91762 | 174.04687 | 182.67068 | 4.10767 | 0.0911276 | 0.23358703 | 2.6111806 | 20 | 6 5.5 | 17.9 |
| 58737 1998 $EA_{10}$ | 14.4 | $X$ | 100.35535 | 40.05250 | 7.17009 | 13.05732 | 0.1741157 | 0.22318151 | 2.6917243 | 20 | 2 18.2 | 18.1 |
| 58738 1998 $EX_{10}$ | 16.3 | $X$ | 35.21580 | 159.79404 | 17.89981 | 5.61293 | 0.1097116 | 0.27134326 | 2.3629617 | 20 | 4 15.6 | 18.5 |
| 58739 1998 $EZ_{11}$ | 16.0 | $X$ | 291.21462 | 128.20086 | 108.20833 | 4.83225 | 0.1573881 | 0.26400128 | 2.4065711 | 20 | 1 16.5 | 19.3 |
| 58740 1998 $ES_{12}$ | 14.7 | $X$ | 314.76335 | 136.60477 | 52.63416 | 3.03218 | 0.1354907 | 0.17288162 | 3.1913187 | 20 | 1 4.6 | 19.0 |
| 58741 1998 $EZ_{12}$ | 13.8 | $X$ | 226.46105 | 252.15397 | 12.44336 | 9.36089 | 0.0939070 | 0.21521937 | 2.7577093 | 20 | — | — |
| 58742 1998 $EG_{13}$ | 15.8 | $X$ | 304.16697 | 102.86716 | 35.76850 | 4.59117 | 0.1505504 | 0.21191304 | 2.7863196 | 20 | — | — |
| 58743 1998 $EJ_{13}$ | 16.1 | $X$ | 333.17402 | 174.49537 | 42.55657 | 2.82149 | 0.1303813 | 0.26716988 | 2.3875055 | 20 | 2 20.8 | 18.8 |
| 58744 1998 $EN_{13}$ | 14.6 | $X$ | 313.98934 | 51.69566 | 125.77106 | 6.20311 | 0.0931575 | 0.17174742 | 3.2053533 | 20 | — | — |
| 58745 1998 $FM_{3}$ | 15.3 | $X$ | 353.80357 | 0.20342 | 2.50058 | 1.65812 | 0.0717532 | 0.20216966 | 2.8751382 | 20 | 10 22.1 | 18.8 |
| 58746 1998 $FS_{3}$ | 15.6 | $X$ | 171.31864 | 167.68336 | 47.36085 | 1.22240 | 0.0751282 | 0.20456347 | 2.8526643 | 20 | 11 20.4 | 19.8 |
| 58747 1998 $FJ_{5}$ | 15.6 | $X$ | 190.24470 | 305.78017 | 181.01610 | 23.63600 | 0.0318723 | 0.37123644 | 1.9173541 | 20 | 9 16.8 | 17.6 |
| 58748 1998 $FB_{9}$ | 14.8 | $X$ | 148.68185 | 2.20038 | 89.78681 | 3.62644 | 0.1363593 | 0.18430351 | 3.0580669 | 20 | 5 28.9 | 19.7 |
| 58749 1998 $FG_{10}$ | 14.3 | $X$ | 328.10628 | 189.48073 | 291.53679 | 2.34317 | 0.0442291 | 0.21088389 | 2.7953774 | 20 | — | — |
| 58750 1998 $FY_{10}$ | 14.9 | $X$ | 247.02402 | 292.45180 | 29.43657 | 2.21446 | 0.0630586 | 0.22680068 | 2.6630122 | 20 | 3 30.3 | 18.7 |
| 58751 1998 $FZ_{11}$ | 15.6 | $X$ | 190.55329 | 3.90186 | 61.58890 | 4.30538 | 0.1192326 | 0.27708496 | 2.3302047 | 20 | 6 5.4 | 19.0 |
| 58752 1998 $FF_{12}$ | 15.5 | $X$ | 245.83773 | 61.77287 | 29.35754 | 8.01897 | 0.1025007 | 0.24313455 | 2.5423671 | 20 | 9 16.8 | 18.9 |
| 58753 1998 $FO_{12}$ | 15.8 | $X$ | 240.16241 | 356.10340 | 158.02863 | 2.82863 | 0.0720271 | 0.20524904 | 2.8463084 | 20 | 11 25.3 | 19.8 |
| 58754 1998 $FT_{12}$ | 15.4 | $X$ | 234.44629 | 295.09292 | 106.55323 | 8.62537 | 0.1993089 | 0.29026892 | 2.2591012 | 20 | 6 14.6 | 18.7 |
| 58755 1998 $FS_{14}$ | 14.5 | $X$ | 11.73070 | 282.31278 | 350.32324 | 9.95460 | 0.0849769 | 0.18878310 | 3.0094974 | 20 | 7 23.3 | 18.4 |
| 58756 1998 $FR_{15}$ | 14.9 | $X$ | 110.27495 | 263.82584 | 202.09936 | 10.58035 | 0.1359625 | 0.18337468 | 3.0683847 | 20 | 5 7.3 | 19.5 |
| 58757 1998 $FF_{18}$ | 14.5 | $X$ | 61.84221 | 302.35266 | 162.31857 | 5.20319 | 0.1744891 | 0.22425917 | 2.6830941 | 20 | 3 2.5 | 17.2 |
| 58758 1998 $FO_{18}$ | 15.1 | $X$ | 63.38470 | 243.25660 | 196.15877 | 1.47696 | 0.1698720 | 0.26590391 | 2.3950775 | 20 | 1 19.3 | 17.2 |
| 58759 1998 $FZ_{18}$ | 13.9 | $X$ | 178.43025 | 110.91221 | 321.11437 | 7.71339 | 0.2369902 | 0.19124264 | 2.9836387 | 20 | 5 31.5 | 19.2 |
| 58760 1998 $FB_{21}$ | 14.5 | $X$ | 82.72316 | 20.12485 | 152.87112 | 5.04700 | 0.1220896 | 0.23252052 | 2.6191590 | 20 | 6 27.4 | 18.1 |
| 58761 1998 $FH_{24}$ | 14.7 | $X$ | 255.62266 | 201.39013 | 344.58060 | 7.88305 | 0.1682140 | 0.21072460 | 2.7967859 | 20 | — | — |
| 58762 1998 $FJ_{24}$ | 13.6 | $X$ | 240.18082 | 30.60553 | 341.67738 | 14.86779 | 0.1342858 | 0.23334509 | 2.6129851 | 20 | 5 12.8 | 17.8 |
| 58763 1998 $FR_{25}$ | 14.9 | $X$ | 7.06286 | 218.62837 | 299.06100 | 2.50057 | 0.0596227 | 0.22154156 | 2.7049915 | 20 | 2 6.4 | 18.2 |
| 58764 1998 $FE_{27}$ | 15.5 | $X$ | 23.56711 | 309.14181 | 196.61172 | 4.12698 | 0.1943452 | 0.22295969 | 2.6935093 | 20 | 2 13.7 | 17.9 |
| 58765 1998 $FZ_{33}$ | 14.0 | $X$ | 165.54145 | 168.80500 | 353.98756 | 14.07506 | 0.0773442 | 0.24091622 | 2.5579498 | 20 | 9 15.5 | 17.7 |
| 58766 1998 $FS_{34}$ | 14.9 | $X$ | 3.28007 | 225.67873 | 295.49545 | 3.03698 | 0.1284933 | 0.17607610 | 3.1526017 | 20 | 2 8.9 | 18.7 |
| 58767 1998 $FQ_{39}$ | 14.9 | $X$ | 45.01592 | 317.71784 | 135.04502 | 3.50696 | 0.1326426 | 0.21935224 | 2.7229605 | 20 | 1 12.5 | 17.7 |
| 58768 1998 $FQ_{40}$ | 16.2 | $X$ | 10.89609 | 78.43343 | 185.35101 | 6.53894 | 0.1009646 | 0.27683622 | 2.3316004 | 20 | 7 12.9 | 18.5 |
| 58769 1998 $FS_{45}$ | 14.2 | $X$ | 121.15988 | 281.26017 | 76.56789 | 3.62328 | 0.1251718 | 0.21423084 | 2.7661861 | 20 | 1 2.5 | 17.9 |
| 58770 1998 $FM_{49}$ | 14.4 | $X$ | 69.97078 | 110.11105 | 185.86011 | 12.50056 | 0.1989922 | 0.24212205 | 2.5494499 | 20 | 12 2.3 | 18.5 |
| 58771 1998 $FP_{49}$ | 14.5 | $X$ | 340.56299 | 172.86773 | 197.51532 | 1.77472 | 0.0554385 | 0.19853861 | 2.9100876 | 20 | 10 11.4 | 18.1 |
| 58772 1998 $FB_{56}$ | 14.8 | $X$ | 228.25194 | 74.61337 | 140.60655 | 4.64858 | 0.0389902 | 0.20932593 | 2.8092304 | 20 | — | — |
| 58773 1998 $FE_{57}$ | 14.7 | $X$ | 281.61623 | 280.30366 | 175.87062 | 2.18228 | 0.0129671 | 0.20164713 | 2.8801030 | 20 | 11 12.9 | 18.6 |
| 58774 1998 $FA_{58}$ | 13.7 | $X$ | 11.95410 | 110.64460 | 193.28048 | 10.37339 | 0.1060381 | 0.19236475 | 2.9720245 | 20 | 9 1.0 | 17.4 |
| 58775 1998 $FR_{59}$ | 14.6 | $X$ | 26.52585 | 69.90004 | 48.68013 | 5.21694 | 0.0575680 | 0.21767973 | 2.7368903 | 20 | 1 17.2 | 18.0 |
| 58776 1998 $FG_{60}$ | 14.6 | $X$ | 35.42595 | 253.54296 | 16.04815 | 9.01846 | 0.0628017 | 0.19140834 | 2.9819165 | 20 | 8 22.8 | 18.6 |
| 58777 1998 $FN_{65}$ | 14.7 | $X$ | 98.58476 | 52.86718 | 208.56702 | 10.14517 | 0.0991400 | 0.19752011 | 2.9200828 | 20 | 11 1.4 | 19.0 |
| 58778 1998 $FS_{66}$ | 14.6 | $X$ | 359.41526 | 299.09054 | 184.03271 | 12.40207 | 0.1298994 | 0.21538139 | 2.7563261 | 20 | — | — |
| 58779 1998 $FA_{70}$ | 15.5 | $X$ | 324.60442 | 255.52216 | 62.72098 | 4.07702 | 0.2675258 | 0.27403419 | 2.3474673 | 20 | 6 17.2 | 17.0 |
| 58780 1998 $FL_{70}$ | 15.2 | $X$ | 188.97026 | 127.39359 | 28.01031 | 5.30199 | 0.1067635 | 0.28636345 | 2.2795948 | 20 | 10 7.0 | 18.4 |
| 58781 1998 $FX_{72}$ | 14.3 | $X$ | 160.27287 | 233.34016 | 201.50382 | 9.01960 | 0.0417455 | 0.18160280 | 3.0883110 | 20 | 5 15.6 | 18.8 |
| 58782 1998 $FY_{72}$ | 15.3 | $X$ | 277.40836 | 7.89442 | 109.62446 | 1.06742 | 0.0746844 | 0.24666218 | 2.5180693 | 20 | 12 8.9 | 18.0 |
| 58783 1998 $FN_{74}$ | 15.3 | $X$ | 242.48874 | 7.01304 | 355.84721 | 2.52881 | 0.1703237 | 0.23360057 | 2.6110796 | 20 | 5 4.5 | 19.3 |
| 58784 1998 $FJ_{75}$ | 13.9 | $X$ | 188.28038 | 75.41063 | 24.15031 | 10.55956 | 0.0665611 | 0.18940558 | 3.0029000 | 20 | 7 19.8 | 18.6 |
| 58785 1998 $FT_{77}$ | 14.0 | $X$ | 49.99278 | 27.20894 | 43.04661 | 9.70146 | 0.1416224 | 0.21467981 | 2.7623281 | 20 | — | — |
| 58786 1998 $FD_{78}$ | 16.3 | $X$ | 228.60231 | 123.78156 | 159.55719 | 8.48969 | 0.2173886 | 0.30273250 | 2.1966626 | 20 | 1 7.1 | 20.0 |
| 58787 1998 $FW_{78}$ | 14.1 | $X$ | 287.59895 | 323.96291 | 50.55335 | 11.97821 | 0.1483493 | 0.18997454 | 2.9969014 | 20 | 7 19.3 | 18.2 |
| 58788 1998 $FW_{79}$ | 14.4 | $X$ | 94.22150 | 28.18892 | 123.42768 | 4.52399 | 0.0525215 | 0.18397920 | 3.0616595 | 20 | 6 3.3 | 18.7 |
| 58789 1998 $FK_{80}$ | 13.9 | $X$ | 348.83489 | 25.56098 | 21.27332 | 15.49742 | 0.1352682 | 0.20548476 | 2.8441313 | 20 | 12 15.8 | 17.5 |
| 58790 1998 $FN_{81}$ | 14.7 | $X$ | 317.47389 | 109.68586 | 75.53503 | 3.74979 | 0.1167913 | 0.21876794 | 2.7278067 | 20 | — | — |
| 58791 1998 $FH_{82}$ | 14.0 | $X$ | 67.79360 | 48.46190 | 32.08368 | 12.64436 | 0.1554874 | 0.22243209 | 2.6977669 | 20 | 2 12.6 | 17.4 |
| 58792 1998 $FF_{84}$ | 14.9 | $X$ | 330.37888 | 38.29713 | 138.88937 | 9.55378 | 0.2096665 | 0.21904776 | 2.7254832 | 20 | — | — |
| 58793 1998 $FJ_{84}$ | 14.7 | $X$ | 285.87722 | 358.61523 | 127.76073 | 9.17998 | 0.1695006 | 0.20932861 | 2.8092064 | 20 | 12 13.2 | 17.9 |
| 58794 1998 $FW_{84}$ | 13.5 | $X$ | 75.67055 | 65.44913 | 25.07375 | 15.15062 | 0.0691412 | 0.17870698 | 3.1215840 | 20 | 3 3.6 | 17.9 |
| 58795 1998 $FE_{87}$ | 14.8 | $X$ | 309.35099 | 350.53913 | 122.31046 | 9.39334 | 0.2451865 | 0.21126159 | 2.7920446 | 20 | — | — |
| 58796 1998 $FO_{94}$ | 14.7 | $X$ | 9.94639 | 39.42058 | 62.59235 | 6.02376 | 0.1504965 | 0.17162089 | 3.2069286 | 20 | — | — |
| 58797 1998 $FU_{98}$ | 13.7 | $X$ | 331.45639 | 86.81346 | 315.31858 | 10.05004 | 0.1397175 | 0.20314627 | 2.8659162 | 20 | 11 6.4 | 17.2 |
| 58798 1998 $FU_{100}$ | 13.9 | $X$ | 58.99948 | 341.79911 | 240.67767 | 9.30224 | 0.0587547 | 0.18918712 | 3.0052113 | 20 | 7 17.5 | 18.1 |
| 58799 1998 $FG_{103}$ | 15.5 | $X$ | 252.99845 | 314.22979 | 223.82010 | 5.99645 | 0.0899629 | 0.25264995 | 2.4781252 | 20 | — | — |
| 58800 1998 $FF_{104}$ | 14.5 | $X$ | 336.57494 | 280.70288 | 215.93343 | 12.45589 | 0.1656412 | 0.21486493 | 2.7607412 | 20 | — | — |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 58801 1998 $FP_{105}$ | 14.7 | X | 174.17047 | 258.84010 | 215.14880 | 9.15173 | 0.0482771 | 0.19045026 | 2.9919087 | 20 | 7 17.6 | 19.3 |
| 58802 1998 $FW_{106}$ | 14.3 | X | 6.26550 | 276.06618 | 212.10324 | 13.10370 | 0.1538035 | 0.17263696 | 3.1943330 | 20 | — | — |
| 58803 1998 $FX_{109}$ | 15.1 | X | 228.99436 | 263.50102 | 206.63421 | 21.54441 | 0.1274681 | 0.24235496 | 2.5478163 | 20 | 9 9.5 | 19.0 |
| 58804 1998 $FM_{110}$ | 14.3 | X | 303.98874 | 264.23458 | 230.56636 | 14.29466 | 0.2409902 | 0.21119792 | 2.7926058 | 20 | — | — |
| 58805 1998 $FN_{113}$ | 14.5 | X | 92.60032 | 281.72246 | 229.69921 | 10.41055 | 0.0506816 | 0.18449342 | 3.0559680 | 20 | 5 31.4 | 18.7 |
| 58806 1998 $FF_{117}$ | 14.6 | X | 257.96064 | 62.85642 | 211.25197 | 11.69020 | 0.1255507 | 0.21772680 | 2.7364958 | 20 | 2 2.6 | 19.0 |
| 58807 1998 $FN_{127}$ | 15.0 | X | 152.29690 | 307.19054 | 121.65523 | 4.43918 | 0.1228043 | 0.22962406 | 2.6411382 | 20 | 5 3.5 | 19.0 |
| 58808 1998 $FV_{127}$ | 14.5 | X | 267.57872 | 176.31427 | 46.55798 | 5.90332 | 0.0879903 | 0.17172231 | 3.2056658 | 20 | — | — |
| 58809 1998 $FX_{130}$ | 15.0 | X | 287.66335 | 124.30694 | 43.68682 | 4.34191 | 0.0377777 | 0.21058387 | 2.7980318 | 20 | — | — |
| 58810 1998 $FR_{136}$ | 15.2 | X | 265.77335 | 216.63645 | 208.25259 | 7.07968 | 0.1191054 | 0.24170941 | 2.5523507 | 20 | 8 30.6 | 18.4 |
| 58811 1998 $FQ_{145}$ | 14.8 | X | 338.37910 | 359.22924 | 153.02167 | 12.89569 | 0.1652862 | 0.21719560 | 2.7409558 | 20 | — | — |
| 58812 1998 $GM$ | 15.5 | X | 213.14561 | 132.36508 | 352.89808 | 4.84514 | 0.1906902 | 0.24512467 | 2.5285878 | 20 | 9 9.9 | 19.2 |
| 58813 1998 $GP_{4}$ | 13.7 | X | 286.94106 | 170.13693 | 31.82475 | 23.04292 | 0.0904835 | 0.17056067 | 3.2202045 | 20 | — | — |
| 58814 1998 $GQ_{6}$ | 13.7 | X | 168.38213 | 302.77409 | 79.98143 | 16.74541 | 0.0405811 | 0.17861560 | 3.1226487 | 20 | 3 30.0 | 18.6 |
| 58815 1998 $GR_{8}$ | 15.4 | X | 234.57805 | 151.91618 | 81.60118 | 14.52260 | 0.1459369 | 0.21012528 | 2.8021014 | 20 | — | — |
| 58816 1998 $GU_{10}$ | 14.8 | X | 259.27010 | 96.90719 | 142.26992 | 9.61575 | 0.1099239 | 0.21636588 | 2.7479587 | 20 | — | — |
| 58817 1998 $GJ_{11}$ | 15.2 | X | 143.06747 | 116.38624 | 357.84872 | 30.87928 | 0.2158138 | 0.23517971 | 2.5993782 | 20 | 6 28.3 | 20.2 |
| 58818 1998 $HE_{2}$ | 13.9 | X | 146.20030 | 43.45331 | 62.50949 | 10.44365 | 0.0500403 | 0.18331558 | 3.0690441 | 20 | 6 6.3 | 18.4 |
| 58819 1998 $HF_{3}$ | 14.0 | X | 354.03560 | 111.48492 | 193.53373 | 12.97122 | 0.1680413 | 0.18557579 | 3.0440737 | 20 | 8 3.0 | 17.6 |
| 58820 1998 $HN_{5}$ | 15.6 | X | 224.25039 | 85.07702 | 43.65182 | 13.95704 | 0.1076235 | 0.24266156 | 2.5456698 | 20 | 10 10.3 | 19.2 |
| 58821 1998 $HZ_{5}$ | 14.9 | X | 59.40523 | 347.63315 | 160.30028 | 5.63372 | 0.1465591 | 0.17959255 | 3.1113140 | 20 | 4 27.9 | 18.9 |
| 58822 1998 $HO_{7}$ | 16.5 | X | 298.23045 | 215.55216 | 48.50258 | 24.36586 | 0.0418157 | 0.39918195 | 1.8267907 | 20 | 3 21.7 | 18.8 |
| 58823 1998 $HR_{8}$ | 16.2 | X | 160.08424 | 329.35577 | 150.48829 | 4.79718 | 0.2191287 | 0.23455242 | 2.6040107 | 20 | 7 15.7 | 20.7 |
| 58824 1998 $HY_{10}$ | 13.9 | X | 356.18725 | 284.59462 | 48.18442 | 11.27145 | 0.1134565 | 0.19225107 | 2.9731960 | 20 | 9 23.1 | 17.6 |
| 58825 1998 $HE_{11}$ | 13.8 | X | 190.32470 | 312.01679 | 44.10283 | 18.67686 | 0.1861242 | 0.17471223 | 3.1689874 | 20 | 3 23.1 | 19.4 |
| 58826 1998 $HC_{15}$ | 14.4 | X | 318.11590 | 83.39163 | 35.69996 | 8.81940 | 0.1758593 | 0.21059365 | 2.7979451 | 20 | — | — |
| 58827 1998 $HH_{15}$ | 13.8 | X | 355.54241 | 193.61823 | 67.43990 | 10.81036 | 0.0120974 | 0.18219514 | 3.0816137 | 20 | 6 8.3 | 18.1 |
| 58828 1998 $HM_{15}$ | 15.1 | X | 61.77644 | 260.85331 | 71.27762 | 10.73223 | 0.0971979 | 0.19760393 | 2.9192570 | 20 | 12 15.2 | 19.3 |
| 58829 1998 $HF_{19}$ | 14.9 | X | 130.37013 | 277.77122 | 197.29288 | 11.88560 | 0.1808188 | 0.18750350 | 3.0231739 | 20 | 6 11.7 | 19.9 |
| 58830 1998 $HE_{23}$ | 15.0 | X | 61.35587 | 107.93259 | 178.98517 | 11.04997 | 0.3411968 | 0.23735409 | 2.5834788 | 20 | 11 27.1 | 19.4 |
| 58831 1998 $HN_{30}$ | 14.9 | X | 297.95191 | 139.02583 | 101.93199 | 3.10993 | 0.0193240 | 0.22028680 | 2.7152536 | 20 | 2 26.2 | 18.5 |
| 58832 1998 $HU_{31}$ | 15.7 | X | 192.00278 | 246.95420 | 221.89305 | 20.92661 | 0.0919679 | 0.36791444 | 1.9288783 | 20 | 8 6.1 | 18.7 |
| 58833 1998 $HM_{33}$ | 13.7 | X | 327.91399 | 339.40254 | 4.17038 | 11.90576 | 0.0681159 | 0.19116733 | 2.9844222 | 20 | 8 21.0 | 17.6 |
| 58834 1998 $HN_{37}$ | 14.5 | X | 82.83703 | 93.25116 | 12.80145 | 12.97967 | 0.1378007 | 0.22310419 | 2.6923462 | 20 | 3 31.7 | 18.0 |
| 58835 1998 $HG_{39}$ | 13.7 | X | 120.45510 | 122.83667 | 25.28528 | 15.56955 | 0.0287624 | 0.23097726 | 2.6308125 | 20 | 6 30.0 | 17.6 |
| 58836 1998 $HA_{43}$ | 15.0 | X | 235.68279 | 69.15214 | 182.85255 | 9.12758 | 0.1070926 | 0.21180741 | 2.7872458 | 20 | — | — |
| 58837 1998 $HQ_{46}$ | 13.7 | X | 71.69821 | 30.55610 | 190.37577 | 10.13289 | 0.0460359 | 0.18889042 | 3.0083574 | 20 | 7 30.3 | 18.0 |
| 58838 1998 $HO_{50}$ | 14.6 | X | 94.71061 | 60.68333 | 112.45222 | 11.20302 | 0.0425452 | 0.18395879 | 3.0618861 | 20 | 6 29.7 | 19.0 |
| 58839 1998 $HZ_{50}$ | 14.7 | X | 327.78024 | 255.19231 | 225.65693 | 6.74292 | 0.1777896 | 0.21022028 | 2.8012571 | 20 | — | — |
| 58840 1998 $HT_{53}$ | 15.3 | X | 107.53988 | 66.51633 | 49.79033 | 6.61758 | 0.0648394 | 0.27093720 | 2.3653221 | 20 | 5 4.4 | 18.1 |
| 58841 1998 $HT_{54}$ | 13.6 | X | 216.37553 | 104.59396 | 13.26257 | 13.01660 | 0.1264361 | 0.24040939 | 2.5615437 | 20 | 9 13.4 | 17.3 |
| 58842 1998 $HP_{55}$ | 15.4 | X | 193.89960 | 323.44691 | 179.91493 | 3.40547 | 0.0812360 | 0.24020447 | 2.5630003 | 20 | 9 21.7 | 19.0 |
| 58843 1998 $HB_{59}$ | 14.9 | X | 113.89013 | 92.34693 | 90.52542 | 1.72023 | 0.1086218 | 0.19006440 | 2.9959566 | 20 | 8 12.8 | 19.3 |
| 58844 1998 $HV_{60}$ | 14.0 | X | 279.41283 | 303.04922 | 18.56914 | 13.43843 | 0.1397251 | 0.18104076 | 3.0946995 | 20 | 4 26.9 | 18.5 |
| 58845 1998 $HZ_{60}$ | 14.4 | X | 87.31596 | 74.37378 | 21.58782 | 12.61985 | 0.1516350 | 0.22191784 | 2.7019330 | 20 | 3 28.8 | 17.9 |
| 58846 1998 $HN_{63}$ | 15.1 | X | 89.39998 | 46.37131 | 163.95344 | 6.57393 | 0.1883324 | 0.19019311 | 2.9946049 | 20 | 8 28.7 | 19.7 |
| 58847 1998 $HO_{68}$ | 13.6 | X | 227.06831 | 86.89358 | 293.81653 | 3.03994 | 0.1051253 | 0.18270911 | 3.0758318 | 20 | 5 17.8 | 18.3 |
| 58848 1998 $HH_{71}$ | 16.4 | X | 82.26473 | 170.56264 | 118.46701 | 2.49954 | 0.2198302 | 0.28443678 | 2.2898773 | 20 | 12 12.8 | 20.0 |
| 58849 1998 $HZ_{72}$ | 15.2 | X | 114.01781 | 280.47190 | 248.23986 | 5.35962 | 0.0550740 | 0.18737854 | 3.0245179 | 20 | 7 18.5 | 19.7 |
| 58850 1998 $HH_{74}$ | 15.1 | X | 95.04726 | 127.20344 | 147.58203 | 2.65639 | 0.0703210 | 0.19743515 | 2.9209205 | 20 | 11 11.3 | 19.3 |
| 58851 1998 $HY_{77}$ | 14.8 | X | 150.43420 | 148.86260 | 323.80380 | 2.17872 | 0.1603002 | 0.18627717 | 3.0364278 | 20 | 6 25.9 | 19.7 |
| 58852 1998 $HE_{84}$ | 13.8 | X | 192.70072 | 137.97649 | 193.87353 | 13.27748 | 0.1840508 | 0.17065487 | 3.2190194 | 20 | 2 14.9 | 19.3 |
| 58853 1998 $HD_{85}$ | 14.4 | X | 277.64843 | 86.83005 | 190.04931 | 4.53812 | 0.1117130 | 0.17521094 | 3.1629712 | 20 | 3 6.9 | 19.0 |
| 58854 1998 $HV_{87}$ | 13.9 | X | 2.43384 | 83.14242 | 231.07824 | 11.84720 | 0.1799910 | 0.18849528 | 3.0125601 | 20 | 9 1.3 | 17.4 |
| 58855 1998 $HR_{92}$ | 14.9 | X | 65.22987 | 314.08940 | 212.67867 | 9.85548 | 0.0944705 | 0.22589585 | 2.6701186 | 20 | 5 21.5 | 18.2 |
| 58856 1998 $HK_{93}$ | 16.4 | X | 148.28929 | 35.21221 | 246.48981 | 3.68757 | 0.1256695 | 0.29239749 | 2.2481241 | 20 | — | — |
| 58857 1998 $HP_{94}$ | 13.8 | X | 268.81469 | 15.02908 | 32.00515 | 10.63235 | 0.0201771 | 0.19049196 | 2.9914720 | 20 | 8 27.7 | 18.1 |
| 58858 1998 $HU_{97}$ | 13.9 | X | 102.19613 | 86.64252 | 21.64922 | 10.34028 | 0.0820382 | 0.17827673 | 3.1266044 | 20 | 4 21.8 | 18.2 |
| 58859 1998 $HD_{98}$ | 13.3 | X | 210.26607 | 43.22721 | 16.85920 | 10.49435 | 0.1242355 | 0.18463453 | 3.0544107 | 20 | 6 16.9 | 18.3 |
| 58860 1998 $HU_{99}$ | 14.4 | X | 354.02820 | 91.83805 | 187.81134 | 9.06062 | 0.0658400 | 0.18436954 | 3.0573367 | 20 | 6 30.2 | 18.4 |
| 58861 1998 $HV_{99}$ | 14.3 | X | 74.27007 | 81.27654 | 68.49815 | 10.01704 | 0.1983108 | 0.18097069 | 3.0954982 | 20 | 5 27.4 | 18.5 |
| 58862 1998 $HR_{101}$ | 13.5 | X | 318.09178 | 124.57915 | 72.57461 | 24.67313 | 0.2107711 | 0.17221355 | 3.1995667 | 20 | 1 6.4 | 18.1 |
| 58863 1998 $HA_{102}$ | 13.6 | X | 126.05197 | 14.77264 | 50.93308 | 14.80205 | 0.0907978 | 0.17431111 | 3.1738471 | 20 | 4 5.5 | 18.4 |
| 58864 1998 $HC_{109}$ | 15.1 | X | 10.62395 | 97.49612 | 133.94530 | 11.98029 | 0.1344624 | 0.22642184 | 2.6659817 | 20 | 5 28.1 | 18.1 |
| 58865 1998 $HX_{109}$ | 14.1 | X | 164.03115 | 275.80335 | 82.96992 | 11.23256 | 0.1185521 | 0.17245738 | 3.1965502 | 20 | 2 26.2 | 19.2 |
| 58866 1998 $HP_{110}$ | 15.0 | X | 112.69810 | 134.30766 | 134.26962 | 5.94799 | 0.0742995 | 0.19890174 | 2.9065446 | 20 | 11 24.1 | 19.4 |
| 58867 1998 $HV_{110}$ | 14.8 | X | 174.07547 | 144.27729 | 90.72342 | 6.66392 | 0.0717699 | 0.20265987 | 2.8705000 | 20 | 12 17.1 | 18.9 |
| 58868 1998 $HK_{112}$ | 14.1 | X | 196.22453 | 150.30688 | 77.69605 | 17.49684 | 0.0573315 | 0.20487099 | 2.8498089 | 20 | — | — |
| 58869 1998 $HA_{113}$ | 15.5 | X | 161.34950 | 64.66115 | 163.48677 | 9.17293 | 0.1100143 | 0.28922588 | 2.2645293 | 20 | 12 11.5 | 18.8 |
| 58870 1998 $HR_{113}$ | 14.5 | X | 2.12255 | 177.75216 | 114.30808 | 6.44268 | 0.2544490 | 0.18575306 | 3.0421368 | 20 | 8 12.3 | 17.2 |
| 58871 1998 $HX_{114}$ | 15.1 | X | 114.16332 | 98.12712 | 153.86262 | 12.44690 | 0.1605346 | 0.24090824 | 2.5580063 | 20 | 11 18.9 | 19.4 |
| 58872 1998 $HY_{117}$ | 15.1 | X | 159.85545 | 52.30421 | 70.33263 | 12.53689 | 0.2296367 | 0.23433537 | 2.6056185 | 20 | 7 21.2 | 19.7 |
| 58873 1998 $HK_{118}$ | 13.9 | X | 313.79574 | 160.71246 | 86.12870 | 16.26034 | 0.0932154 | 0.17654476 | 3.1470200 | 20 | 3 27.5 | 18.4 |
| 58874 1998 $HH_{119}$ | 14.5 | X | 175.11348 | 46.00156 | 133.80608 | 8.11974 | 0.1606263 | 0.19742829 | 2.9209881 | 20 | 10 11.5 | 19.3 |
| 58875 1998 $HS_{119}$ | 13.8 | X | 274.99053 | 356.46607 | 64.91153 | 15.18844 | 0.1819797 | 0.23873533 | 2.5735044 | 20 | 9 9.9 | 17.2 |
| 58876 1998 $HT_{121}$ | 14.6 | X | 350.65422 | 173.51621 | 145.62747 | 10.50465 | 0.0915987 | 0.18831326 | 3.0145011 | 20 | 8 18.8 | 18.4 |
| 58877 1998 $HM_{124}$ | 13.1 | X | 250.07613 | 93.67496 | 204.75726 | 21.55992 | 0.0818364 | 0.17307776 | 3.1889072 | 20 | 3 2.6 | 18.1 |
| 58878 1998 $HK_{125}$ | 15.2 | X | 171.22577 | 137.03178 | 142.77127 | 8.39446 | 0.2862922 | 0.20344674 | 2.8630937 | 20 | — | — |
| 58879 1998 $HO_{126}$ | 12.6 | X | 293.60247 | 98.51491 | 99.01002 | 23.51366 | 0.1074204 | 0.16997231 | 3.2276314 | 20 | — | — |
| 58880 1998 $HA_{130}$ | 15.0 | X | 278.77070 | 338.06656 | 192.04886 | 12.27476 | 0.1570404 | 0.21088184 | 2.7953955 | 20 | — | — |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 58881 1998 $HZ_{132}$ | 15.2 | $X$ | 44.06150 | 323.70198 | 297.06157 | 1.84931 | 0.1606194 | 0.19011504 | 2.9954246 | 20 | 9 2.1 | 19.0 |
| 58882 1998 $HF_{134}$ | 14.5 | $X$ | 287.17810 | 303.46895 | 357.23495 | 9.26277 | 0.2673588 | 0.17947966 | 3.1126185 | 20 | 3 25.7 | 19.1 |
| 58883 1998 $HH_{137}$ | 15.2 | $X$ | 227.14880 | 187.57419 | 42.64653 | 8.56681 | 0.1547315 | 0.20918364 | 2.8105042 | 20 | — | — |
| 58884 1998 $HD_{139}$ | 14.6 | $X$ | 341.08977 | 290.22213 | 163.11635 | 12.07223 | 0.1956868 | 0.25436455 | 2.4669764 | 20 | — | — |
| 58885 1998 $HA_{142}$ | 16.2 | $X$ | 91.21230 | 137.07339 | 176.71366 | 6.59366 | 0.1646023 | 0.28984498 | 2.2613036 | 20 | — | — |
| 58886 1998 $HN_{143}$ | 13.9 | $X$ | 300.28462 | 266.81104 | 46.65944 | 18.49716 | 0.3499138 | 0.17914338 | 3.1165125 | 20 | 4 18.9 | 18.3 |
| 58887 1998 $HD_{144}$ | 14.6 | $X$ | 235.76804 | 352.60824 | 132.26007 | 7.74717 | 0.1982695 | 0.19946130 | 2.9011061 | 20 | 9 29.2 | 19.0 |
| 58888 1998 $HE_{144}$ | 16.0 | $X$ | 46.44332 | 100.54595 | 125.82283 | 6.22191 | 0.1640068 | 0.27441705 | 2.3452834 | 20 | 7 30.7 | 18.2 |
| 58889 1998 $HW_{144}$ | 16.3 | $X$ | 174.20389 | 140.79412 | 142.12656 | 4.40759 | 0.1324831 | 0.29571356 | 2.2312859 | 20 | — | — |
| 58890 1998 $HS_{145}$ | 14.8 | $X$ | 70.73306 | 178.27582 | 76.45069 | 10.08592 | 0.0522047 | 0.19153857 | 2.9805647 | 20 | 9 20.2 | 19.1 |
| 58891 1998 $HT_{145}$ | 15.2 | $X$ | 186.26424 | 43.25467 | 85.92924 | 8.37900 | 0.1372281 | 0.23708844 | 2.5854083 | 20 | 8 25.5 | 19.3 |
| 58892 1998 $HP_{148}$ | 14.3 | $X$ | 325.31125 | 205.29982 | 53.73757 | 19.05866 | 0.1269107 | 0.17749219 | 3.1358111 | 20 | 4 20.7 | 18.4 |
| 58893 1998 $HQ_{153}$ | 14.3 | $X$ | 64.75644 | 56.71205 | 145.28771 | 17.08959 | 0.1449784 | 0.18488143 | 3.0516907 | 20 | 7 13.2 | 18.6 |
| 58894 1998 $HK_{155}$ | 15.4 | $X$ | 25.72088 | 216.85585 | 74.02297 | 5.27694 | 0.1765694 | 0.23544194 | 2.5974478 | 20 | 9 28.7 | 18.4 |
| 58895 1998 $JS_{3}$ | 14.2 | $X$ | 84.89069 | 349.56002 | 148.88788 | 5.84056 | 0.1058217 | 0.17815832 | 3.1279897 | 20 | 5 14.7 | 18.6 |
| 58896 Schlosser | 14.6 | $X$ | 308.86575 | 23.78771 | 235.28227 | 12.97384 | 0.1591836 | 0.21999043 | 2.7176918 | 20 | 3 7.2 | 18.5 |
| 58897 1998 $KZ$ | 15.5 | $X$ | 284.60008 | 306.50199 | 48.91930 | 22.93853 | 0.0664333 | 0.36290582 | 1.9465852 | 20 | 7 10.7 | 17.9 |
| 58898 1998 $KH_{4}$ | 14.4 | $X$ | 255.09205 | 84.14496 | 195.84833 | 1.53506 | 0.1458651 | 0.17107256 | 3.2137775 | 20 | 2 13.2 | 19.3 |
| 58899 1998 $KD_{7}$ | 13.7 | $X$ | 65.29731 | 56.78910 | 77.06751 | 17.95922 | 0.0463545 | 0.17493666 | 3.1662765 | 20 | 4 12.7 | 18.4 |
| 58900 1998 $KM_{7}$ | 13.8 | $X$ | 330.32728 | 162.92853 | 74.93999 | 13.14505 | 0.0937795 | 0.17607592 | 3.1526039 | 20 | 4 6.3 | 18.1 |
| 58901 1998 $KX_{8}$ | 14.7 | $X$ | 296.76283 | 106.91497 | 129.38477 | 8.91642 | 0.1801468 | 0.21572888 | 2.7533654 | 20 | 1 26.5 | 18.6 |
| 58902 1998 $KC_{9}$ | 13.9 | $X$ | 327.43288 | 106.65239 | 182.69984 | 16.05569 | 0.2317779 | 0.17988686 | 3.1079195 | 20 | 5 17.5 | 17.6 |
| 58903 1998 $KC_{10}$ | 16.0 | $X$ | 95.05466 | 113.73043 | 172.51340 | 2.95764 | 0.1830941 | 0.28389047 | 2.2928141 | 20 | 12 18.4 | 19.5 |
| 58904 1998 $KV_{10}$ | 14.6 | $X$ | 159.12683 | 7.50631 | 126.66805 | 10.91647 | 0.0384837 | 0.18648995 | 3.0341177 | 20 | 7 27.6 | 19.0 |
| 58905 1998 $KE_{11}$ | 14.3 | $X$ | 319.44442 | 128.74148 | 152.92048 | 14.46597 | 0.1118736 | 0.17837810 | 3.1254198 | 20 | 5 11.8 | 18.6 |
| 58906 1998 $KN_{18}$ | 13.2 | $X$ | 203.03485 | 155.22164 | 236.21919 | 21.22446 | 0.1121527 | 0.17931647 | 3.1145066 | 20 | 5 6.4 | 18.1 |
| 58907 1998 $KM_{22}$ | 15.5 | $X$ | 11.82589 | 108.10776 | 184.05506 | 3.46537 | 0.1901217 | 0.23060343 | 2.6336549 | 20 | 9 2.3 | 18.0 |
| 58908 1998 $KM_{29}$ | 14.0 | $X$ | 280.34891 | 56.47727 | 200.69590 | 9.56770 | 0.0460834 | 0.17162870 | 3.2068312 | 20 | 2 22.6 | 18.6 |
| 58909 1998 $KP_{30}$ | 14.0 | $X$ | 34.68758 | 137.13271 | 50.94272 | 18.37308 | 0.1147701 | 0.17802326 | 3.1295715 | 20 | 5 7.2 | 17.8 |
| 58910 1998 $KE_{32}$ | 16.2 | $X$ | 329.10850 | 234.83212 | 67.87675 | 4.45546 | 0.2394770 | 0.22522045 | 2.6754541 | 20 | 6 5.5 | 18.5 |
| 58911 1998 $KO_{33}$ | 15.7 | $X$ | 78.16963 | 23.58392 | 248.41354 | 3.76430 | 0.1984017 | 0.23638008 | 2.5905708 | 20 | 11 8.2 | 19.6 |
| 58912 1998 $KN_{34}$ | 13.9 | $X$ | 304.03333 | 161.30389 | 75.85414 | 20.45973 | 0.1634887 | 0.17187940 | 3.2037123 | 20 | 2 21.1 | 18.7 |
| 58913 1998 $KY_{34}$ | 15.1 | $X$ | 189.89564 | 143.02671 | 169.32017 | 4.33405 | 0.0928466 | 0.21018371 | 2.8015821 | 20 | 1 17.3 | 19.4 |
| 58914 1998 $KE_{41}$ | 13.7 | $X$ | 60.01145 | 319.10663 | 241.73267 | 17.06559 | 0.1048314 | 0.18202304 | 3.0835558 | 20 | 6 27.1 | 18.0 |
| 58915 1998 $KA_{50}$ | 13.7 | $X$ | 12.81738 | 188.61001 | 90.17297 | 14.68495 | 0.2682271 | 0.18412085 | 3.0600891 | 20 | 8 24.5 | 17.0 |
| 58916 1998 $KM_{50}$ | 14.5 | $X$ | 315.94598 | 116.32690 | 175.83154 | 16.75893 | 0.1812167 | 0.17892505 | 3.1190472 | 20 | 5 9.3 | 18.6 |
| 58917 1998 $KP_{53}$ | 14.4 | $X$ | 315.65590 | 127.88546 | 130.50674 | 10.93367 | 0.1703567 | 0.17577905 | 3.1561525 | 20 | 3 28.8 | 18.6 |
| 58918 1998 $KB_{54}$ | 15.0 | $X$ | 172.72668 | 346.57367 | 154.64447 | 9.73394 | 0.0686694 | 0.23302603 | 2.6153697 | 20 | 8 25.4 | 18.8 |
| 58919 1998 $KF_{55}$ | 14.3 | $X$ | 316.41676 | 81.34757 | 213.60342 | 15.44081 | 0.2336983 | 0.17769745 | 3.1333957 | 20 | 5 2.9 | 17.9 |
| 58920 1998 $KJ_{56}$ | 16.0 | $X$ | 6.17400 | 167.14018 | 197.49903 | 20.85460 | 0.0759322 | 0.37183775 | 1.9152864 | 20 | 12 27.8 | 18.5 |
| 58921 1998 $KH_{58}$ | 14.5 | $X$ | 317.29829 | 245.37675 | 35.60168 | 16.99850 | 0.2102922 | 0.17890102 | 3.1193266 | 20 | 4 20.2 | 18.4 |
| 58922 1998 $KK_{58}$ | 15.1 | $X$ | 178.08510 | 261.18131 | 356.74883 | 1.67141 | 0.0957936 | 0.20303661 | 2.8669480 | 20 | — | — |
| 58923 1998 $KJ_{62}$ | 14.3 | $X$ | 53.22412 | 298.87644 | 227.23446 | 22.30988 | 0.1627556 | 0.17970847 | 3.1099759 | 20 | 5 13.0 | 18.0 |
| 58924 1998 $KF_{67}$ | 15.0 | $X$ | 128.90811 | 184.76417 | 107.60497 | 15.10474 | 0.2459918 | 0.24453761 | 2.5326331 | 20 | — | — |
| 58925 1998 $LZ_{2}$ | 13.6 | $X$ | 35.80119 | 325.89723 | 221.75274 | 15.45858 | 0.1662084 | 0.17605597 | 3.1528421 | 20 | 5 13.8 | 17.2 |
| 58926 1998 $MO_{1}$ | 15.6 | $X$ | 40.26288 | 285.96058 | 182.73724 | 4.90338 | 0.1180679 | 0.21389269 | 2.7691007 | 20 | 1 25.4 | 18.7 |
| 58927 1998 $MB_{10}$ | 15.8 | $X$ | 252.61017 | 83.34591 | 182.49453 | 9.60627 | 0.1111841 | 0.30097500 | 2.2052057 | 20 | 1 10.1 | 19.1 |
| 58928 1998 $MP_{18}$ | 14.6 | $X$ | 345.40319 | 353.54602 | 345.03133 | 1.29648 | 0.1863819 | 0.18106838 | 3.0943847 | 20 | 9 5.5 | 17.8 |
| 58929 1998 $MU_{30}$ | 13.3 | $X$ | 233.34486 | 287.44320 | 69.86349 | 22.50968 | 0.1172652 | 0.17661862 | 3.1461425 | 20 | 5 2.8 | 18.3 |
| 58930 1998 $MK_{31}$ | 15.4 | $X$ | 338.21356 | 158.89086 | 107.16705 | 2.84642 | 0.2313118 | 0.22035497 | 2.7146936 | 20 | 5 2.7 | 17.8 |
| 58931 Palmys | 11.6 | $X$ | 326.13666 | 134.13413 | 119.56840 | 16.40992 | 0.1001324 | 0.08168655 | 5.2606050 | 20 | 4 25.3 | 18.4 |
| 58932 1998 $OF_{7}$ | 15.6 | $X$ | 199.77432 | 12.00129 | 288.57839 | 5.96638 | 0.1996506 | 0.29407489 | 2.2395671 | 20 | 1 5.9 | 19.1 |
| 58933 1998 $ON_{10}$ | 15.9 | $X$ | 175.08565 | 67.87055 | 298.28099 | 1.28627 | 0.2561471 | 0.25152321 | 2.4855204 | 20 | 3 10.4 | 20.3 |
| 58934 1998 $OK_{13}$ | 15.5 | $X$ | 117.04008 | 294.08512 | 130.83295 | 6.24261 | 0.1057089 | 0.29695015 | 2.2250871 | 20 | 3 12.1 | 18.1 |
| 58935 1998 $ON_{14}$ | 15.1 | $X$ | 210.66160 | 302.00685 | 113.48711 | 3.26849 | 0.1887446 | 0.26075130 | 2.4265267 | 20 | 6 9.7 | 19.1 |
| 58936 1998 $PJ_{1}$ | 16.1 | $X$ | 95.78380 | 153.62415 | 93.40793 | 3.22543 | 0.1206621 | 0.27565151 | 2.3382761 | 20 | 10 26.6 | 19.5 |
| 58937 1998 $QL_{6}$ | 15.4 | $X$ | 18.36235 | 221.03152 | 193.24281 | 3.41236 | 0.1953883 | 0.23199946 | 2.6230792 | 20 | — | — |
| 58938 1998 $QJ_{18}$ | 15.1 | $X$ | 320.53922 | 230.26235 | 146.83885 | 14.07674 | 0.2670405 | 0.22474073 | 2.6792600 | 20 | 9 13.7 | 17.1 |
| 58939 1998 $QY_{20}$ | 16.1 | $X$ | 261.33286 | 65.95256 | 267.70489 | 1.04602 | 0.2190114 | 0.25950143 | 2.4343119 | 20 | 4 10.5 | 19.9 |
| 58940 1998 $QP_{21}$ | 16.1 | $X$ | 42.77677 | 315.48620 | 12.41880 | 2.60014 | 0.0834010 | 0.32220600 | 2.1072382 | 20 | 12 15.0 | 18.6 |
| 58941 1998 $QK_{29}$ | 16.0 | $X$ | 155.81283 | 135.34498 | 281.77098 | 5.81158 | 0.1207656 | 0.25478546 | 2.4642586 | 20 | 4 16.5 | 19.8 |
| 58942 1998 $QH_{33}$ | 15.5 | $X$ | 67.79199 | 86.45993 | 278.06074 | 3.59768 | 0.1392317 | 0.28301180 | 2.2975573 | 20 | — | — |
| 58943 1998 $QF_{37}$ | 15.5 | $X$ | 79.36307 | 182.62861 | 203.98283 | 4.61987 | 0.3089642 | 0.23988072 | 2.5653058 | 20 | 1 2.9 | 17.9 |
| 58944 1998 $QO_{41}$ | 15.7 | $X$ | 215.47408 | 333.86586 | 332.71606 | 3.80936 | 0.0649871 | 0.29527849 | 2.2334771 | 20 | 1 26.5 | 18.6 |
| 58945 1998 $QY_{43}$ | 15.6 | $X$ | 277.26605 | 253.24051 | 16.20995 | 3.92221 | 0.0363149 | 0.29849430 | 2.2174067 | 20 | 2 24.7 | 18.1 |
| 58946 1998 $QY_{51}$ | 15.5 | $X$ | 301.13415 | 169.34312 | 238.12772 | 4.73319 | 0.1476876 | 0.27023773 | 2.3694019 | 20 | 10 7.1 | 17.8 |
| 58947 1998 $QX_{52}$ | 16.2 | $X$ | 121.33677 | 175.65193 | 191.49449 | 12.58113 | 0.3170015 | 0.24301778 | 2.5431815 | 20 | 1 31.2 | 20.3 |
| 58948 1998 $QT_{54}$ | 14.2 | $X$ | 239.08859 | 227.17903 | 203.53869 | 5.59368 | 0.0640590 | 0.26484174 | 2.4014770 | 20 | 8 13.5 | 17.3 |
| 58949 1998 $QK_{63}$ | 16.0 | $X$ | 321.81846 | 184.79122 | 210.81192 | 5.15321 | 0.1306203 | 0.31671021 | 2.1315458 | 20 | 11 19.8 | 17.4 |
| 58950 1998 $QE_{69}$ | 15.9 | $X$ | 21.19149 | 129.77672 | 197.38574 | 8.53242 | 0.2491203 | 0.27400096 | 2.3476571 | 20 | 11 30.1 | 18.7 |
| 58951 1998 $QD_{72}$ | 14.2 | $X$ | 2.32307 | 71.82647 | 237.90343 | 10.48471 | 0.2662026 | 0.22478317 | 2.6789227 | 20 | 9 13.3 | 16.7 |
| 58952 1998 $QO_{74}$ | 14.1 | $X$ | 0.67682 | 131.71721 | 285.06258 | 11.47354 | 0.1406817 | 0.23386898 | 2.6090814 | 20 | — | — |
| 58953 1998 $QC_{75}$ | 13.6 | $X$ | 197.10572 | 65.97881 | 237.67566 | 9.03207 | 0.1153407 | 0.15672534 | 3.4070348 | 20 | 1 19.7 | 19.1 |
| 58954 1998 $QE_{76}$ | 14.9 | $X$ | 329.70699 | 64.58389 | 234.53798 | 7.79271 | 0.2675804 | 0.21944242 | 2.7222144 | 20 | 5 28.1 | 17.3 |
| 58955 1998 $QG_{78}$ | 15.8 | $X$ | 27.66543 | 236.46492 | 236.35822 | 6.12765 | 0.1278330 | 0.29010992 | 2.2599266 | 20 | — | — |
| 58956 1998 $QG_{90}$ | 13.4 | $X$ | 36.41547 | 338.77017 | 301.51968 | 16.21072 | 0.1850397 | 0.17840932 | 3.1250552 | 20 | 9 10.4 | 17.6 |
| 58957 1998 $QE_{91}$ | 14.4 | $X$ | 333.00021 | 302.66817 | 8.16709 | 21.34354 | 0.3539572 | 0.17500008 | 3.1655115 | 20 | 6 1.8 | 17.8 |
| 58958 1998 $QL_{97}$ | 16.6 | $X$ | 59.24893 | 104.14866 | 184.75336 | 22.00073 | 0.1153108 | 0.36528769 | 1.9381142 | 20 | 11 27.7 | 19.4 |
| 58959 1998 $QD_{98}$ | 15.2 | $X$ | 181.18536 | 205.42440 | 135.11314 | 5.30373 | 0.1925403 | 0.29383646 | 2.2407785 | 20 | 2 7.8 | 18.7 |
| 58960 1998 $QH_{99}$ | 15.8 | $X$ | 285.69300 | 353.83609 | 45.84042 | 3.19746 | 0.1896903 | 0.26692936 | 2.3889395 | 20 | 8 21.9 | 18.1 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| | Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | m | | ° | ° | ° | ° | | ° | | | | |
| 58961 | 1998 $QG_{100}$ | 16.0 | X | 20.38696 | 266.64733 | 147.57641 | 7.33920 | 0.2057088 | 0.28027098 | 2.3125118 | 20 | — | — |
| 58962 | 1998 $QJ_{100}$ | 15.1 | X | 197.01061 | 254.94150 | 14.39823 | 7.07356 | 0.1034499 | 0.28811396 | 2.2703519 | 20 | — | — |
| 58963 | 1998 $QR_{100}$ | 15.2 | X | 21.83416 | 187.36891 | 128.16123 | 4.37789 | 0.1917262 | 0.22657736 | 2.6647617 | 20 | 10 26.2 | 18.3 |
| 58964 | 1998 $QJ_{104}$ | 14.0 | X | 54.78291 | 292.77793 | 9.89965 | 11.80964 | 0.2773952 | 0.18416842 | 3.0595621 | 20 | 11 19.5 | 18.7 |
| 58965 | 1998 $RO_2$ | 14.3 | X | 49.18622 | 170.79867 | 153.79443 | 11.57010 | 0.1324203 | 0.18388072 | 3.0627526 | 20 | 11 26.2 | 18.8 |
| 58966 | 1998 $RW_3$ | 15.5 | X | 344.55599 | 236.70655 | 174.94959 | 17.14313 | 0.2349923 | 0.23000413 | 2.6382278 | 20 | — | — |
| 58967 | 1998 $RR_5$ | 16.6 | X | 290.39411 | 192.88230 | 177.65941 | 2.41033 | 0.2358198 | 0.26422331 | 2.4052227 | 20 | 7 5.5 | 19.2 |
| 58968 | 1998 $RJ_6$ | 14.7 | X | 190.03059 | 223.02277 | 345.84877 | 4.63203 | 0.0827216 | 0.28023365 | 2.3127172 | 20 | 12 18.8 | 17.7 |
| 58969 | 1998 $RO_6$ | 15.1 | X | 216.80510 | 194.14851 | 226.44520 | 4.48624 | 0.1530782 | 0.26143608 | 2.4222876 | 20 | 6 24.5 | 18.7 |
| 58970 | 1998 $RZ_8$ | 15.1 | X | 74.13592 | 197.79647 | 166.11377 | 3.65504 | 0.1642867 | 0.19274699 | 2.9680940 | 20 | — | — |
| 58971 | 1998 $RE_{11}$ | 16.1 | X | 153.76247 | 109.67597 | 178.99083 | 0.39026 | 0.1279046 | 0.28396544 | 2.2924105 | 20 | — | — |
| 58972 | 1998 $RO_{16}$ | 14.6 | X | 352.11217 | 129.42583 | 176.84990 | 11.66961 | 0.2110674 | 0.22356240 | 2.6886661 | 20 | 8 9.2 | 17.0 |
| 58973 | 1998 $RX_{16}$ | 15.7 | X | 94.14330 | 202.06351 | 174.05457 | 7.70301 | 0.2284807 | 0.24192896 | 2.5508063 | 20 | — | — |
| 58974 | 1998 $RP_{22}$ | 16.1 | X | 241.80757 | 188.73947 | 194.43165 | 0.74942 | 0.1852770 | 0.26087133 | 2.4257822 | 20 | 5 29.3 | 19.8 |
| 58975 | 1998 $RD_{31}$ | 14.6 | X | 93.98808 | 349.60727 | 296.42175 | 5.25101 | 0.0858729 | 0.18655907 | 3.0333683 | 20 | 11 21.2 | 19.1 |
| 58976 | 1998 $RD_{34}$ | 15.7 | X | 82.07921 | 202.40518 | 124.02195 | 5.80672 | 0.1543903 | 0.23531006 | 2.5984182 | 20 | — | — |
| 58977 | 1998 $RK_{38}$ | 14.4 | X | 50.80582 | 341.82556 | 353.15810 | 8.81989 | 0.1328767 | 0.18621258 | 3.0371299 | 20 | 12 7.3 | 18.8 |
| 58978 | 1998 $RG_{40}$ | 15.4 | X | 62.02804 | 278.33275 | 78.98868 | 3.77550 | 0.2469554 | 0.23527056 | 2.5987091 | 20 | — | — |
| 58979 | 1998 $RE_{46}$ | 15.5 | X | 293.19664 | 135.93254 | 293.53880 | 2.74796 | 0.2134225 | 0.27060825 | 2.3672386 | 20 | 10 17.2 | 17.5 |
| 58980 | 1998 $RG_{47}$ | 15.4 | X | 232.44560 | 107.52471 | 215.25649 | 5.49749 | 0.2657524 | 0.29946286 | 2.2126229 | 20 | 2 24.8 | 19.2 |
| 58981 | 1998 $RZ_{56}$ | 16.1 | X | 332.31941 | 235.52942 | 188.21755 | 3.11441 | 0.2711498 | 0.22909865 | 2.6451747 | 20 | — | — |
| 58982 | 1998 $RF_{63}$ | 15.8 | X | 39.96118 | 317.59725 | 54.67238 | 3.81989 | 0.2672274 | 0.27863887 | 2.3215333 | 20 | — | — |
| 58983 | 1998 $RF_{66}$ | 16.1 | X | 258.41489 | 180.47224 | 225.81668 | 1.09965 | 0.1537236 | 0.26343089 | 2.4100437 | 20 | 7 23.9 | 19.1 |
| 58984 | 1998 $RU_{69}$ | 15.2 | X | 278.78995 | 300.88882 | 161.66404 | 3.81814 | 0.1036120 | 0.27367622 | 2.3495139 | 20 | 11 26.1 | 17.7 |
| 58985 | 1998 $RL_{72}$ | 15.3 | X | 318.70265 | 55.42712 | 13.46324 | 5.02133 | 0.0972584 | 0.27442208 | 2.3452547 | 20 | 12 16.9 | 17.8 |
| 58986 | 1998 $RO_{72}$ | 16.0 | X | 13.03864 | 177.71423 | 156.31047 | 2.67062 | 0.2229722 | 0.27201327 | 2.3590799 | 20 | 11 22.4 | 18.4 |
| 58987 | 1998 $RU_{74}$ | 15.7 | X | 42.15369 | 207.57297 | 199.74527 | 4.38821 | 0.0959441 | 0.28217155 | 2.3021162 | 20 | — | — |
| 58988 | 1998 $RD_{75}$ | 14.1 | X | 349.69054 | 148.24835 | 179.14803 | 5.24711 | 0.1605325 | 0.17623890 | 3.1506599 | 20 | 8 27.0 | 17.7 |
| 58989 | 1998 $RN_{80}$ | 15.5 | X | 188.50056 | 221.92749 | 183.39716 | 5.97273 | 0.1228821 | 0.25453183 | 2.4658954 | 20 | 5 9.1 | 19.3 |
| 58990 | 1998 $SA_2$ | 15.8 | X | 28.70348 | 353.28483 | 87.77302 | 5.65137 | 0.2703211 | 0.23694953 | 2.5864186 | 20 | — | — |
| 58991 | 1998 $SJ_4$ | 15.7 | X | 225.65055 | 29.84306 | 29.12084 | 1.71326 | 0.2130132 | 0.26095649 | 2.4252545 | 20 | 6 26.6 | 19.5 |
| 58992 | 1998 $SH_8$ | 15.9 | X | 139.51263 | 16.12934 | 331.04177 | 0.35892 | 0.2371888 | 0.28887074 | 2.2663850 | 20 | 1 12.2 | 18.8 |
| 58993 | 1998 $SF_9$ | 14.5 | X | 59.92467 | 253.01952 | 62.93111 | 0.65605 | 0.2118291 | 0.18428164 | 3.0583088 | 20 | 12 5.6 | 19.1 |
| 58994 | 1998 $SY_9$ | 15.8 | X | 331.05333 | 194.53045 | 231.23786 | 1.31093 | 0.1930625 | 0.27519528 | 2.3408598 | 20 | — | — |
| 58995 | 1998 $SY_{16}$ | 15.7 | X | 217.88443 | 276.56031 | 74.59448 | 0.82069 | 0.2161135 | 0.25385169 | 2.4702980 | 20 | 3 25.9 | 19.8 |
| 58996 | 1998 $SM_{17}$ | 15.5 | X | 68.72238 | 232.68024 | 163.99060 | 4.83098 | 0.1893524 | 0.23846802 | 2.5754272 | 20 | — | — |
| 58997 | 1998 $SG_{20}$ | 15.6 | X | 327.09174 | 147.39342 | 177.39743 | 5.87502 | 0.0435278 | 0.21930115 | 2.7233834 | 20 | 7 23.5 | 19.1 |
| 58998 | 1998 $SK_{21}$ | 14.8 | X | 346.47433 | 91.24934 | 187.89679 | 13.01664 | 0.1618662 | 0.21609664 | 2.7502407 | 20 | 6 16.2 | 17.9 |
| 58999 | 1998 $SP_{23}$ | 15.5 | X | 249.20683 | 18.96590 | 44.10054 | 7.83150 | 0.0828063 | 0.26518079 | 2.3994296 | 20 | 8 20.1 | 18.6 |
| 59000 | Beiguan | 16.4 | X | 150.94354 | 96.84927 | 359.56194 | 4.79000 | 0.1199719 | 0.30066134 | 2.2067391 | 20 | 6 4.0 | 19.5 |
| 59001 | Senftenberg | 15.2 | X | 91.75839 | 317.60067 | 41.77741 | 8.58619 | 0.2190622 | 0.23791748 | 2.5793987 | 20 | — | — |
| 59002 | 1998 $SZ_{36}$ | 15.3 | X | 67.22472 | 159.45782 | 39.88538 | 1.22080 | 0.1009812 | 0.25956727 | 2.4339002 | 20 | 7 11.0 | 18.1 |
| 59003 | 1998 $SL_{43}$ | 16.6 | X | 3.46685 | 182.57327 | 221.76740 | 1.78685 | 0.2268383 | 0.27581305 | 2.3373631 | 20 | — | — |
| 59004 | 1998 $SO_{43}$ | 14.5 | X | 16.49507 | 76.95608 | 227.87272 | 0.76992 | 0.1750886 | 0.17866828 | 3.1220348 | 20 | 9 17.5 | 18.2 |
| 59005 | 1998 $SW_{54}$ | 15.4 | X | 90.06987 | 135.08255 | 167.40634 | 3.41090 | 0.2380412 | 0.23392401 | 2.6086722 | 20 | 12 27.6 | 19.7 |
| 59006 | 1998 $SX_{58}$ | 15.6 | X | 158.36296 | 327.22321 | 9.04593 | 4.23304 | 0.2255288 | 0.24478868 | 2.5309011 | 20 | 1 22.1 | 19.6 |
| 59007 | 1998 $SF_{63}$ | 15.4 | X | 69.64666 | 291.80272 | 85.32400 | 4.20283 | 0.1829947 | 0.28313283 | 2.2969025 | 20 | — | — |
| 59008 | 1998 $SS_{63}$ | 14.9 | X | 15.75355 | 51.60972 | 348.08202 | 8.72935 | 0.2106249 | 0.23244681 | 2.6197126 | 20 | — | — |
| 59009 | 1998 $SZ_{65}$ | 15.3 | X | 152.79045 | 200.84950 | 53.33816 | 7.72621 | 0.0891979 | 0.27710185 | 2.3301100 | 20 | — | — |
| 59010 | 1998 $SX_{67}$ | 15.5 | X | 136.28675 | 19.87029 | 290.50436 | 6.94676 | 0.1960843 | 0.24106357 | 2.5569074 | 20 | — | — |
| 59011 | 1998 $SD_{71}$ | 16.4 | X | 6.56631 | 276.08780 | 74.94307 | 2.06523 | 0.0415251 | 0.31620838 | 2.1338004 | 20 | 11 18.4 | 18.4 |
| 59012 | 1998 $SW_{71}$ | 14.1 | X | 319.94180 | 191.87313 | 189.91515 | 14.48183 | 0.1094017 | 0.17667576 | 3.1454642 | 20 | 9 17.7 | 18.1 |
| 59013 | 1998 $SL_{72}$ | 14.2 | X | 284.90642 | 357.25494 | 155.80021 | 3.50115 | 0.1255540 | 0.23294108 | 2.6160056 | 20 | — | — |
| 59014 | 1998 $SC_{74}$ | 16.3 | X | 256.53119 | 331.64664 | 83.46134 | 3.25996 | 0.1956976 | 0.26270043 | 2.4145091 | 20 | 7 28.3 | 19.5 |
| 59015 | 1998 $SH_{74}$ | 15.4 | X | 76.19695 | 30.01501 | 54.85677 | 5.35692 | 0.2653937 | 0.24223149 | 2.5486820 | 20 | 3 14.6 | 18.2 |
| 59016 | 1998 $SX_{76}$ | 15.6 | X | 95.72624 | 129.06333 | 252.01173 | 4.08640 | 0.3112056 | 0.24102389 | 2.5571880 | 20 | 1 21.5 | 18.8 |
| 59017 | 1998 $ST_{77}$ | 15.9 | X | 267.23804 | 331.29042 | 80.30444 | 3.39529 | 0.1570407 | 0.26597430 | 2.3946549 | 20 | 8 14.6 | 18.7 |
| 59018 | 1998 $SH_{80}$ | 16.2 | X | 314.59617 | 220.77035 | 223.39647 | 4.76907 | 0.2012968 | 0.27480589 | 2.3430705 | 20 | — | — |
| 59019 | 1998 $SM_{83}$ | 15.3 | X | 282.13131 | 218.95251 | 188.24378 | 5.88516 | 0.1009922 | 0.22194899 | 2.7016802 | 20 | 8 31.8 | 18.6 |
| 59020 | 1998 $SX_{86}$ | 15.4 | X | 70.97966 | 222.72585 | 211.34664 | 7.09232 | 0.0799541 | 0.24373441 | 2.5381940 | 20 | 1 18.1 | 18.5 |
| 59021 | 1998 $SN_{94}$ | 16.4 | X | 252.50121 | 201.47555 | 143.30565 | 3.72219 | 0.1991805 | 0.25785420 | 2.4446681 | 20 | 4 20.1 | 20.2 |
| 59022 | 1998 $SC_{100}$ | 15.9 | X | 21.53475 | 143.55926 | 273.40269 | 4.52397 | 0.1332425 | 0.28009006 | 2.3135075 | 20 | — | — |
| 59023 | 1998 $SV_{103}$ | 16.2 | X | 233.99613 | 2.98875 | 42.43681 | 3.81234 | 0.2094691 | 0.30566274 | 2.1826011 | 20 | 6 17.9 | 19.4 |
| 59024 | 1998 $SB_{106}$ | 16.2 | X | 351.97847 | 303.45612 | 152.17678 | 3.04117 | 0.1517789 | 0.28061576 | 2.3106172 | 20 | — | — |
| 59025 | 1998 $SX_{110}$ | 16.3 | X | 153.42733 | 222.86166 | 206.03703 | 7.49477 | 0.1134248 | 0.29823432 | 2.2186952 | 20 | 4 30.7 | 19.4 |
| 59026 | 1998 $SS_{111}$ | 16.4 | X | 256.79810 | 264.80042 | 159.51789 | 2.43603 | 0.1799966 | 0.26442004 | 2.4040296 | 20 | 8 12.2 | 19.3 |
| 59027 | 1998 $SO_{115}$ | 15.8 | X | 120.51492 | 310.62516 | 5.57126 | 3.23634 | 0.2348878 | 0.23777391 | 2.5804369 | 20 | — | — |
| 59028 | 1998 $SV_{117}$ | 15.1 | X | 205.97642 | 77.29198 | 327.29084 | 2.32266 | 0.1664171 | 0.25608427 | 2.4559194 | 20 | 5 22.3 | 18.9 |
| 59029 | 1998 $SP_{118}$ | 16.0 | X | 336.21880 | 161.76657 | 198.90626 | 1.87636 | 0.2386105 | 0.22325837 | 2.6911065 | 20 | 9 28.8 | 17.8 |
| 59030 | 1998 $SB_{122}$ | 15.6 | X | 230.94719 | 56.58337 | 309.36750 | 2.20984 | 0.0760677 | 0.25540672 | 2.4602610 | 20 | 5 3.9 | 19.0 |
| 59031 | 1998 $SM_{124}$ | 16.2 | X | 230.33980 | 5.98483 | 57.88096 | 1.33756 | 0.1203987 | 0.30693078 | 2.1765856 | 20 | 7 20.8 | 18.7 |
| 59032 | 1998 $SG_{125}$ | 15.9 | X | 356.86259 | 258.41254 | 165.96921 | 6.68930 | 0.0826182 | 0.27808177 | 2.3246328 | 20 | — | — |
| 59033 | 1998 $SQ_{127}$ | 16.4 | X | 31.39221 | 317.45043 | 82.13259 | 3.39588 | 0.2315085 | 0.27895402 | 2.3197845 | 20 | — | — |
| 59034 | 1998 $SO_{128}$ | 15.6 | X | 294.46423 | 313.53147 | 62.36516 | 3.27217 | 0.0862612 | 0.21897072 | 2.7261224 | 20 | 8 11.8 | 18.9 |
| 59035 | 1998 $SF_{134}$ | 15.7 | X | 349.45664 | 337.11976 | 23.68854 | 3.01200 | 0.1743845 | 0.27021060 | 2.3695605 | 20 | 11 9.2 | 17.6 |
| 59036 | 1998 $SD_{135}$ | 14.1 | X | 77.93163 | 107.23897 | 181.64310 | 8.98331 | 0.2753046 | 0.18408770 | 3.0604565 | 20 | 11 28.7 | 19.2 |
| 59037 | 1998 $SU_{140}$ | 15.6 | X | 36.98619 | 163.03961 | 212.31324 | 4.11038 | 0.1160084 | 0.27718922 | 2.3296204 | 20 | — | — |
| 59038 | 1998 $SG_{147}$ | 15.9 | X | 83.68864 | 5.36685 | 23.45552 | 8.18399 | 0.1740660 | 0.28412749 | 2.2915388 | 20 | — | — |
| 59039 | 1998 $SS_{156}$ | 16.1 | X | 84.98620 | 44.03522 | 280.01948 | 1.82682 | 0.0783079 | 0.32361785 | 2.1011049 | 20 | — | — |
| 59040 | 1998 $SR_{160}$ | 15.5 | X | 298.79262 | 16.23960 | 41.87452 | 3.76817 | 0.0460810 | 0.22450677 | 2.6811210 | 20 | 10 19.6 | 18.7 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59041 1998 $SS_{161}$ | 15.4 | $X$ | 232.87758 | 276.18160 | 144.92974 | 2.51272 | 0.2004138 | 0.26029668 | 2.4293512 | 20 | 7 7.6 | 19.1 |
| 59042 1998 $SW_{162}$ | 16.2 | $X$ | 42.29719 | 209.01276 | 206.02487 | 3.93591 | 0.1953090 | 0.23589308 | 2.5941351 | 20 | — | — |
| 59043 1998 $SF_{167}$ | 15.5 | $X$ | 112.17943 | 207.72185 | 131.60164 | 6.60356 | 0.2286039 | 0.23983091 | 2.5656610 | 20 | — | — |
| 59044 1998 $SV_{169}$ | 15.0 | $X$ | 240.59343 | 237.54603 | 226.91297 | 10.04302 | 0.1355923 | 0.22286361 | 2.6942834 | 20 | 9 13.0 | 19.0 |
| 59045 1998 $TR_2$ | 16.3 | $X$ | 50.88382 | 44.44388 | 348.83160 | 2.61194 | 0.1354867 | 0.23462266 | 2.6034910 | 20 | — | — |
| 59046 1998 $TW_{17}$ | 15.6 | $X$ | 252.97196 | 326.41348 | 88.63201 | 2.62600 | 0.1626072 | 0.26151754 | 2.4217845 | 20 | 7 28.3 | 18.8 |
| 59047 1998 $TO_{19}$ | 15.7 | $X$ | 304.10777 | 226.36359 | 228.95109 | 3.11999 | 0.2125426 | 0.27263089 | 2.3555157 | 20 | 12 30.2 | 17.1 |
| 59048 1998 $TH_{22}$ | 16.2 | $X$ | 346.57209 | 126.79959 | 210.00716 | 0.75135 | 0.1970261 | 0.26705193 | 2.3882085 | 20 | 9 27.3 | 18.0 |
| 59049 1998 $TC_{31}$ | 11.7 | $X$ | 266.76002 | 220.28020 | 226.13950 | 24.20671 | 0.1221964 | 0.08434781 | 5.1493630 | 20 | 9 3.1 | 18.9 |
| 59050 1998 $TB_{33}$ | 12.9 | $X$ | 328.37159 | 267.04479 | 48.31854 | 7.17312 | 0.2187141 | 0.12527046 | 3.9558237 | 20 | 6 21.8 | 17.5 |
| 59051 1998 $TJ_{33}$ | 15.8 | $X$ | 19.62972 | 308.07026 | 64.74483 | 3.75557 | 0.1758504 | 0.27437739 | 2.3455093 | 20 | — | — |
| 59052 1998 $TV_{34}$ | 16.0 | $X$ | 7.58547 | 356.52534 | 57.08537 | 3.67891 | 0.1119168 | 0.27698339 | 2.3307744 | 20 | — | — |
| 59053 1998 $UU_1$ | 16.4 | $X$ | 314.96838 | 341.91297 | 112.65584 | 3.30093 | 0.1814346 | 0.26848444 | 2.3797060 | 20 | — | — |
| 59054 1998 $UY_5$ | 15.7 | $X$ | 135.93397 | 296.70492 | 61.44851 | 5.78583 | 0.2802553 | 0.24297914 | 2.5434511 | 20 | 2 3.5 | 19.7 |
| 59055 1998 $UQ_7$ | 14.8 | $X$ | 3.11463 | 67.17383 | 42.55525 | 13.48452 | 0.1230678 | 0.23586664 | 2.5943289 | 20 | — | — |
| 59056 1998 $UK_{16}$ | 15.7 | $X$ | 34.86396 | 241.66128 | 135.21516 | 2.47686 | 0.1052155 | 0.23021405 | 2.6366238 | 20 | — | — |
| 59057 1998 $UO_{18}$ | 15.6 | $X$ | 355.45927 | 13.42193 | 2.00224 | 2.23704 | 0.2197129 | 0.27020944 | 2.3695673 | 20 | 12 20.4 | 17.8 |
| 59058 1998 $UA_{19}$ | 15.0 | $X$ | 216.12403 | 47.55547 | 15.83565 | 5.30672 | 0.0717926 | 0.21312506 | 2.7757459 | 20 | 7 3.6 | 19.1 |
| 59059 1998 $UZ_{22}$ | 15.9 | $X$ | 76.15894 | 181.36521 | 223.48368 | 2.45939 | 0.1930807 | 0.28355287 | 2.2946336 | 20 | — | — |
| 59060 1998 $UE_{25}$ | 16.5 | $X$ | 164.24960 | 312.97605 | 126.07644 | 4.95567 | 0.0866035 | 0.29922018 | 2.2138191 | 20 | 5 26.6 | 19.5 |
| 59061 1998 $UP_{25}$ | 16.3 | $X$ | 166.13948 | 316.57576 | 91.63134 | 4.91206 | 0.0630483 | 0.29621563 | 2.2287639 | 20 | 4 15.7 | 19.2 |
| 59062 1998 $US_{25}$ | 16.2 | $X$ | 232.06333 | 232.98456 | 166.19512 | 6.99324 | 0.1166198 | 0.30340919 | 2.1933952 | 20 | 6 17.4 | 19.2 |
| 59063 1998 $UC_{32}$ | 16.1 | $X$ | 277.50615 | 30.53525 | 63.28779 | 4.55290 | 0.1235563 | 0.26766411 | 2.3845657 | 20 | 11 6.6 | 18.6 |
| 59064 1998 $UB_{33}$ | 15.3 | $X$ | 91.51341 | 83.04249 | 241.29166 | 6.91698 | 0.2132150 | 0.23473556 | 2.6026561 | 20 | — | — |
| 59065 1998 $UB_{43}$ | 15.1 | $X$ | 246.74332 | 356.55233 | 18.92884 | 5.35763 | 0.1215842 | 0.25767323 | 2.4458126 | 20 | 5 30.6 | 18.7 |
| 59066 1998 $VY$ | 16.1 | $X$ | 75.99513 | 20.10442 | 41.57080 | 25.77436 | 0.1511922 | 0.28572259 | 2.2830022 | 20 | 1 12.9 | 19.0 |
| 59067 1998 $VS_1$ | 15.0 | $X$ | 358.50876 | 9.02025 | 43.42906 | 14.81664 | 0.1006735 | 0.22900700 | 2.6458804 | 20 | — | — |
| 59068 1998 $VZ_1$ | 15.6 | $X$ | 60.15995 | 65.48153 | 287.88638 | 0.88534 | 0.0923347 | 0.23034077 | 2.6356567 | 20 | — | — |
| 59069 1998 $VX_3$ | 16.0 | $X$ | 256.38015 | 350.62783 | 71.56830 | 6.63156 | 0.1964202 | 0.26125263 | 2.4234214 | 20 | 8 8.5 | 19.3 |
| 59070 1998 $VG_6$ | 15.0 | $X$ | 309.86624 | 24.58189 | 8.45120 | 6.70761 | 0.2305570 | 0.26673278 | 2.3901131 | 20 | 9 26.2 | 16.6 |
| 59071 1998 $VX_7$ | 14.6 | $X$ | 201.93009 | 214.23083 | 217.07022 | 8.33567 | 0.2050801 | 0.21141349 | 2.7907070 | 20 | 6 19.9 | 19.4 |
| 59072 1998 $VV_9$ | 16.1 | $X$ | 301.97117 | 26.72233 | 309.40487 | 3.88692 | 0.2311763 | 0.30729771 | 2.1748526 | 20 | 6 4.0 | 18.0 |
| 59073 1998 $VL_{13}$ | 14.5 | $X$ | 42.10227 | 274.99988 | 41.70192 | 8.06922 | 0.1920351 | 0.27176342 | 2.3605256 | 20 | 12 1.4 | 17.6 |
| 59074 1998 $VN_{13}$ | 16.2 | $X$ | 98.96090 | 204.70932 | 241.01393 | 4.99456 | 0.1027293 | 0.29171790 | 2.2516143 | 20 | 3 11.3 | 18.9 |
| 59075 1998 $VT_{13}$ | 15.7 | $X$ | 215.53353 | 40.32398 | 13.44245 | 4.60309 | 0.1412923 | 0.30273429 | 2.1966539 | 20 | 6 15.5 | 18.8 |
| 59076 1998 $VT_{14}$ | 14.9 | $X$ | 276.72780 | 134.65900 | 231.00887 | 11.46260 | 0.1275017 | 0.21441003 | 2.7646446 | 20 | 6 23.4 | 18.7 |
| 59077 1998 $VT_{15}$ | 15.0 | $X$ | 57.87221 | 203.02474 | 212.32288 | 8.51356 | 0.1944871 | 0.23722995 | 2.5843800 | 20 | — | — |
| 59078 1998 $VT_{19}$ | 15.2 | $X$ | 117.84029 | 157.48354 | 198.31878 | 11.99749 | 0.2073672 | 0.23964108 | 2.5670158 | 20 | 1 1.5 | 18.9 |
| 59079 1998 $VY_{19}$ | 12.4 | $X$ | 358.42606 | 216.72134 | 69.11203 | 12.41561 | 0.1485737 | 0.12390698 | 3.9847910 | 20 | 7 14.1 | 17.3 |
| 59080 1998 $VU_{21}$ | 15.9 | $X$ | 170.57067 | 19.83291 | 8.20574 | 4.95221 | 0.1287409 | 0.29436280 | 2.2381066 | 20 | 3 25.9 | 19.0 |
| 59081 1998 $VJ_{24}$ | 16.2 | $X$ | 140.62409 | 255.62481 | 185.45739 | 5.05188 | 0.1509931 | 0.29573338 | 2.2311862 | 20 | 5 6.8 | 19.3 |
| 59082 1998 $VJ_{25}$ | 16.1 | $X$ | 180.68594 | 293.74823 | 142.10896 | 1.36282 | 0.1564600 | 0.29999207 | 2.2100200 | 20 | 6 9.2 | 19.5 |
| 59083 1998 $VZ_{25}$ | 15.3 | $X$ | 250.85550 | 340.07540 | 33.30588 | 2.60434 | 0.1967968 | 0.25770541 | 2.4456090 | 20 | 5 24.2 | 18.8 |
| 59084 1998 $VD_{26}$ | 13.8 | $X$ | 302.42259 | 131.05543 | 230.53426 | 15.36726 | 0.1930308 | 0.17086409 | 3.2163911 | 20 | 7 10.5 | 18.1 |
| 59085 1998 $VK_{29}$ | 15.7 | $X$ | 219.29427 | 7.23017 | 64.36623 | 4.88133 | 0.0693172 | 0.30419351 | 2.1896234 | 20 | 7 24.9 | 18.4 |
| 59086 1998 $VJ_{31}$ | 16.0 | $X$ | 75.35859 | 150.84862 | 286.83309 | 1.26857 | 0.2019300 | 0.28520024 | 2.2857889 | 20 | 2 9.8 | 18.0 |
| 59087 Maccacaro | 15.2 | $X$ | 76.84339 | 115.61808 | 322.93795 | 5.25236 | 0.1653750 | 0.28354915 | 2.2946537 | 20 | 2 8.8 | 17.3 |
| 59088 1998 $VW_{35}$ | 16.0 | $X$ | 74.70770 | 32.23609 | 59.95889 | 9.31565 | 0.2376230 | 0.28632323 | 2.2798083 | 20 | 3 14.7 | 18.3 |
| 59089 1998 $VF_{38}$ | 15.8 | $X$ | 293.24626 | 351.45730 | 47.21599 | 3.33281 | 0.1669924 | 0.26502791 | 2.4003522 | 20 | 9 7.5 | 18.2 |
| 59090 1998 $VZ_{41}$ | 15.8 | $X$ | 17.89933 | 142.63530 | 110.36827 | 4.81937 | 0.0981742 | 0.29547267 | 2.2324985 | 20 | 7 11.7 | 17.6 |
| 59091 1998 $VJ_{42}$ | 15.8 | $X$ | 286.24474 | 89.16732 | 39.26446 | 2.92782 | 0.2185545 | 0.27315815 | 2.3524836 | 20 | — | — |
| 59092 1998 $VT_{42}$ | 15.5 | $X$ | 292.92780 | 234.36557 | 44.40565 | 6.31506 | 0.2187035 | 0.29888703 | 2.2154639 | 20 | 3 4.5 | 18.4 |
| 59093 1998 $VE_{47}$ | 14.7 | $X$ | 259.53490 | 28.47150 | 55.20847 | 9.75972 | 0.0239310 | 0.21979799 | 2.7192777 | 20 | 10 5.0 | 18.4 |
| 59094 1998 $VM_{49}$ | 15.7 | $X$ | 115.51288 | 322.04257 | 8.47277 | 0.46563 | 0.1486918 | 0.28223529 | 2.3017695 | 20 | — | — |
| 59095 1998 $WK$ | 15.1 | $X$ | 69.93964 | 142.14947 | 244.07212 | 2.23464 | 0.1314686 | 0.23370994 | 2.6102650 | 20 | — | — |
| 59096 1998 $WT_3$ | 14.2 | $X$ | 332.41121 | 319.91304 | 57.43662 | 10.25177 | 0.1977468 | 0.26748274 | 2.3856435 | 20 | 11 1.9 | 15.9 |
| 59097 1998 $WD_5$ | 16.4 | $X$ | 353.47240 | 236.62942 | 166.25026 | 2.37980 | 0.2101191 | 0.27275627 | 2.3547938 | 20 | — | — |
| 59098 1998 $WN_7$ | 14.5 | $X$ | 241.01432 | 30.36691 | 72.35901 | 10.55375 | 0.1582972 | 0.21825286 | 2.7320968 | 20 | 9 17.6 | 18.6 |
| 59099 1998 $WS_{10}$ | 14.7 | $X$ | 342.43782 | 5.17061 | 44.65444 | 3.13442 | 0.2190808 | 0.22638068 | 2.6663049 | 20 | 12 27.9 | 17.1 |
| 59100 1998 $WA_{11}$ | 14.9 | $X$ | 12.83869 | 302.86386 | 87.10336 | 4.64897 | 0.0903811 | 0.22788938 | 2.6545240 | 20 | — | — |
| 59101 1998 $WB_{13}$ | 15.7 | $X$ | 56.81748 | 62.43790 | 0.82030 | 2.94587 | 0.2325685 | 0.23666474 | 2.5884931 | 20 | — | — |
| 59102 1998 $WC_{14}$ | 15.9 | $X$ | 75.42934 | 55.36944 | 270.84799 | 0.42127 | 0.0810277 | 0.31958483 | 2.1187446 | 20 | — | — |
| 59103 1998 $WF_{15}$ | 15.4 | $X$ | 37.49783 | 256.21557 | 87.92968 | 5.68222 | 0.1113948 | 0.22590178 | 2.6700718 | 20 | 12 10.1 | 18.8 |
| 59104 1998 $WQ_{17}$ | 14.9 | $X$ | 125.69931 | 33.94553 | 251.71726 | 8.26617 | 0.0827293 | 0.22872494 | 2.6480552 | 20 | — | — |
| 59105 1998 $WP_{20}$ | 15.7 | $X$ | 270.29606 | 249.74185 | 142.81441 | 1.72418 | 0.1910370 | 0.26117759 | 2.4238855 | 20 | 7 14.7 | 18.7 |
| 59106 1998 $WF_{23}$ | 15.5 | $X$ | 51.08901 | 148.28573 | 271.92951 | 2.87986 | 0.1617933 | 0.28168131 | 2.3047865 | 20 | — | — |
| 59107 1998 $WF_{27}$ | 15.6 | $X$ | 226.48689 | 276.93664 | 285.97003 | 4.14364 | 0.1239853 | 0.22287246 | 2.6942120 | 20 | — | — |
| 59108 1998 $WG_{27}$ | 15.4 | $X$ | 22.95223 | 40.49159 | 94.53569 | 3.21563 | 0.1048531 | 0.28140850 | 2.3062758 | 20 | 1 17.9 | 17.5 |
| 59109 1998 $WT_{28}$ | 15.9 | $X$ | 272.43431 | 251.63653 | 276.73069 | 5.71214 | 0.0633145 | 0.27144329 | 2.3623812 | 20 | — | — |
| 59110 1998 $WR_{31}$ | 15.2 | $X$ | 166.29409 | 82.08085 | 323.99932 | 7.47481 | 0.1751060 | 0.29380919 | 2.2409171 | 20 | 4 12.9 | 18.7 |
| 59111 1998 $WZ_{33}$ | 15.2 | $X$ | 1.31248 | 328.45581 | 97.45661 | 6.71121 | 0.2232191 | 0.22975077 | 2.6401670 | 20 | — | — |
| 59112 1998 $WN_{35}$ | 13.1 | $X$ | 301.17208 | 116.36786 | 229.91175 | 2.65739 | 0.1892829 | 0.12309546 | 4.0022852 | 20 | 6 20.9 | 18.2 |
| 59113 1998 $XQ$ | 15.5 | $X$ | 70.55605 | 278.89212 | 118.29525 | 0.65007 | 0.1350972 | 0.23327882 | 2.6134800 | 20 | — | — |
| 59114 1998 $XQ_2$ | 16.1 | $X$ | 126.80693 | 138.22716 | 305.52113 | 0.18748 | 0.1092212 | 0.29211913 | 2.2495521 | 20 | 4 18.7 | 19.0 |
| 59115 1998 $XG_3$ | 15.1 | $X$ | 84.30043 | 42.24579 | 348.91917 | 7.52220 | 0.1962681 | 0.28161416 | 2.3051528 | 20 | — | — |
| 59116 1998 $XL_3$ | 15.3 | $X$ | 90.50612 | 350.60580 | 291.48526 | 4.11037 | 0.0094050 | 0.31278377 | 2.1493472 | 20 | 12 3.1 | 17.7 |
| 59117 1998 $XQ_3$ | 14.7 | $X$ | 229.22994 | 19.12788 | 77.30444 | 6.73226 | 0.0251538 | 0.21464759 | 2.7626044 | 20 | 9 10.3 | 18.5 |
| 59118 1998 $XS_5$ | 15.9 | $X$ | 226.63941 | 296.99492 | 161.87302 | 1.24767 | 0.1132148 | 0.26201632 | 2.4187101 | 20 | 8 31.3 | 19.0 |
| 59119 1998 $XU_5$ | 15.5 | $X$ | 286.80254 | 91.35808 | 94.62613 | 2.66112 | 0.0320567 | 0.23557746 | 2.5964516 | 20 | — | — |
| 59120 1998 $XT_8$ | 16.1 | $X$ | 321.54895 | 331.66123 | 105.63252 | 3.25005 | 0.1681388 | 0.27088564 | 2.3656222 | 20 | — | — |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59121 1998 $XR_{10}$ | 15.8 | $X$ | 301.20115 | 167.07166 | 281.25869 | 0.57054 | 0.1393182 | 0.26545864 | 2.3977550 | 20 | 12 10.2 | 17.8 |
| 59122 1998 $XJ_{15}$ | 15.0 | $X$ | 279.93372 | 320.07732 | 100.73570 | 7.16998 | 0.0487036 | 0.21811607 | 2.7332390 | 20 | 9 28.3 | 18.6 |
| 59123 1998 $XN_{16}$ | 14.1 | $X$ | 17.98730 | 163.16204 | 285.79682 | 24.87957 | 0.1875279 | 0.27751529 | 2.3277952 | 20 | — | — |
| 59124 1998 $XJ_{19}$ | 16.2 | $X$ | 258.15106 | 332.99572 | 81.03006 | 2.26720 | 0.0850884 | 0.30695995 | 2.1764477 | 20 | 8 21.5 | 18.4 |
| 59125 1998 $XK_{20}$ | 16.3 | $X$ | 324.62230 | 240.99857 | 213.47653 | 1.08740 | 0.1109958 | 0.27017583 | 2.3697638 | 20 | — | — |
| 59126 1998 $XE_{25}$ | 14.7 | $X$ | 36.18053 | 220.89882 | 79.53264 | 7.71657 | 0.1606423 | 0.22078739 | 2.7111479 | 20 | 10 22.5 | 18.2 |
| 59127 1998 $XP_{25}$ | 15.8 | $X$ | 242.58050 | 229.52093 | 115.11026 | 6.33327 | 0.1252875 | 0.29208419 | 2.2497315 | 20 | 4 16.7 | 19.0 |
| 59128 1998 $XA_{26}$ | 14.4 | $X$ | 30.80703 | 284.28653 | 111.78332 | 12.81453 | 0.1249663 | 0.18006746 | 3.1058410 | 20 | — | — |
| 59129 1998 $XC_{27}$ | 14.9 | $X$ | 131.23496 | 287.69925 | 244.25029 | 14.36272 | 0.1978547 | 0.25542621 | 2.4601358 | 20 | 8 20.0 | 19.2 |
| 59130 1998 $XU_{34}$ | 15.3 | $X$ | 71.00092 | 112.81564 | 283.59151 | 2.55635 | 0.1951665 | 0.23502080 | 2.6005498 | 20 | — | — |
| 59131 1998 $XA_{38}$ | 15.0 | $X$ | 118.63382 | 67.58004 | 289.23203 | 1.93071 | 0.0935145 | 0.23500767 | 2.6006467 | 20 | — | — |
| 59132 1998 $XM_{39}$ | 14.9 | $X$ | 86.93789 | 328.93260 | 80.11933 | 8.59091 | 0.1875554 | 0.23755869 | 2.5819952 | 20 | 1 29.3 | 18.0 |
| 59133 1998 $XM_{41}$ | 15.5 | $X$ | 145.09893 | 66.70984 | 37.22488 | 8.43480 | 0.1284365 | 0.29560698 | 2.2318222 | 20 | 6 8.2 | 18.8 |
| 59134 1998 $XR_{43}$ | 16.1 | $X$ | 316.59491 | 144.54750 | 325.80997 | 4.18747 | 0.2318896 | 0.27234115 | 2.3571861 | 20 | — | — |
| 59135 1998 $XN_{46}$ | 14.9 | $X$ | 319.90202 | 323.07320 | 42.13847 | 6.83825 | 0.1847427 | 0.30796327 | 2.1717180 | 20 | 9 23.7 | 16.1 |
| 59136 1998 $XZ_{49}$ | 14.0 | $X$ | 235.06856 | 329.54139 | 61.78629 | 12.23097 | 0.1190948 | 0.20678685 | 2.8321794 | 20 | 6 7.4 | 18.3 |
| 59137 1998 $XY_{50}$ | 15.9 | $X$ | 69.15270 | 357.48131 | 69.89130 | 4.98554 | 0.2036795 | 0.28217684 | 2.3020874 | 20 | 1 13.8 | 17.5 |
| 59138 1998 $XC_{52}$ | 15.7 | $X$ | 338.33313 | 59.99025 | 40.76247 | 7.70700 | 0.1419931 | 0.27336674 | 2.3512867 | 20 | — | — |
| 59139 1998 $XS_{59}$ | 16.2 | $X$ | 54.65742 | 289.19404 | 152.95278 | 3.37829 | 0.1338250 | 0.28221636 | 2.3018724 | 20 | — | — |
| 59140 1998 $XN_{60}$ | 15.4 | $X$ | 55.28568 | 158.02930 | 250.72706 | 4.18504 | 0.2086022 | 0.23367165 | 2.6105501 | 20 | — | — |
| 59141 1998 $XE_{61}$ | 16.0 | $X$ | 215.76790 | 333.70889 | 281.82725 | 4.47214 | 0.2010381 | 0.27307600 | 2.3529554 | 20 | — | — |
| 59142 1998 $XD_{62}$ | 15.2 | $X$ | 310.35853 | 153.02593 | 231.25911 | 4.39094 | 0.0741055 | 0.21865054 | 2.7287831 | 20 | 9 15.1 | 18.6 |
| 59143 1998 $XT_{72}$ | 13.8 | $X$ | 188.80999 | 95.84205 | 319.81599 | 11.56555 | 0.1375849 | 0.20526606 | 2.8461511 | 20 | 5 18.9 | 18.6 |
| 59144 1998 $XN_{73}$ | 15.1 | $X$ | 293.20574 | 319.14164 | 26.66093 | 8.19887 | 0.0055094 | 0.29947005 | 2.2125875 | 20 | 7 16.0 | 17.8 |
| 59145 1998 $XX_{73}$ | 15.5 | $X$ | 336.02860 | 355.95531 | 64.55520 | 15.20236 | 0.2345350 | 0.22426598 | 2.6830398 | 20 | 12 30.1 | 18.0 |
| 59146 1998 $XC_{74}$ | 15.1 | $X$ | 26.33246 | 55.36726 | 43.65611 | 3.95459 | 0.1774887 | 0.27935293 | 2.3175755 | 20 | — | — |
| 59147 1998 $XG_{77}$ | 15.7 | $X$ | 3.21077 | 216.56107 | 262.90494 | 4.07873 | 0.0608222 | 0.28027049 | 2.3125145 | 20 | — | — |
| 59148 1998 $XB_{78}$ | 13.6 | $X$ | 205.77318 | 347.54195 | 117.21070 | 13.16190 | 0.0891429 | 0.21325415 | 2.7746256 | 20 | 8 14.1 | 17.7 |
| 59149 1998 $XA_{84}$ | 16.0 | $X$ | 70.22299 | 13.75177 | 132.94211 | 2.76724 | 0.0693232 | 0.29182720 | 2.2510520 | 20 | 4 24.3 | 18.3 |
| 59150 1998 $XV_{90}$ | 14.2 | $X$ | 311.95288 | 188.15251 | 217.29807 | 4.14096 | 0.1190588 | 0.17365207 | 3.1818723 | 20 | 10 4.9 | 18.2 |
| 59151 1998 $XK_{96}$ | 15.7 | $X$ | 325.59943 | 134.36033 | 37.35374 | 1.32608 | 0.1470442 | 0.27689112 | 2.3312921 | 20 | — | — |
| 59152 1998 $XN_{97}$ | 14.7 | $X$ | 6.28904 | 341.81979 | 25.60488 | 13.68295 | 0.2186408 | 0.27416780 | 2.3467046 | 20 | 12 28.1 | 17.6 |
| 59153 1998 $XV_{97}$ | 16.2 | $X$ | 140.08357 | 336.77013 | 62.24842 | 6.35269 | 0.1069880 | 0.29016632 | 2.2596337 | 20 | 3 8.3 | 19.2 |
| 59154 1998 $XP_{98}$ | 15.4 | $X$ | 256.86125 | 65.70201 | 185.82564 | 1.52001 | 0.0446245 | 0.19489479 | 2.9462475 | 20 | 1 19.3 | 19.7 |
| 59155 1998 $XL_{99}$ | 15.3 | $X$ | 27.68123 | 229.87360 | 77.23423 | 6.08422 | 0.1892437 | 0.17519123 | 3.1632084 | 20 | 10 13.4 | 19.3 |
| 59156 1998 $YC_{3}$ | 15.1 | $X$ | 25.87282 | 156.43901 | 310.02067 | 3.82242 | 0.0945652 | 0.27966787 | 2.3158353 | 20 | — | — |
| 59157 1998 $YC_{4}$ | 15.2 | $X$ | 105.03536 | 304.79196 | 121.30135 | 6.49981 | 0.1696743 | 0.28602797 | 2.2813769 | 20 | 3 9.1 | 17.9 |
| 59158 1998 $YQ_{4}$ | 15.5 | $X$ | 82.23287 | 288.41374 | 219.01651 | 23.21393 | 0.2450301 | 0.29127800 | 2.2538807 | 20 | 6 9.7 | 18.7 |
| 59159 1998 $YX_{7}$ | 15.8 | $X$ | 76.94472 | 315.07860 | 111.43822 | 7.18947 | 0.0811628 | 0.28118514 | 2.3074970 | 20 | 1 10.9 | 18.3 |
| 59160 1998 $YF_{8}$ | 13.6 | $X$ | 292.94612 | 229.58539 | 232.26115 | 4.69421 | 0.1842337 | 0.17487428 | 3.1670294 | 20 | 11 9.5 | 17.2 |
| 59161 1998 $YL_{10}$ | 16.2 | $X$ | 337.61309 | 41.89894 | 110.28124 | 2.44890 | 0.1818909 | 0.27696691 | 2.3308668 | 20 | — | — |
| 59162 1998 $YX_{10}$ | 15.1 | $X$ | 220.89338 | 174.94966 | 306.12678 | 3.83249 | 0.0378948 | 0.21189163 | 2.7865073 | 20 | 9 24.1 | 19.0 |
| 59163 1998 $YX_{11}$ | 15.9 | $X$ | 344.82465 | 46.41797 | 96.95159 | 5.01930 | 0.1435719 | 0.27783896 | 2.3259870 | 20 | — | — |
| 59164 1998 $YG_{12}$ | 15.6 | $X$ | 36.11647 | 357.62880 | 67.20236 | 3.22693 | 0.1935083 | 0.27641804 | 2.3339513 | 20 | — | — |
| 59165 1998 $YY_{13}$ | 14.9 | $X$ | 255.07629 | 264.22365 | 67.16956 | 2.99575 | 0.0758801 | 0.20540539 | 2.8448639 | 20 | 4 21.2 | 18.8 |
| 59166 1998 $YZ_{18}$ | 16.3 | $X$ | 12.42768 | 209.01902 | 193.78953 | 2.90487 | 0.1685561 | 0.22894605 | 2.6463500 | 20 | — | — |
| 59167 1998 $YC_{19}$ | 16.1 | $X$ | 330.63932 | 279.42016 | 195.99755 | 2.79106 | 0.1788462 | 0.27589967 | 2.3368738 | 20 | — | — |
| 59168 1998 $YU_{19}$ | 15.6 | $X$ | 10.64786 | 50.53914 | 65.16942 | 1.72091 | 0.1573493 | 0.27796666 | 2.3252746 | 20 | — | — |
| 59169 1998 $YJ_{26}$ | 14.7 | $X$ | 12.64034 | 201.41030 | 322.46786 | 5.30148 | 0.0752059 | 0.28593723 | 2.2818596 | 20 | 2 11.9 | 16.7 |
| 59170 1998 $YA_{27}$ | 15.6 | $X$ | 310.47712 | 25.94682 | 22.96013 | 0.71311 | 0.1963245 | 0.26613448 | 2.3936939 | 20 | 10 27.3 | 17.4 |
| 59171 1999 $AP_{2}$ | 15.1 | $X$ | 241.87332 | 301.29641 | 18.52463 | 5.59943 | 0.0281244 | 0.28737782 | 2.2742274 | 20 | 3 20.4 | 17.9 |
| 59172 1999 $AE_{3}$ | 15.7 | $X$ | 134.01474 | 274.13410 | 137.11215 | 14.80872 | 0.0974664 | 0.23945663 | 2.5683338 | 20 | 3 21.4 | 19.5 |
| 59173 1999 $AC_{5}$ | 16.0 | $X$ | 258.52764 | 34.91475 | 96.59959 | 7.68781 | 0.1425101 | 0.26426862 | 2.4049478 | 20 | 11 25.9 | 18.7 |
| 59174 1999 $AT_{5}$ | 14.0 | $X$ | 294.79446 | 293.14852 | 336.39422 | 14.21371 | 0.0659084 | 0.23917809 | 2.5703275 | 20 | 3 16.1 | 17.4 |
| 59175 1999 $AF_{6}$ | 14.5 | $X$ | 286.50342 | 75.85598 | 135.60848 | 14.23904 | 0.1303153 | 0.18236804 | 3.0796656 | 20 | — | — |
| 59176 1999 $AP_{7}$ | 16.3 | $X$ | 244.05822 | 7.57982 | 127.07366 | 5.86783 | 0.1700266 | 0.26435976 | 2.4043950 | 20 | 11 5.2 | 19.3 |
| 59177 1999 $AT_{7}$ | 15.4 | $X$ | 78.64469 | 349.21380 | 62.01857 | 5.22105 | 0.2303406 | 0.27942478 | 2.3171782 | 20 | 1 14.2 | 17.2 |
| 59178 1999 $AF_{8}$ | 14.6 | $X$ | 210.12420 | 323.60579 | 80.40692 | 6.75242 | 0.0474460 | 0.29274407 | 2.2463494 | 20 | 6 2.9 | 17.3 |
| 59179 1999 $AG_{8}$ | 15.0 | $X$ | 21.61296 | 310.93172 | 103.98749 | 7.66303 | 0.1139251 | 0.27084172 | 2.3658780 | 20 | — | — |
| 59180 1999 $AP_{12}$ | 16.4 | $X$ | 184.20277 | 276.57859 | 279.03862 | 0.81737 | 0.1431779 | 0.26206228 | 2.4184273 | 20 | 11 15.0 | 20.0 |
| 59181 1999 $AB_{13}$ | 16.5 | $X$ | 221.30759 | 124.28196 | 134.38101 | 5.67260 | 0.2030879 | 0.27419638 | 2.3465415 | 20 | — | — |
| 59182 1999 $AR_{13}$ | 15.1 | $X$ | 276.91781 | 329.17739 | 114.95443 | 9.87009 | 0.1280552 | 0.21678211 | 2.7444401 | 20 | 10 14.9 | 18.7 |
| 59183 1999 $AP_{15}$ | 15.1 | $X$ | 327.08425 | 341.18260 | 313.11421 | 2.71173 | 0.1656922 | 0.29471978 | 2.2362989 | 20 | 5 29.1 | 16.9 |
| 59184 1999 $AR_{15}$ | 15.2 | $X$ | 260.29910 | 339.32444 | 317.57274 | 2.89579 | 0.1636726 | 0.28658206 | 2.2784354 | 20 | 2 25.7 | 18.5 |
| 59185 1999 $AT_{15}$ | 15.4 | $X$ | 230.52145 | 331.25471 | 309.10044 | 5.91367 | 0.1215950 | 0.28000901 | 2.3139540 | 20 | 1 10.4 | 18.9 |
| 59186 1999 $AK_{16}$ | 16.2 | $X$ | 92.85618 | 329.15090 | 322.42025 | 1.58502 | 0.1805176 | 0.26388272 | 2.4072918 | 20 | 12 19.1 | 19.9 |
| 59187 1999 $AP_{17}$ | 16.4 | $X$ | 268.40986 | 309.01221 | 144.12996 | 2.10981 | 0.1383848 | 0.26193361 | 2.4192193 | 20 | 10 17.8 | 19.2 |
| 59188 1999 $AJ_{18}$ | 15.7 | $X$ | 197.63402 | 345.06049 | 309.54124 | 2.29519 | 0.1645297 | 0.27612725 | 2.3355896 | 20 | — | — |
| 59189 1999 $AU_{19}$ | 15.7 | $X$ | 308.04933 | 140.52909 | 127.18505 | 1.44600 | 0.1314321 | 0.28564271 | 2.2834278 | 20 | 3 21.7 | 18.4 |
| 59190 1999 $AZ_{21}$ | 15.1 | $X$ | 310.17390 | 170.63175 | 272.57861 | 4.60470 | 0.2042382 | 0.26628127 | 2.3928142 | 20 | 12 22.4 | 16.7 |
| 59191 1999 $AS_{24}$ | 14.9 | $X$ | 19.26619 | 71.50288 | 331.59691 | 6.40699 | 0.1154957 | 0.26785614 | 2.3834259 | 20 | — | — |
| 59192 1999 $AU_{30}$ | 15.7 | $X$ | 27.39312 | 290.53020 | 131.10136 | 5.41565 | 0.2650286 | 0.27573055 | 2.3378292 | 20 | — | — |
| 59193 1999 $AJ_{31}$ | 16.2 | $X$ | 149.42909 | 248.92873 | 353.71374 | 0.94937 | 0.1461232 | 0.26136571 | 2.4227223 | 20 | 12 9.4 | 19.8 |
| 59194 1999 $BV_{1}$ | 15.9 | $X$ | 299.72162 | 243.91788 | 238.55417 | 1.64962 | 0.1743190 | 0.26768195 | 2.3844597 | 20 | — | — |
| 59195 1999 $BG_{2}$ | 14.8 | $X$ | 16.75167 | 296.76818 | 176.22439 | 26.32621 | 0.1627569 | 0.23405950 | 2.6076654 | 20 | — | — |
| 59196 1999 $BN_{2}$ | 16.7 | $X$ | 18.77358 | 297.45565 | 308.77278 | 3.37849 | 0.1488294 | 0.29365736 | 2.2416895 | 20 | 7 8.7 | 18.5 |
| 59197 1999 $BN_{3}$ | 17.0 | $X$ | 316.35594 | 325.77095 | 134.71081 | 2.89074 | 0.1666292 | 0.26886313 | 2.3774709 | 20 | — | — |
| 59198 1999 $BT_{3}$ | 15.8 | $X$ | 26.91993 | 18.19711 | 153.04205 | 4.78170 | 0.0806071 | 0.28480273 | 2.2879154 | 20 | 3 20.1 | 18.0 |
| 59199 1999 $BH_{6}$ | 15.1 | $X$ | 302.53570 | 115.04244 | 156.72391 | 6.96778 | 0.1090426 | 0.28227078 | 2.3015766 | 20 | 3 24.4 | 17.7 |
| 59200 1999 $BS_{7}$ | 15.3 | $X$ | 349.95637 | 314.92660 | 274.24491 | 4.06293 | 0.0952236 | 0.28824368 | 2.2696707 | 20 | 4 5.9 | 17.5 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59201 1999 $BW_7$ | 16.9 | $X$ | 8.19392 | 334.30403 | 147.84379 | 6.50559 | 0.1453552 | 0.27766628 | 2.3269513 | 20 | — | — |
| 59202 1999 $BB_8$ | 15.6 | $X$ | 348.58220 | 318.75525 | 146.98889 | 5.95613 | 0.1000996 | 0.27281599 | 2.3544502 | 20 | — | — |
| 59203 1999 $BC_9$ | 14.8 | $X$ | 73.57533 | 293.75758 | 134.84369 | 13.77825 | 0.1699438 | 0.23400211 | 2.6080917 | 20 | 1 30.2 | 17.7 |
| 59204 1999 $BF_9$ | 15.3 | $X$ | 304.29929 | 322.28098 | 153.48543 | 3.20602 | 0.2455465 | 0.22230207 | 2.6988187 | 20 | — | — |
| 59205 1999 $BD_{10}$ | 15.8 | $X$ | 253.23727 | 182.27788 | 318.34062 | 8.46652 | 0.1557405 | 0.26414224 | 2.4057148 | 20 | 11 24.5 | 18.8 |
| 59206 1999 $BE_{10}$ | 15.3 | $X$ | 40.41174 | 15.19914 | 125.24061 | 3.22097 | 0.0966058 | 0.28288747 | 2.2982305 | 20 | 2 27.5 | 17.4 |
| 59207 1999 $BD_{11}$ | 16.2 | $X$ | 290.44261 | 268.20607 | 348.38130 | 1.37818 | 0.1936342 | 0.27971898 | 2.3155532 | 20 | 2 4.0 | 19.3 |
| 59208 1999 $BW_{12}$ | 16.0 | $X$ | 19.15899 | 305.36951 | 215.02594 | 1.75105 | 0.1690829 | 0.28233864 | 2.3012078 | 20 | 2 13.4 | 17.6 |
| 59209 1999 $BD_{13}$ | 15.5 | $X$ | 58.04224 | 300.12428 | 153.67415 | 6.78556 | 0.0669843 | 0.28042652 | 2.3116566 | 20 | 1 17.3 | 18.0 |
| 59210 1999 $BJ_{13}$ | 15.2 | $X$ | 73.36000 | 176.11188 | 259.85099 | 1.89352 | 0.1175409 | 0.28038391 | 2.3118908 | 20 | 1 22.8 | 17.3 |
| 59211 1999 $BS_{13}$ | 16.1 | $X$ | 185.38943 | 119.86962 | 141.09253 | 1.81621 | 0.1541955 | 0.26737233 | 2.3863002 | 20 | — | — |
| 59212 1999 $BU_{13}$ | 15.9 | $X$ | 23.61987 | 332.77051 | 137.93065 | 6.41136 | 0.0876437 | 0.27652687 | 2.3333389 | 20 | — | — |
| 59213 1999 $BQ_{14}$ | 15.1 | $X$ | 6.30914 | 85.18987 | 1.61301 | 8.38944 | 0.1757059 | 0.27420338 | 2.3465016 | 20 | — | — |
| 59214 1999 $BX_{14}$ | 16.0 | $X$ | 259.04972 | 239.58279 | 313.21987 | 2.03155 | 0.1070830 | 0.27139769 | 2.3626458 | 20 | — | — |
| 59215 1999 $BC_{15}$ | 15.2 | $X$ | 279.07350 | 149.82908 | 133.76165 | 7.13250 | 0.1057339 | 0.28524583 | 2.2855454 | 20 | 3 9.8 | 18.2 |
| 59216 1999 $BG_{15}$ | 14.0 | $X$ | 111.83626 | 341.15287 | 338.24229 | 9.56166 | 0.1251250 | 0.21831398 | 2.7315868 | 20 | — | — |
| 59217 1999 $BK_{19}$ | 16.1 | $X$ | 346.09784 | 313.74194 | 98.72753 | 4.11393 | 0.2248706 | 0.27008637 | 2.3702870 | 20 | — | — |
| 59218 1999 $BE_{20}$ | 13.8 | $X$ | 43.66982 | 45.94900 | 2.29333 | 10.29048 | 0.1489844 | 0.18447264 | 3.0561975 | 20 | — | — |
| 59219 1999 $BJ_{23}$ | 14.4 | $X$ | 126.00248 | 283.45340 | 130.68938 | 6.42504 | 0.2747158 | 0.19710764 | 2.9241552 | 20 | 4 5.2 | 19.2 |
| 59220 1999 $BX_{25}$ | 15.6 | $X$ | 338.81674 | 249.51862 | 229.27831 | 3.42997 | 0.1268383 | 0.27373909 | 2.3491541 | 20 | — | — |
| 59221 1999 $BU_{29}$ | 16.2 | $X$ | 306.92115 | 159.74850 | 329.90525 | 3.09743 | 0.1827682 | 0.26973245 | 2.3723599 | 20 | — | — |
| 59222 1999 $BT_{31}$ | 15.9 | $X$ | 295.83698 | 105.89006 | 328.58450 | 1.73344 | 0.1737582 | 0.26465266 | 2.4026206 | 20 | 11 4.1 | 18.0 |
| 59223 1999 $BV_{32}$ | 16.4 | $X$ | 324.82724 | 107.54208 | 119.16100 | 7.04996 | 0.1398610 | 0.28380847 | 2.2932557 | 20 | 2 17.1 | 18.9 |
| 59224 1999 $BS_{34}$ | 16.0 | $X$ | 2.47160 | 103.88898 | 29.34216 | 4.29977 | 0.1786466 | 0.27807082 | 2.3246939 | 20 | — | — |
| 59225 1999 $CC$ | 14.8 | $X$ | 17.09510 | 350.56649 | 66.36348 | 5.80444 | 0.2655717 | 0.27300515 | 2.3533625 | 20 | — | — |
| 59226 1999 $CE$ | 14.9 | $X$ | 86.32955 | 350.25452 | 45.47957 | 7.37987 | 0.1195706 | 0.27714866 | 2.3298477 | 20 | — | — |
| 59227 1999 $CG$ | 15.4 | $X$ | 296.42664 | 91.65827 | 52.62895 | 5.10041 | 0.1857032 | 0.26976020 | 2.3721972 | 20 | — | — |
| 59228 1999 $CH$ | 14.6 | $X$ | 151.46544 | 346.73939 | 37.33664 | 7.16489 | 0.1189568 | 0.28385328 | 2.2930143 | 20 | 3 3.6 | 17.8 |
| 59229 1999 $CQ$ | 15.8 | $X$ | 308.95519 | 67.11494 | 26.57657 | 2.87766 | 0.1849275 | 0.26681050 | 2.3896490 | 20 | — | — |
| 59230 1999 $CY$ | 14.9 | $X$ | 20.54247 | 244.62000 | 88.51168 | 4.00803 | 0.1984291 | 0.30500628 | 2.1857317 | 20 | 12 6.4 | 17.4 |
| 59231 1999 $CZ$ | 15.5 | $X$ | 358.21559 | 17.43441 | 57.83326 | 3.57678 | 0.2193230 | 0.27155463 | 2.3617354 | 20 | — | — |
| 59232 Sfiligoi | 15.5 | $X$ | 185.35531 | 123.26895 | 92.15589 | 9.99585 | 0.2001073 | 0.26188843 | 2.4194975 | 20 | 12 6.8 | 19.4 |
| 59233 1999 $CH_1$ | 14.8 | $X$ | 249.35535 | 263.74363 | 344.76281 | 13.74717 | 0.0493374 | 0.27550134 | 2.3391258 | 20 | — | — |
| 59234 1999 $CR_1$ | 14.9 | $X$ | 291.28752 | 204.56393 | 349.79808 | 14.41437 | 0.0599630 | 0.22770891 | 2.6559264 | 20 | — | — |
| 59235 1999 $CV_1$ | 14.4 | $X$ | 93.90655 | 346.38585 | 15.86820 | 8.51483 | 0.1607584 | 0.27207788 | 2.3587064 | 20 | — | — |
| 59236 1999 $CD_2$ | 14.4 | $X$ | 210.25283 | 274.10449 | 97.98891 | 5.68764 | 0.1695652 | 0.28786232 | 2.2716749 | 20 | 4 16.8 | 17.9 |
| 59237 1999 $CF_2$ | 16.3 | $X$ | 43.17296 | 71.69108 | 38.92038 | 6.40519 | 0.1591881 | 0.28068004 | 2.3102645 | 20 | 1 22.3 | 18.2 |
| 59238 1999 $CN_2$ | 15.5 | $X$ | 324.51865 | 275.15475 | 141.11327 | 1.92788 | 0.1695862 | 0.26530373 | 2.3986883 | 20 | 12 10.9 | 17.4 |
| 59239 Alhazen | 15.2 | $X$ | 190.13131 | 31.92274 | 4.79114 | 7.14047 | 0.2103534 | 0.29194348 | 2.2504543 | 20 | 4 24.9 | 18.9 |
| 59240 1999 $CY_2$ | 15.1 | $X$ | 345.26417 | 117.37066 | 295.68693 | 1.46583 | 0.1950634 | 0.26701179 | 2.3884478 | 20 | — | — |
| 59241 1999 $CC_4$ | 15.0 | $X$ | 44.77618 | 343.41012 | 138.81254 | 5.52231 | 0.1139949 | 0.28196802 | 2.3032238 | 20 | 2 8.2 | 17.1 |
| 59242 1999 $CS_4$ | 14.5 | $X$ | 29.48346 | 209.75538 | 198.88715 | 1.96290 | 0.1557932 | 0.26898629 | 2.3767452 | 20 | — | — |
| 59243 1999 $CZ_4$ | 16.0 | $X$ | 92.55708 | 330.21621 | 103.85133 | 4.94717 | 0.1673052 | 0.28410924 | 2.2916369 | 20 | 3 1.9 | 18.5 |
| 59244 1999 $CG_6$ | 14.3 | $X$ | 30.33677 | 101.22042 | 328.77512 | 26.64511 | 0.2626850 | 0.23038362 | 2.6353299 | 20 | — | — |
| 59245 1999 $CT_7$ | 14.7 | $X$ | 53.21615 | 58.00745 | 348.24078 | 22.79747 | 0.2016644 | 0.27449001 | 2.3448677 | 20 | — | — |
| 59246 1999 $CQ_8$ | 15.2 | $X$ | 16.98247 | 93.31273 | 140.00249 | 8.00225 | 0.1986063 | 0.28975466 | 2.2617734 | 20 | 6 18.1 | 16.8 |
| 59247 1999 $CU_{11}$ | 15.0 | $X$ | 325.80583 | 261.32144 | 314.69979 | 21.23367 | 0.1901081 | 0.23322124 | 2.6139101 | 20 | 2 3.2 | 18.0 |
| 59248 1999 $CG_{13}$ | 15.8 | $X$ | 6.05599 | 237.24639 | 175.09231 | 7.74938 | 0.0792515 | 0.26718334 | 2.3874253 | 20 | — | — |
| 59249 1999 $CZ_{15}$ | 14.5 | $X$ | 350.85396 | 111.87715 | 110.78613 | 21.72903 | 0.2672142 | 0.28219140 | 2.3020082 | 20 | 3 19.6 | 16.7 |
| 59250 1999 $CD_{16}$ | 14.6 | $X$ | 48.65065 | 68.97777 | 125.74600 | 24.02514 | 0.1881487 | 0.28683918 | 2.2770736 | 20 | 6 23.7 | 17.2 |
| 59251 1999 $CG_{21}$ | 16.0 | $X$ | 173.60842 | 158.47779 | 321.00430 | 1.02300 | 0.0468658 | 0.29795652 | 2.2200740 | 20 | 8 3.4 | 18.7 |
| 59252 1999 $CE_{25}$ | 15.7 | $X$ | 236.35466 | 67.85336 | 76.40014 | 5.07181 | 0.1743777 | 0.26257955 | 2.4152501 | 20 | 11 5.5 | 18.8 |
| 59253 1999 $CH_{25}$ | 15.8 | $X$ | 254.72493 | 97.35497 | 59.25758 | 3.20651 | 0.1552133 | 0.26595133 | 2.3947928 | 20 | 12 22.0 | 18.3 |
| 59254 1999 $CL_{25}$ | 15.0 | $X$ | 232.55904 | 116.55406 | 358.86844 | 5.35057 | 0.0796474 | 0.21270975 | 2.7793578 | 20 | 9 27.3 | 19.0 |
| 59255 1999 $CB_{26}$ | 15.6 | $X$ | 267.72793 | 310.18685 | 138.68570 | 1.69997 | 0.1575706 | 0.26115856 | 2.4240033 | 20 | 10 7.1 | 18.4 |
| 59256 1999 $CG_{27}$ | 15.3 | $X$ | 201.63425 | 192.47832 | 9.30109 | 6.36502 | 0.0585877 | 0.26479568 | 2.4017554 | 20 | 12 23.4 | 18.5 |
| 59257 1999 $CO_{27}$ | 14.9 | $X$ | 348.82698 | 166.70555 | 51.86204 | 6.21368 | 0.0154739 | 0.28657987 | 2.2784470 | 20 | 3 31.8 | 17.6 |
| 59258 1999 $CD_{29}$ | 15.9 | $X$ | 204.94328 | 128.93013 | 134.78183 | 2.87285 | 0.1773578 | 0.27100568 | 2.3649236 | 20 | — | — |
| 59259 1999 $CP_{29}$ | 15.5 | $X$ | 76.28255 | 181.20601 | 317.12904 | 3.05007 | 0.0745158 | 0.28702919 | 2.2760685 | 20 | 4 19.4 | 18.1 |
| 59260 1999 $CR_{29}$ | 16.2 | $X$ | 336.27329 | 167.32040 | 331.10964 | 2.98288 | 0.1330566 | 0.27412159 | 2.3469683 | 20 | — | — |
| 59261 1999 $CX_{29}$ | 14.4 | $X$ | 263.77174 | 270.26440 | 141.33427 | 7.09864 | 0.2017011 | 0.20963160 | 2.8064989 | 20 | 7 26.8 | 18.4 |
| 59262 1999 $CY_{29}$ | 15.4 | $X$ | 293.41449 | 99.55154 | 343.11106 | 3.44885 | 0.1751519 | 0.26366535 | 2.4086147 | 20 | 11 10.6 | 17.4 |
| 59263 1999 $CK_{30}$ | 15.7 | $X$ | 304.52348 | 301.01975 | 100.57500 | 2.24895 | 0.1901766 | 0.26030899 | 2.4292746 | 20 | 10 1.2 | 17.6 |
| 59264 1999 $CL_{30}$ | 16.0 | $X$ | 182.04090 | 219.13722 | 3.27413 | 2.11919 | 0.1378140 | 0.26299110 | 2.4127298 | 20 | 12 17.2 | 19.4 |
| 59265 1999 $CJ_{31}$ | 15.8 | $X$ | 67.97535 | 65.84016 | 4.39356 | 4.47905 | 0.0888212 | 0.27846162 | 2.3225183 | 20 | 1 3.6 | 18.1 |
| 59266 1999 $CD_{32}$ | 15.2 | $X$ | 260.17440 | 150.71981 | 58.69189 | 7.74135 | 0.0613794 | 0.27283032 | 2.3543677 | 20 | — | — |
| 59267 1999 $CR_{32}$ | 15.4 | $X$ | 32.74676 | 359.31105 | 115.13654 | 7.36595 | 0.0801023 | 0.27882667 | 2.3204907 | 20 | 1 6.3 | 17.7 |
| 59268 1999 $CU_{34}$ | 15.0 | $X$ | 354.59761 | 104.06993 | 356.94594 | 4.38631 | 0.0328204 | 0.27162626 | 2.3613202 | 20 | — | — |
| 59269 1999 $CL_{36}$ | 15.2 | $X$ | 307.78502 | 221.21627 | 84.28509 | 7.80834 | 0.1761734 | 0.29114492 | 2.2545675 | 20 | 5 10.2 | 17.6 |
| 59270 1999 $CT_{37}$ | 15.5 | $X$ | 318.51247 | 227.43796 | 130.34424 | 3.87258 | 0.1427453 | 0.30068359 | 2.2066302 | 20 | 9 3.9 | 17.0 |
| 59271 1999 $CG_{38}$ | 16.4 | $X$ | 232.41290 | 185.73530 | 317.35870 | 1.72693 | 0.1563221 | 0.26122307 | 2.4236042 | 20 | 10 30.2 | 19.4 |
| 59272 1999 $CN_{38}$ | 15.9 | $X$ | 19.21666 | 19.09590 | 67.26905 | 0.74208 | 0.1855026 | 0.27470197 | 2.3436614 | 20 | — | — |
| 59273 1999 $CG_{39}$ | 15.1 | $X$ | 313.58745 | 70.86822 | 356.44880 | 5.73487 | 0.0858953 | 0.26294397 | 2.4130181 | 20 | 11 30.6 | 17.7 |
| 59274 1999 $CL_{42}$ | 15.9 | $X$ | 218.88988 | 240.24103 | 341.12680 | 7.31971 | 0.1510481 | 0.26679058 | 2.3897679 | 20 | — | — |
| 59275 1999 $CC_{43}$ | 14.5 | $X$ | 303.13177 | 103.90138 | 349.65058 | 4.31019 | 0.1745643 | 0.17322504 | 3.1870993 | 20 | 11 15.6 | 18.3 |
| 59276 1999 $CF_{45}$ | 14.8 | $X$ | 10.77380 | 336.53481 | 115.27808 | 7.43534 | 0.0622662 | 0.27238961 | 2.3569065 | 20 | — | — |
| 59277 1999 $CG_{45}$ | 15.6 | $X$ | 255.72522 | 153.22686 | 47.17339 | 3.40340 | 0.1762640 | 0.26884660 | 2.3775684 | 20 | — | — |
| 59278 1999 $CT_{45}$ | 15.3 | $X$ | 279.62175 | 83.27627 | 19.59749 | 2.60634 | 0.1130311 | 0.26272329 | 2.4143691 | 20 | 11 21.9 | 17.8 |
| 59279 1999 $CA_{46}$ | 17.1 | $X$ | 302.58511 | 7.19666 | 124.25573 | 2.44639 | 0.1892043 | 0.26890317 | 2.3772349 | 20 | — | — |
| 59280 1999 $CL_{48}$ | 15.3 | $X$ | 39.94687 | 52.53633 | 57.28806 | 2.11537 | 0.0324932 | 0.27774973 | 2.3264851 | 20 | 1 12.4 | 17.8 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59281 1999 $CX_{48}$ | 14.9 | $X$ | 204.67115 | 280.28209 | 115.92653 | 6.48562 | 0.1237882 | 0.29106904 | 2.2549593 | 20 | 5 14.0 | 18.2 |
| 59282 1999 $CG_{49}$ | 15.3 | $X$ | 259.26815 | 123.75543 | 100.85086 | 7.20853 | 0.1083328 | 0.27288854 | 2.3540328 | 20 | — | — |
| 59283 1999 $CF_{50}$ | 15.0 | $X$ | 178.16014 | 81.02016 | 355.92422 | 9.22544 | 0.0978040 | 0.24585454 | 2.5235809 | 20 | 6 6.1 | 18.9 |
| 59284 1999 $CM_{50}$ | 15.8 | $X$ | 66.49911 | 308.61611 | 141.38888 | 4.91189 | 0.1602531 | 0.28031595 | 2.3122645 | 20 | 2 6.1 | 17.7 |
| 59285 1999 $CP_{50}$ | 14.5 | $X$ | 39.76477 | 125.89087 | 153.98421 | 5.57995 | 0.1709106 | 0.29703451 | 2.2246658 | 20 | 10 14.5 | 17.0 |
| 59286 1999 $CV_{51}$ | 15.1 | $X$ | 55.56620 | 81.19223 | 41.10422 | 4.50715 | 0.1723169 | 0.23597553 | 2.5935307 | 20 | 3 16.3 | 17.7 |
| 59287 1999 $CC_{54}$ | 13.4 | $X$ | 266.65707 | 279.60024 | 342.74066 | 9.84395 | 0.0580556 | 0.18574577 | 3.0422164 | 20 | 2 14.2 | 17.7 |
| 59288 1999 $CQ_{54}$ | 15.2 | $X$ | 236.88854 | 102.60001 | 352.53203 | 3.64937 | 0.1312727 | 0.25578247 | 2.4578509 | 20 | 9 5.2 | 18.5 |
| 59289 1999 $CA_{55}$ | 15.5 | $X$ | 277.53390 | 51.25164 | 28.26488 | 5.13938 | 0.1754439 | 0.25988114 | 2.4319401 | 20 | 10 6.8 | 18.1 |
| 59290 1999 $CC_{55}$ | 15.0 | $X$ | 135.66219 | 290.27360 | 90.58235 | 5.56699 | 0.0807329 | 0.27877251 | 2.3207913 | 20 | 2 3.1 | 17.9 |
| 59291 1999 $CJ_{56}$ | 14.1 | $X$ | 184.85553 | 265.11395 | 113.53915 | 7.83479 | 0.1264553 | 0.28522961 | 2.2856320 | 20 | 4 1.9 | 17.6 |
| 59292 1999 $CN_{56}$ | 14.9 | $X$ | 85.30974 | 351.26181 | 46.76214 | 4.57470 | 0.1268037 | 0.27514752 | 2.3411306 | 20 | — | — |
| 59293 1999 $CM_{57}$ | 14.7 | $X$ | 266.14274 | 57.49109 | 149.78498 | 6.09358 | 0.1142422 | 0.22456733 | 2.6806390 | 20 | — | — |
| 59294 1999 $CY_{58}$ | 14.9 | $X$ | 291.30102 | 72.58574 | 21.38226 | 6.93915 | 0.1092224 | 0.26224457 | 2.4173065 | 20 | 11 28.8 | 17.4 |
| 59295 1999 $CK_{59}$ | 15.6 | $X$ | 329.06477 | 104.93744 | 24.83341 | 7.18136 | 0.0770294 | 0.27090048 | 2.3655358 | 20 | — | — |
| 59296 1999 $CU_{64}$ | 14.1 | $X$ | 178.89632 | 301.04044 | 276.10265 | 15.25319 | 0.1346710 | 0.21600898 | 2.7509848 | 20 | 11 28.5 | 18.5 |
| 59297 1999 $CD_{66}$ | 14.8 | $X$ | 240.32107 | 259.11749 | 192.76946 | 1.69723 | 0.1553200 | 0.25745823 | 2.4471741 | 20 | 8 31.9 | 18.0 |
| 59298 1999 $CQ_{66}$ | 15.0 | $X$ | 173.34784 | 205.54971 | 178.42753 | 6.19730 | 0.1204244 | 0.28643322 | 2.2792246 | 20 | 3 23.8 | 18.1 |
| 59299 1999 $CE_{68}$ | 14.9 | $X$ | 271.39306 | 295.46456 | 213.23387 | 5.64726 | 0.0571461 | 0.26696042 | 2.3887542 | 20 | — | — |
| 59300 1999 $CW_{71}$ | 15.9 | $X$ | 275.88423 | 314.49481 | 247.32803 | 4.80469 | 0.1629814 | 0.27204931 | 2.3588716 | 20 | — | — |
| 59301 1999 $CB_{73}$ | 15.2 | $X$ | 64.76010 | 168.94509 | 229.42570 | 7.20734 | 0.1139185 | 0.27351343 | 2.3504460 | 20 | — | — |
| 59302 1999 $CF_{74}$ | 16.4 | $X$ | 0.68863 | 296.66578 | 168.24286 | 3.04123 | 0.1045642 | 0.27336798 | 2.3512797 | 20 | — | — |
| 59303 1999 $CX_{75}$ | 16.0 | $X$ | 306.39238 | 206.07136 | 286.11609 | 3.33600 | 0.1286810 | 0.26926070 | 2.3751301 | 20 | — | — |
| 59304 1999 $CJ_{76}$ | 15.4 | $X$ | 335.53049 | 259.67100 | 183.12489 | 2.04833 | 0.1719791 | 0.26858090 | 2.3791361 | 20 | — | — |
| 59305 1999 $CD_{78}$ | 14.8 | $X$ | 245.86392 | 159.74856 | 262.53041 | 4.93219 | 0.1330575 | 0.29972538 | 2.2113307 | 20 | 8 3.7 | 17.5 |
| 59306 1999 $CN_{79}$ | 15.2 | $X$ | 255.57768 | 138.37900 | 167.84735 | 6.68463 | 0.1561961 | 0.28304661 | 2.2973689 | 20 | 3 5.2 | 18.4 |
| 59307 1999 $CT_{79}$ | 15.0 | $X$ | 84.06964 | 232.50606 | 249.52493 | 4.00793 | 0.0970337 | 0.28547396 | 2.2843276 | 20 | 4 11.4 | 17.5 |
| 59308 1999 $CQ_{83}$ | 14.5 | $X$ | 28.61104 | 299.03502 | 113.17713 | 13.87155 | 0.1942454 | 0.22827771 | 2.6515127 | 20 | — | — |
| 59309 1999 $CY_{84}$ | 15.5 | $X$ | 151.82387 | 45.51007 | 66.50015 | 4.90832 | 0.0932063 | 0.29506467 | 2.2345560 | 20 | 6 26.4 | 18.5 |
| 59310 1999 $CA_{87}$ | 15.6 | $X$ | 26.20867 | 356.50219 | 82.26471 | 5.89551 | 0.1375500 | 0.27566600 | 2.3381942 | 20 | — | — |
| 59311 1999 $CJ_{87}$ | 15.6 | $X$ | 242.32287 | 74.11557 | 46.16276 | 2.23871 | 0.1267447 | 0.26136247 | 2.4227424 | 20 | 10 18.3 | 18.4 |
| 59312 1999 $CR_{87}$ | 16.3 | $X$ | 30.07162 | 322.22599 | 139.51132 | 2.69062 | 0.1704523 | 0.27846887 | 2.3224780 | 20 | — | — |
| 59313 1999 $CF_{88}$ | 14.3 | $X$ | 202.41652 | 99.75684 | 42.88732 | 8.17651 | 0.1681007 | 0.21204749 | 2.7851416 | 20 | 9 22.9 | 18.7 |
| 59314 1999 $CP_{88}$ | 14.4 | $X$ | 201.29793 | 192.88562 | 36.31531 | 10.80479 | 0.0749559 | 0.26846196 | 2.3798388 | 20 | — | — |
| 59315 1999 $CC_{89}$ | 15.6 | $X$ | 266.13062 | 319.36007 | 116.98506 | 3.10541 | 0.1969870 | 0.26007770 | 2.4307146 | 20 | 9 10.1 | 18.3 |
| 59316 1999 $CL_{89}$ | 15.8 | $X$ | 14.70753 | 168.95842 | 339.14753 | 4.17636 | 0.1049119 | 0.23446985 | 2.6046221 | 20 | 2 2.1 | 18.5 |
| 59317 1999 $CN_{89}$ | 16.0 | $X$ | 195.79330 | 117.87500 | 106.74183 | 4.06239 | 0.1309284 | 0.26573625 | 2.3960848 | 20 | — | — |
| 59318 1999 $CB_{90}$ | 14.7 | $X$ | 5.22900 | 120.40540 | 67.67939 | 8.43218 | 0.1127001 | 0.28376323 | 2.2934994 | 20 | 3 9.2 | 17.0 |
| 59319 1999 $CT_{91}$ | 15.2 | $X$ | 19.28987 | 57.68154 | 331.00640 | 6.51700 | 0.0914190 | 0.26681700 | 2.3896101 | 20 | — | — |
| 59320 1999 $CH_{92}$ | 15.1 | $X$ | 25.93048 | 355.87450 | 50.37073 | 6.86505 | 0.1053648 | 0.27076700 | 2.3663132 | 20 | — | — |
| 59321 1999 $CF_{93}$ | 15.8 | $X$ | 210.74001 | 76.30664 | 100.45340 | 3.53778 | 0.1436795 | 0.26176884 | 2.4202344 | 20 | 11 20.5 | 19.1 |
| 59322 1999 $CB_{95}$ | 15.6 | $X$ | 158.08956 | 145.77509 | 68.56202 | 3.39324 | 0.1429354 | 0.25881147 | 2.4386363 | 20 | 11 12.9 | 19.3 |
| 59323 1999 $CS_{95}$ | 15.3 | $X$ | 19.42284 | 169.56063 | 357.69122 | 4.56314 | 0.1199487 | 0.28232679 | 2.3012722 | 20 | 2 28.9 | 17.3 |
| 59324 1999 $CF_{97}$ | 16.4 | $X$ | 315.46359 | 41.80002 | 109.71986 | 3.31815 | 0.1101685 | 0.27225055 | 2.3577090 | 20 | — | — |
| 59325 1999 $CZ_{97}$ | 15.3 | $X$ | 122.03055 | 26.75663 | 39.82237 | 3.20862 | 0.0965276 | 0.28422034 | 2.2910397 | 20 | 3 20.1 | 18.2 |
| 59326 1999 $CO_{98}$ | 15.4 | $X$ | 207.86492 | 213.19265 | 346.95916 | 4.78956 | 0.1525638 | 0.26278178 | 2.4140108 | 20 | 12 15.3 | 18.8 |
| 59327 1999 $CG_{99}$ | 15.1 | $X$ | 209.85855 | 159.91419 | 347.06143 | 7.79500 | 0.0820291 | 0.25794175 | 2.4441149 | 20 | 10 15.1 | 18.5 |
| 59328 1999 $CM_{102}$ | 14.7 | $X$ | 342.57652 | 141.47886 | 298.37846 | 4.09674 | 0.1247063 | 0.22415750 | 2.6839054 | 20 | — | — |
| 59329 1999 $CN_{102}$ | 15.3 | $X$ | 176.60342 | 151.72503 | 294.66371 | 4.56239 | 0.0541453 | 0.29509475 | 2.2344041 | 20 | 6 19.8 | 18.3 |
| 59330 1999 $CW_{103}$ | 15.2 | $X$ | 357.60410 | 273.66497 | 308.49384 | 5.63550 | 0.0518902 | 0.28781990 | 2.2718980 | 20 | 4 10.9 | 17.8 |
| 59331 1999 $CC_{104}$ | 15.1 | $X$ | 286.00587 | 121.36959 | 307.51427 | 1.94701 | 0.0616259 | 0.21276371 | 2.7788878 | 20 | 10 9.9 | 18.6 |
| 59332 1999 $CQ_{104}$ | 15.0 | $X$ | 204.83826 | 282.63760 | 260.92118 | 2.81779 | 0.1325041 | 0.26192804 | 2.4192535 | 20 | 11 22.9 | 18.4 |
| 59333 1999 $CM_{105}$ | 15.7 | $X$ | 314.14704 | 278.52557 | 272.93123 | 5.75699 | 0.1652436 | 0.27674567 | 2.3321089 | 20 | — | — |
| 59334 1999 $CY_{105}$ | 15.6 | $X$ | 40.60436 | 265.79433 | 154.94288 | 6.07868 | 0.1993077 | 0.27582711 | 2.3372836 | 20 | — | — |
| 59335 1999 $CR_{106}$ | 14.9 | $X$ | 33.64746 | 299.43776 | 208.80888 | 10.46695 | 0.1826381 | 0.23666042 | 2.5885246 | 20 | 3 5.5 | 17.4 |
| 59336 1999 $CR_{110}$ | 14.9 | $X$ | 131.72334 | 197.63509 | 203.77123 | 6.32408 | 0.0984674 | 0.28282258 | 2.2985820 | 20 | 2 24.0 | 17.9 |
| 59337 1999 $CT_{111}$ | 14.0 | $X$ | 62.04468 | 140.17705 | 281.65036 | 9.18261 | 0.0953470 | 0.18350384 | 3.0669447 | 20 | 1 4.9 | 17.8 |
| 59338 1999 $CV_{111}$ | 14.8 | $X$ | 218.11274 | 271.98897 | 228.22927 | 6.59431 | 0.1537966 | 0.21270873 | 2.7793666 | 20 | 10 1.5 | 19.0 |
| 59339 1999 $CT_{113}$ | 15.6 | $X$ | 74.13683 | 253.34382 | 236.53767 | 6.08170 | 0.1624573 | 0.28547727 | 2.2843099 | 20 | 4 18.8 | 18.1 |
| 59340 1999 $CV_{116}$ | 14.8 | $X$ | 41.37603 | 228.66178 | 179.55175 | 13.15446 | 0.3017898 | 0.22867255 | 2.6484597 | 20 | — | — |
| 59341 1999 $CY_{116}$ | 15.4 | $X$ | 186.93051 | 230.01046 | 153.96140 | 15.14337 | 0.1769613 | 0.24197789 | 2.5504624 | 20 | 4 13.9 | 19.8 |
| 59342 1999 $CS_{118}$ | 13.8 | $X$ | 57.57158 | 344.90111 | 18.31288 | 25.40317 | 0.2284863 | 0.26584376 | 2.3954387 | 20 | — | — |
| 59343 1999 $CA_{123}$ | 15.7 | $X$ | 216.43892 | 84.59949 | 62.26938 | 11.83590 | 0.1941090 | 0.26029246 | 2.4293774 | 20 | 10 17.1 | 19.4 |
| 59344 1999 $CW_{123}$ | 14.4 | $X$ | 42.17645 | 52.22932 | 29.56811 | 13.63992 | 0.1204253 | 0.23058196 | 2.6338184 | 20 | — | — |
| 59345 1999 $CK_{135}$ | 14.9 | $X$ | 37.82459 | 13.22315 | 334.26265 | 5.90190 | 0.1387949 | 0.26060139 | 2.4274571 | 20 | 12 27.8 | 18.1 |
| 59346 1999 $CC_{137}$ | 15.9 | $X$ | 221.28470 | 206.31517 | 164.22661 | 2.55322 | 0.1079748 | 0.29009343 | 2.2600122 | 20 | 4 26.9 | 19.0 |
| 59347 1999 $CX_{137}$ | 15.9 | $X$ | 139.31430 | 296.63570 | 151.80721 | 2.19489 | 0.1013602 | 0.28933390 | 2.2639657 | 20 | 5 10.7 | 19.0 |
| 59348 1999 $CU_{141}$ | 16.4 | $X$ | 278.77550 | 98.44232 | 123.55620 | 2.40723 | 0.1511067 | 0.27649183 | 2.3335361 | 20 | — | — |
| 59349 1999 $CN_{142}$ | 16.5 | $X$ | 263.68073 | 279.58238 | 330.17117 | 2.27832 | 0.1946920 | 0.27659331 | 2.3329652 | 20 | — | — |
| 59350 1999 $CT_{142}$ | 16.4 | $X$ | 186.94622 | 79.70289 | 127.21434 | 3.25281 | 0.1537557 | 0.26186974 | 2.4196126 | 20 | 12 1.8 | 19.9 |
| 59351 1999 $CQ_{145}$ | 15.6 | $X$ | 206.76834 | 121.85087 | 159.70382 | 3.07341 | 0.0403608 | 0.22644165 | 2.6658263 | 20 | — | — |
| 59352 1999 $CH_{147}$ | 15.3 | $X$ | 353.41441 | 304.76026 | 341.14804 | 9.63517 | 0.1138356 | 0.29141942 | 2.2531515 | 20 | 7 20.6 | 17.3 |
| 59353 1999 $CE_{151}$ | 15.2 | $X$ | 141.11190 | 12.48836 | 349.56605 | 6.65077 | 0.1166489 | 0.27584403 | 2.3371880 | 20 | 1 21.8 | 18.4 |
| 59354 1999 $CF_{152}$ | 15.8 | $X$ | 80.55031 | 286.37056 | 323.44637 | 5.36514 | 0.1094648 | 0.25341839 | 2.4731130 | 20 | 10 4.6 | 19.3 |
| 59355 1999 $CL_{153}$ | 12.9 | $X$ | 187.34101 | 321.38772 | 214.92071 | 0.81399 | 0.0875242 | 0.08237528 | 5.2312416 | 20 | 10 4.2 | 20.2 |
| 59356 1999 $CX_{153}$ | 15.2 | $X$ | 162.24298 | 322.57877 | 98.97813 | 5.82462 | 0.1260866 | 0.28876282 | 2.2669496 | 20 | 5 3.2 | 18.5 |
| 59357 1999 $CB_{154}$ | 15.1 | $X$ | 257.22694 | 231.29030 | 200.47439 | 4.91785 | 0.1410923 | 0.25570268 | 2.4583622 | 20 | 8 27.2 | 18.3 |
| 59358 1999 $CL_{158}$ | 6.9 | $X$ | 52.52935 | 327.38488 | 120.18523 | 10.04824 | 0.2044742 | 0.00371952 | 41.2551105 | 20 | 3 3.9 | 22.6 |
| 59359 1999 $DV$ | 15.0 | $X$ | 111.21802 | 337.79432 | 71.01827 | 4.03551 | 0.1401565 | 0.27996066 | 2.3142204 | 20 | 2 18.3 | 17.8 |
| 59360 1999 $DY_1$ | 15.0 | $X$ | 207.96494 | 357.34312 | 42.99479 | 5.99639 | 0.1294276 | 0.29155538 | 2.2524510 | 20 | 5 20.1 | 18.3 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59361 1999 $DW_2$ | 15.9 | $X$ | 35.32978 | 262.65327 | 191.45914 | 5.70710 | 0.0944924 | 0.27593137 | 2.3366948 | 20 | — | — |
| 59362 1999 $DO_5$ | 14.6 | $X$ | 22.07092 | 292.22586 | 211.91611 | 14.51666 | 0.0492382 | 0.23385674 | 2.6091724 | 20 | 2 4.2 | 18.2 |
| 59363 1999 $DP_7$ | 15.2 | $X$ | 244.53747 | 78.85503 | 71.32845 | 3.60659 | 0.1483020 | 0.26225588 | 2.4172370 | 20 | 11 27.5 | 17.8 |
| 59364 1999 $DS_7$ | 14.6 | $X$ | 78.03594 | 2.80289 | 20.80564 | 7.11371 | 0.1145476 | 0.27113850 | 2.3641512 | 20 | — | — |
| 59365 1999 $EM$ | 15.8 | $X$ | 291.18813 | 221.78424 | 322.84598 | 2.01736 | 0.1100058 | 0.27171911 | 2.3607822 | 20 | — | — |
| 59366 1999 $EE_3$ | 14.2 | $X$ | 112.55523 | 262.70026 | 224.98650 | 9.73728 | 0.0524605 | 0.19179366 | 2.9779213 | 20 | 5 26.2 | 18.4 |
| 59367 1999 $EQ_3$ | 15.4 | $X$ | 195.75897 | 208.37743 | 89.99304 | 3.17048 | 0.2179915 | 0.27088759 | 2.3656109 | 20 | 1 3.4 | 19.1 |
| 59368 1999 $EP_4$ | 14.5 | $X$ | 21.26888 | 107.69646 | 179.34274 | 16.32554 | 0.2088179 | 0.24257570 | 2.5462704 | 20 | 9 18.7 | 16.9 |
| 59369 Chanco | 14.8 | $X$ | 17.65837 | 128.99476 | 82.78486 | 3.25617 | 0.1205612 | 0.19248710 | 2.9707650 | 20 | 5 10.3 | 18.3 |
| 59370 1999 $EK_5$ | 15.5 | $X$ | 310.59650 | 66.50252 | 20.07468 | 5.22781 | 0.0555520 | 0.26149433 | 2.4219279 | 20 | 12 23.3 | 18.3 |
| 59371 1999 $EY_6$ | 14.4 | $X$ | 3.26657 | 178.45097 | 177.43711 | 2.94835 | 0.1460794 | 0.25645379 | 2.4535597 | 20 | 11 20.3 | 16.9 |
| 59372 1999 $EP_8$ | 16.9 | $X$ | 274.67086 | 67.82671 | 339.80685 | 1.83357 | 0.1672463 | 0.25605158 | 2.4561285 | 20 | 8 16.2 | 19.8 |
| 59373 1999 $ET_{10}$ | 15.0 | $X$ | 1.53668 | 213.17176 | 187.33999 | 1.77730 | 0.2007695 | 0.26438072 | 2.4042679 | 20 | — | — |
| 59374 1999 $EO_{12}$ | 14.4 | $X$ | 29.06331 | 145.57152 | 136.09656 | 8.26830 | 0.1870739 | 0.20013959 | 2.8945477 | 20 | 9 15.9 | 17.9 |
| 59375 1999 $EQ_{13}$ | 14.9 | $X$ | 179.35580 | 321.88364 | 342.96649 | 9.37099 | 0.0643710 | 0.18122674 | 3.0925818 | 20 | 1 2.6 | 19.6 |
| 59376 1999 $FK$ | 14.9 | $X$ | 108.95700 | 291.55390 | 58.70577 | 6.99237 | 0.1595366 | 0.26806175 | 2.3822069 | 20 | — | — |
| 59377 1999 $FF_1$ | 14.8 | $X$ | 344.05665 | 285.50588 | 17.70033 | 12.59789 | 0.3147640 | 0.23950660 | 2.5679766 | 20 | 7 21.2 | 16.4 |
| 59378 1999 $FV_3$ | 14.6 | $X$ | 195.42739 | 247.98836 | 177.38436 | 2.22312 | 0.0763404 | 0.19724947 | 2.9227533 | 20 | 6 11.5 | 18.9 |
| 59379 1999 $FO_4$ | 15.8 | $X$ | 75.24472 | 245.26410 | 195.79297 | 2.45672 | 0.0644608 | 0.22844584 | 2.6502116 | 20 | 2 4.6 | 19.1 |
| 59380 1999 $FA_5$ | 15.4 | $X$ | 337.58913 | 270.20743 | 24.74897 | 4.12262 | 0.1231992 | 0.24043999 | 2.5613263 | 20 | 6 25.5 | 18.0 |
| 59381 1999 $FZ_5$ | 15.8 | $X$ | 280.55242 | 27.70996 | 149.08351 | 3.11721 | 0.1223895 | 0.27208466 | 2.3586673 | 20 | — | — |
| 59382 1999 $FP_6$ | 16.2 | $X$ | 34.09485 | 5.71118 | 186.12169 | 2.04790 | 0.0989948 | 0.23626633 | 2.5914022 | 20 | 5 7.1 | 19.1 |
| 59383 1999 $FY_9$ | 15.3 | $X$ | 165.23005 | 208.30602 | 24.81074 | 2.51846 | 0.1581535 | 0.25867205 | 2.4395125 | 20 | 12 11.3 | 19.0 |
| 59384 1999 $FH_{10}$ | 15.4 | $X$ | 216.27328 | 148.90905 | 88.28489 | 7.34982 | 0.0308465 | 0.26864681 | 2.3787470 | 20 | — | — |
| 59385 1999 $FH_{15}$ | 15.2 | $X$ | 306.64963 | 310.30684 | 19.85022 | 6.77265 | 0.0730494 | 0.24197002 | 2.5505177 | 20 | 6 29.3 | 18.4 |
| 59386 1999 $FJ_{17}$ | 14.8 | $X$ | 272.09693 | 14.70612 | 192.58682 | 17.87609 | 0.2460746 | 0.22226401 | 2.6991268 | 20 | — | — |
| 59387 1999 $FZ_{17}$ | 15.5 | $X$ | 48.65005 | 155.30274 | 55.64601 | 1.74174 | 0.1431906 | 0.28685364 | 2.2769971 | 20 | 7 7.9 | 17.8 |
| 59388 Monod | 15.4 | $X$ | 200.21194 | 204.77667 | 47.15472 | 4.13407 | 0.1198211 | 0.26543630 | 2.3978895 | 20 | — | — |
| 59389 Oskarvonmiller | 15.8 | $X$ | 152.78773 | 21.26690 | 193.48312 | 7.47022 | 0.1288572 | 0.25627729 | 2.4546861 | 20 | 11 9.1 | 19.5 |
| 59390 Habermas | 14.3 | $X$ | 252.54348 | 340.23719 | 27.71078 | 6.40971 | 0.1035800 | 0.19590097 | 2.9361506 | 20 | 5 29.8 | 18.7 |
| 59391 1999 $FC_{22}$ | 14.8 | $X$ | 251.57496 | 3.47915 | 183.05903 | 3.29390 | 0.0295258 | 0.22160204 | 2.7044993 | 20 | — | — |
| 59392 1999 $FD_{23}$ | 15.8 | $X$ | 9.93218 | 235.51854 | 241.25906 | 1.58543 | 0.1637733 | 0.27553023 | 2.3389623 | 20 | — | — |
| 59393 1999 $FG_{23}$ | 15.4 | $X$ | 1.37584 | 228.66440 | 287.29198 | 3.35977 | 0.1524393 | 0.23185872 | 2.6241406 | 20 | 1 16.3 | 18.1 |
| 59394 1999 $FZ_{23}$ | 15.4 | $X$ | 319.57239 | 325.37275 | 158.66348 | 3.20728 | 0.1365318 | 0.26927262 | 2.3750600 | 20 | — | — |
| 59395 1999 $FM_{25}$ | 15.6 | $X$ | 201.40807 | 139.12952 | 42.53839 | 7.13049 | 0.1450710 | 0.25805665 | 2.4433894 | 20 | 11 14.3 | 19.2 |
| 59396 1999 $FY_{25}$ | 15.5 | $X$ | 3.40643 | 72.05882 | 216.42939 | 4.82934 | 0.1778830 | 0.28947839 | 2.2632123 | 20 | 8 16.5 | 17.3 |
| 59397 1999 $FT_{26}$ | 15.3 | $X$ | 184.81417 | 122.32263 | 93.90459 | 3.55503 | 0.1472793 | 0.25903043 | 2.4372618 | 20 | 12 10.8 | 18.8 |
| 59398 1999 $FF_{29}$ | 15.3 | $X$ | 61.34719 | 126.99915 | 145.38946 | 3.67440 | 0.1859831 | 0.29495759 | 2.2350968 | 20 | 11 1.5 | 18.3 |
| 59399 1999 $FK_{30}$ | 14.4 | $X$ | 354.48619 | 346.19555 | 24.00262 | 4.34109 | 0.1006425 | 0.25453121 | 2.4658994 | 20 | 11 17.4 | 17.0 |
| 59400 1999 $FH_{31}$ | 14.4 | $X$ | 69.60806 | 241.29309 | 80.48426 | 6.99367 | 0.2387997 | 0.25518534 | 2.4616836 | 20 | — | — |
| 59401 1999 $FC_{32}$ | 14.6 | $X$ | 230.35156 | 93.04846 | 53.03212 | 4.79679 | 0.1429930 | 0.25840162 | 2.4412142 | 20 | 11 3.2 | 17.8 |
| 59402 1999 $FR_{32}$ | 13.6 | $X$ | 140.18725 | 305.32911 | 33.89900 | 8.40947 | 0.2709654 | 0.26587394 | 2.3952575 | 20 | 1 11.3 | 17.4 |
| 59403 1999 $FV_{34}$ | 14.6 | $X$ | 289.22688 | 208.75963 | 29.04748 | 13.03041 | 0.1334537 | 0.22785729 | 2.6547732 | 20 | 1 28.8 | 18.6 |
| 59404 1999 $FW_{34}$ | 14.1 | $X$ | 248.84822 | 101.68441 | 47.05244 | 9.76698 | 0.0968220 | 0.21363151 | 2.7713572 | 20 | 11 26.2 | 17.9 |
| 59405 1999 $FA_{35}$ | 14.7 | $X$ | 62.33173 | 296.13505 | 208.14344 | 14.18158 | 0.0567299 | 0.23463495 | 2.6034001 | 20 | 4 8.6 | 18.0 |
| 59406 1999 $FM_{35}$ | 15.4 | $X$ | 138.37377 | 198.71909 | 219.72678 | 2.09266 | 0.1473144 | 0.28551528 | 2.2841072 | 20 | 4 2.2 | 18.4 |
| 59407 1999 $FC_{38}$ | 14.7 | $X$ | 87.14443 | 172.16279 | 242.44767 | 5.94598 | 0.1262167 | 0.27751754 | 2.3277826 | 20 | 1 16.1 | 17.2 |
| 59408 1999 $FL_{40}$ | 15.6 | $X$ | 262.70465 | 176.11392 | 295.35162 | 2.05759 | 0.1967989 | 0.26160483 | 2.4212458 | 20 | 10 22.9 | 18.3 |
| 59409 1999 $FX_{42}$ | 16.2 | $X$ | 312.15710 | 338.10980 | 146.97598 | 2.12818 | 0.1202302 | 0.26816069 | 2.3816209 | 20 | — | — |
| 59410 1999 $FH_{50}$ | 15.3 | $X$ | 85.14021 | 321.06923 | 347.31868 | 6.16011 | 0.1316808 | 0.25970755 | 2.4330237 | 20 | 12 29.2 | 19.0 |
| 59411 1999 $FX_{50}$ | 14.4 | $X$ | 223.55352 | 287.35032 | 324.91390 | 5.44758 | 0.0948384 | 0.27019611 | 2.3696452 | 20 | — | — |
| 59412 1999 $FU_{51}$ | 15.5 | $X$ | 345.87236 | 148.03742 | 322.83735 | 2.25409 | 0.1172916 | 0.27048266 | 2.3679713 | 20 | — | — |
| 59413 1999 $FN_{58}$ | 15.6 | $X$ | 304.81732 | 241.71525 | 237.17038 | 5.40800 | 0.0931004 | 0.26564757 | 2.3966180 | 20 | — | — |
| 59414 1999 $FP_{62}$ | 15.9 | $X$ | 182.85932 | 91.49681 | 141.30412 | 3.00636 | 0.1326934 | 0.26111832 | 2.4242523 | 20 | 12 31.1 | 19.3 |
| 59415 1999 $GJ$ | 15.6 | $X$ | 108.61824 | 264.18135 | 8.50476 | 2.40424 | 0.1618418 | 0.25607335 | 2.4559892 | 20 | 12 7.8 | 19.4 |
| 59416 1999 $GM$ | 15.8 | $X$ | 266.10816 | 168.23346 | 339.83006 | 2.13051 | 0.1680660 | 0.26396365 | 2.4067998 | 20 | 12 27.2 | 17.9 |
| 59417 Giocasilli | 15.2 | $X$ | 193.01371 | 85.19015 | 183.47016 | 7.14177 | 0.0982822 | 0.26599024 | 2.3945592 | 20 | — | — |
| 59418 1999 $GJ_1$ | 14.8 | $X$ | 101.65763 | 126.27148 | 80.00570 | 6.88377 | 0.0678133 | 0.24573426 | 2.5244043 | 20 | 9 2.1 | 18.3 |
| 59419 Prešov | 15.1 | $X$ | 15.65424 | 183.70526 | 45.37666 | 9.33805 | 0.1099295 | 0.23796895 | 2.5790268 | 20 | 5 28.0 | 17.9 |
| 59420 1999 $GR_2$ | 15.2 | $X$ | 299.17700 | 57.16980 | 60.16329 | 3.48758 | 0.1253145 | 0.26436703 | 2.4043509 | 20 | — | — |
| 59421 1999 $GV_3$ | 15.3 | $X$ | 158.96327 | 336.33841 | 157.59713 | 2.45775 | 0.1799008 | 0.20118767 | 2.8844862 | 20 | 7 30.3 | 20.0 |
| 59422 1999 $GD_4$ | 14.4 | $X$ | 155.56627 | 34.20283 | 228.52203 | 13.83083 | 0.1075651 | 0.25797371 | 2.4439130 | 20 | — | — |
| 59423 1999 $GE_4$ | 14.3 | $X$ | 92.49152 | 212.28678 | 233.51341 | 12.44067 | 0.1102128 | 0.22882388 | 2.6472919 | 20 | 3 7.8 | 18.0 |
| 59424 1999 $GP_4$ | 14.5 | $X$ | 332.66625 | 199.28517 | 56.23891 | 9.80153 | 0.1037567 | 0.23479832 | 2.6021923 | 20 | 4 23.3 | 17.4 |
| 59425 Xuyangsheng | 16.1 | $X$ | 232.62161 | 49.80212 | 154.53815 | 1.72433 | 0.1060932 | 0.26472366 | 2.4021911 | 20 | — | — |
| 59426 1999 $GS_5$ | 15.2 | $X$ | 287.76682 | 98.95113 | 34.67526 | 3.15401 | 0.1236555 | 0.26402784 | 2.4064097 | 20 | — | — |
| 59427 1999 $GM_6$ | 15.1 | $X$ | 310.58139 | 33.77591 | 87.60629 | 5.84571 | 0.1031788 | 0.26454520 | 2.4032713 | 20 | — | — |
| 59428 1999 $GK_7$ | 16.0 | $X$ | 230.61452 | 331.65683 | 222.08574 | 2.34736 | 0.1443152 | 0.26257955 | 2.4152502 | 20 | — | — |
| 59429 1999 $GK_8$ | 15.4 | $X$ | 13.56750 | 359.25662 | 259.02730 | 2.10639 | 0.1718035 | 0.24029912 | 2.5623273 | 20 | 7 14.7 | 17.7 |
| 59430 1999 $GT_{12}$ | 14.3 | $X$ | 1.84079 | 274.29706 | 201.14067 | 8.33135 | 0.0538586 | 0.17586716 | 3.1550982 | 20 | — | — |
| 59431 1999 $GG_{13}$ | 15.7 | $X$ | 52.13648 | 25.30645 | 217.15440 | 4.52455 | 0.1951399 | 0.24277811 | 2.5448549 | 20 | 8 31.2 | 18.9 |
| 59432 1999 $GW_{14}$ | 15.3 | $X$ | 59.45946 | 198.85749 | 196.53704 | 2.51680 | 0.1003576 | 0.21934785 | 2.7229968 | 20 | — | — |
| 59433 1999 $GH_{17}$ | 15.4 | $X$ | 226.95371 | 99.95445 | 177.93077 | 6.23791 | 0.2960795 | 0.26947378 | 2.3738778 | 20 | 1 2.5 | 19.7 |
| 59434 1999 $GR_{18}$ | 14.8 | $X$ | 54.53418 | 81.48740 | 67.58836 | 12.47098 | 0.2150345 | 0.23646368 | 2.5899602 | 20 | 4 30.9 | 17.6 |
| 59435 1999 $GE_{20}$ | 14.7 | $X$ | 343.58161 | 196.51626 | 69.89849 | 8.69754 | 0.1650198 | 0.23712336 | 2.5851544 | 20 | 5 21.6 | 16.9 |
| 59436 1999 $GE_{21}$ | 14.6 | $X$ | 89.21426 | 246.08576 | 49.93095 | 15.35698 | 0.1839053 | 0.25383086 | 2.4704331 | 20 | 12 18.2 | 18.7 |
| 59437 1999 $GY_{21}$ | 14.9 | $X$ | 269.99855 | 103.09600 | 55.16748 | 8.21578 | 0.0264252 | 0.21618231 | 2.7495140 | 20 | — | — |
| 59438 1999 $GA_{22}$ | 15.2 | $X$ | 62.67331 | 111.80524 | 42.18751 | 9.66021 | 0.1167667 | 0.23643188 | 2.5901924 | 20 | 5 2.0 | 18.0 |
| 59439 1999 $GS_{23}$ | 14.2 | $X$ | 198.50310 | 283.17446 | 10.98900 | 12.65767 | 0.1679912 | 0.22369309 | 2.6876188 | 20 | 1 6.8 | 18.8 |
| 59440 1999 $GL_{24}$ | 15.9 | $X$ | 209.69477 | 112.59852 | 84.15164 | 3.14134 | 0.1476063 | 0.26090288 | 2.4255867 | 20 | 12 13.6 | 19.2 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59441 1999 $GZ_{29}$ | 14.7 | X | 280.82948 | 273.00019 | 37.44215 | 4.49023 | 0.1880333 | 0.28117850 | 2.3075333 | 20 | 4 5.4 | 17.7 |
| 59442 1999 $GS_{30}$ | 15.3 | X | 323.84795 | 357.26210 | 107.83977 | 3.36671 | 0.1428318 | 0.26472734 | 2.4021688 | 20 | — | — |
| 59443 1999 $GV_{30}$ | 14.9 | X | 231.50893 | 236.18576 | 42.28707 | 12.81379 | 0.1444980 | 0.22433646 | 2.6824779 | 20 | 1 17.6 | 19.4 |
| 59444 1999 $GY_{30}$ | 16.0 | X | 106.66381 | 85.10665 | 162.06510 | 4.79965 | 0.1251881 | 0.29831302 | 2.2183049 | 20 | 11 11.4 | 19.2 |
| 59445 1999 $GJ_{32}$ | 15.8 | X | 322.28968 | 15.86830 | 196.27427 | 10.83168 | 0.1777804 | 0.22898684 | 2.6460357 | 20 | 1 23.6 | 19.3 |
| 59446 1999 $GO_{32}$ | 15.6 | X | 287.24106 | 88.89808 | 38.33488 | 2.64416 | 0.1554665 | 0.26284832 | 2.4136034 | 20 | — | — |
| 59447 1999 $GV_{32}$ | 15.2 | X | 229.58302 | 4.95518 | 157.27146 | 14.25749 | 0.1216329 | 0.25778823 | 2.4450852 | 20 | 11 29.3 | 18.7 |
| 59448 1999 $GC_{33}$ | 14.9 | X | 62.20911 | 293.61867 | 62.79843 | 7.63630 | 0.1293104 | 0.26025219 | 2.4296280 | 20 | — | — |
| 59449 1999 $GH_{33}$ | 14.5 | X | 286.55626 | 115.35780 | 202.24721 | 13.27235 | 0.2073114 | 0.23512285 | 2.5997973 | 20 | 4 21.7 | 17.9 |
| 59450 1999 $GW_{33}$ | 15.8 | X | 86.06950 | 63.15456 | 85.23108 | 4.31146 | 0.1190402 | 0.28463460 | 2.2888162 | 20 | 5 28.9 | 18.5 |
| 59451 1999 $GX_{33}$ | 14.9 | X | 312.40951 | 254.15631 | 34.89645 | 11.96891 | 0.2469388 | 0.23396663 | 2.6083554 | 20 | 4 13.8 | 17.8 |
| 59452 1999 $GS_{34}$ | 13.7 | X | 294.37500 | 197.08616 | 321.68596 | 4.54163 | 0.1164443 | 0.17430573 | 3.1739125 | 20 | — | — |
| 59453 1999 $GN_{35}$ | 15.2 | X | 83.51908 | 173.00492 | 20.80317 | 4.40625 | 0.0978688 | 0.24316334 | 2.5421664 | 20 | 7 25.6 | 18.6 |
| 59454 1999 $GO_{35}$ | 15.6 | X | 243.69246 | 318.11608 | 204.46676 | 8.93784 | 0.1338276 | 0.26106986 | 2.4245523 | 20 | 12 15.1 | 18.6 |
| 59455 1999 $GK_{36}$ | 15.0 | X | 334.47437 | 91.29073 | 14.09446 | 2.52342 | 0.1592843 | 0.26608752 | 2.3939756 | 20 | — | — |
| 59456 1999 $GJ_{38}$ | 15.9 | X | 36.41462 | 164.17746 | 71.35882 | 4.86134 | 0.1929688 | 0.28863251 | 2.2676319 | 20 | 8 5.0 | 18.0 |
| 59457 1999 $GF_{39}$ | 14.2 | X | 182.01639 | 31.21542 | 33.81519 | 15.79288 | 0.1123659 | 0.24223682 | 2.5486446 | 20 | 5 23.6 | 18.2 |
| 59458 1999 $GM_{41}$ | 15.0 | X | 162.71734 | 207.95939 | 88.85942 | 10.17306 | 0.2009152 | 0.26461718 | 2.4028354 | 20 | — | — |
| 59459 1999 $GV_{42}$ | 14.0 | X | 100.47885 | 292.58060 | 165.73792 | 11.07286 | 0.0676661 | 0.18768274 | 3.0212488 | 20 | 4 8.1 | 18.3 |
| 59460 1999 $GR_{43}$ | 15.4 | X | 146.52466 | 165.65107 | 106.95361 | 7.89298 | 0.1347382 | 0.25986157 | 2.4320622 | 20 | — | — |
| 59461 1999 $GO_{45}$ | 14.1 | X | 87.10541 | 15.20976 | 57.65875 | 15.87900 | 0.0900324 | 0.22892702 | 2.6464966 | 20 | 2 23.1 | 17.9 |
| 59462 1999 $GQ_{45}$ | 14.8 | X | 131.27180 | 304.18229 | 192.31051 | 12.32941 | 0.1006292 | 0.24237271 | 2.5476919 | 20 | 7 3.4 | 18.8 |
| 59463 1999 $GV_{45}$ | 14.1 | X | 211.98818 | 282.14519 | 141.50808 | 10.29045 | 0.1467198 | 0.24353726 | 2.5395637 | 20 | 6 24.2 | 18.1 |
| 59464 1999 $GM_{50}$ | 15.5 | X | 151.77913 | 144.17970 | 145.71085 | 5.21070 | 0.2484941 | 0.26191363 | 2.4193423 | 20 | — | — |
| 59465 1999 $GS_{51}$ | 14.0 | X | 226.45380 | 18.42900 | 204.45255 | 21.77641 | 0.1347469 | 0.17135217 | 3.2102805 | 20 | — | — |
| 59466 1999 $GE_{54}$ | 16.4 | X | 184.79935 | 43.85131 | 160.72951 | 1.40859 | 0.1292584 | 0.25853085 | 2.4404007 | 20 | 11 28.0 | 19.8 |
| 59467 1999 $GQ_{57}$ | 13.8 | X | 326.40473 | 10.71987 | 198.89917 | 10.45603 | 0.0826027 | 0.18500931 | 3.0502843 | 20 | 2 15.5 | 18.0 |
| 59468 1999 $GH_{61}$ | 15.6 | X | 299.14838 | 311.71330 | 212.96547 | 9.51183 | 0.2071804 | 0.22176573 | 2.7031683 | 20 | — | — |
| 59469 1999 $GJ_{61}$ | 15.5 | X | 330.57072 | 185.59112 | 30.42877 | 15.73395 | 0.2561876 | 0.22954598 | 2.6417371 | 20 | 2 7.3 | 18.9 |
| 59470 1999 $HM$ | 15.3 | X | 80.40893 | 173.87064 | 353.46520 | 3.61630 | 0.0165200 | 0.23887149 | 2.5725264 | 20 | 5 30.0 | 18.7 |
| 59471 1999 $HP$ | 15.8 | X | 10.34259 | 33.37851 | 228.23131 | 1.33330 | 0.1385217 | 0.23915280 | 2.5705087 | 20 | 7 9.8 | 18.4 |
| 59472 1999 $HX$ | 14.1 | X | 172.06120 | 79.42836 | 227.09534 | 29.15845 | 0.3758635 | 0.21452771 | 2.7636335 | 20 | 1 1.9 | 19.8 |
| 59473 1999 $HT_{1}$ | 14.3 | X | 185.46699 | 267.66432 | 95.32348 | 5.56324 | 0.1443991 | 0.22810098 | 2.6528821 | 20 | 3 16.9 | 18.5 |
| 59474 1999 $HK_{2}$ | 14.9 | X | 49.14570 | 186.04428 | 51.92918 | 15.01761 | 0.2131558 | 0.24011692 | 2.5636233 | 20 | 9 3.5 | 18.5 |
| 59475 1999 $HN_{2}$ | 13.9 | X | 32.38891 | 282.92725 | 64.47826 | 9.29871 | 0.0517125 | 0.25509030 | 2.4622950 | 20 | 12 5.4 | 17.1 |
| 59476 1999 $HQ_{2}$ | 15.6 | X | 103.03435 | 56.73939 | 212.34820 | 4.31675 | 0.1163870 | 0.29972524 | 2.2113314 | 20 | 12 4.8 | 18.8 |
| 59477 1999 $HP_{3}$ | 13.7 | X | 19.99848 | 56.16002 | 99.19707 | 10.26807 | 0.0830198 | 0.18528593 | 3.0472477 | 20 | 3 3.3 | 17.7 |
| 59478 1999 $HR_{4}$ | 14.8 | X | 215.79175 | 281.84175 | 50.03079 | 4.40792 | 0.2274597 | 0.22640607 | 2.6661056 | 20 | 3 4.4 | 19.4 |
| 59479 1999 $HX_{5}$ | 15.0 | X | 105.90953 | 309.38122 | 138.07291 | 14.03460 | 0.1096879 | 0.22976518 | 2.6400566 | 20 | 4 6.9 | 18.8 |
| 59480 1999 $HJ_{7}$ | 13.6 | X | 149.56702 | 61.35343 | 44.10643 | 10.50810 | 0.0665854 | 0.19217238 | 2.9740076 | 20 | 6 10.1 | 18.1 |
| 59481 1999 $HX_{8}$ | 15.4 | X | 97.30325 | 324.39647 | 243.51405 | 1.03565 | 0.0443333 | 0.24630671 | 2.5204914 | 20 | 8 22.8 | 18.7 |
| 59482 1999 $HP_{10}$ | 15.3 | X | 203.77430 | 328.44520 | 203.89753 | 7.32372 | 0.1540010 | 0.21001763 | 2.8030588 | 20 | 10 28.4 | 19.5 |
| 59483 1999 $HN_{11}$ | 14.8 | X | 265.63153 | 99.62269 | 208.70017 | 11.41166 | 0.2739393 | 0.23081323 | 2.6320588 | 20 | 3 8.0 | 19.3 |
| 59484 1999 $JJ$ | 15.2 | X | 294.75174 | 2.37261 | 248.51731 | 18.19580 | 0.0462590 | 0.37045143 | 1.9200618 | 20 | 1 30.7 | 17.7 |
| 59485 1999 $JR$ | 15.1 | X | 325.81984 | 86.99266 | 139.00645 | 13.72486 | 0.1534426 | 0.22957258 | 2.6415330 | 20 | 2 23.7 | 18.2 |
| 59486 1999 $JV$ | 15.0 | X | 25.09635 | 88.53374 | 118.11591 | 14.89152 | 0.0629639 | 0.23520716 | 2.5991760 | 20 | 5 15.9 | 18.4 |
| 59487 1999 $JZ_{1}$ | 14.4 | X | 233.49945 | 256.61272 | 152.79483 | 7.30820 | 0.1498680 | 0.24419586 | 2.5349954 | 20 | 6 27.5 | 18.3 |
| 59488 1999 $JE_{2}$ | 14.8 | X | 349.97409 | 129.42692 | 182.84173 | 15.22487 | 0.2355136 | 0.24238371 | 2.5476148 | 20 | 8 17.9 | 17.0 |
| 59489 1999 $JQ_{2}$ | 14.1 | X | 65.11635 | 302.90568 | 82.16292 | 7.37137 | 0.1435180 | 0.26531321 | 2.3986311 | 20 | — | — |
| 59490 1999 $JD_{4}$ | 14.3 | X | 238.61455 | 76.91420 | 236.41602 | 22.37066 | 0.3032299 | 0.27233294 | 2.3572335 | 20 | 2 11.4 | 19.0 |
| 59491 1999 $JO_{4}$ | 14.8 | X | 320.34191 | 60.77598 | 238.62126 | 11.70779 | 0.2601612 | 0.28170696 | 2.3046466 | 20 | 5 5.5 | 16.8 |
| 59492 1999 $JU_{4}$ | 15.0 | X | 288.58044 | 38.71148 | 225.90221 | 15.29960 | 0.2013788 | 0.22781877 | 2.6550725 | 20 | 2 11.1 | 19.2 |
| 59493 1999 $JG_{5}$ | 15.1 | X | 85.77118 | 202.02693 | 227.81972 | 21.50197 | 0.0694544 | 0.36503348 | 1.9390139 | 20 | 1 3.5 | 17.2 |
| 59494 1999 $JN_{5}$ | 15.1 | X | 344.16311 | 244.70718 | 66.12324 | 19.44469 | 0.1967420 | 0.23922191 | 2.5700136 | 20 | 8 9.3 | 17.9 |
| 59495 1999 $JB_{6}$ | 14.5 | X | 162.54769 | 148.82271 | 57.80006 | 8.99406 | 0.0987986 | 0.20900907 | 2.8120689 | 20 | 11 2.5 | 18.8 |
| 59496 1999 $JY_{6}$ | 15.5 | X | 138.46209 | 112.06685 | 146.12661 | 6.04597 | 0.0963647 | 0.25560939 | 2.4589603 | 20 | 12 18.5 | 19.1 |
| 59497 1999 $JJ_{7}$ | 15.2 | X | 17.95507 | 328.93583 | 159.31733 | 9.86052 | 0.0399774 | 0.22442722 | 2.6817546 | 20 | 1 14.5 | 18.7 |
| 59498 1999 $JG_{8}$ | 14.2 | X | 210.61604 | 331.54462 | 201.16318 | 24.38465 | 0.0999993 | 0.25386011 | 2.4702434 | 20 | 11 19.5 | 17.9 |
| 59499 1999 $JP_{8}$ | 14.6 | X | 274.54488 | 241.18363 | 59.08227 | 12.88777 | 0.1330075 | 0.23131144 | 2.6282781 | 20 | 4 1.1 | 18.5 |
| 59500 1999 $JT_{8}$ | 15.5 | X | 18.33074 | 41.49404 | 244.84014 | 15.23049 | 0.1961172 | 0.24050978 | 2.5608308 | 20 | 9 1.1 | 18.6 |
| 59501 1999 $JB_{9}$ | 14.4 | X | 167.18924 | 144.57537 | 179.09289 | 11.65904 | 0.1211335 | 0.21962667 | 2.7206917 | 20 | 1 8.1 | 18.8 |
| 59502 1999 $JR_{9}$ | 15.2 | X | 41.61268 | 202.40492 | 58.16559 | 7.77255 | 0.2002670 | 0.24354637 | 2.5395004 | 20 | 9 17.8 | 18.4 |
| 59503 1999 $JU_{9}$ | 14.6 | X | 216.58950 | 283.38344 | 173.01901 | 8.93862 | 0.0718374 | 0.24589757 | 2.5232865 | 20 | 8 17.4 | 18.2 |
| 59504 1999 $JY_{9}$ | 14.0 | X | 256.64281 | 177.66450 | 101.95858 | 10.56819 | 0.0527170 | 0.18046535 | 3.1012742 | 20 | 2 26.5 | 18.6 |
| 59505 1999 $JW_{10}$ | 14.4 | X | 293.58690 | 13.91651 | 84.39317 | 7.32300 | 0.1137181 | 0.21312331 | 2.7757611 | 20 | 11 25.7 | 17.7 |
| 59506 1999 $JD_{11}$ | 14.6 | X | 147.52114 | 350.61167 | 185.48472 | 3.46898 | 0.0674322 | 0.24627885 | 2.5206815 | 20 | 9 12.4 | 18.1 |
| 59507 1999 $JW_{12}$ | 14.7 | X | 202.87520 | 176.88009 | 185.34692 | 15.29271 | 0.1312113 | 0.23060027 | 2.6336790 | 20 | 3 29.6 | 18.9 |
| 59508 1999 $JP_{13}$ | 15.1 | X | 189.64563 | 335.72590 | 75.48345 | 9.53102 | 0.1151916 | 0.28191258 | 2.3035258 | 20 | 5 17.7 | 18.5 |
| 59509 1999 $JR_{13}$ | 15.3 | X | 346.83806 | 207.61283 | 48.79962 | 14.07421 | 0.1136280 | 0.23453015 | 2.6041756 | 20 | 5 15.3 | 18.0 |
| 59510 1999 $JY_{13}$ | 14.9 | X | 295.18517 | 106.80371 | 237.42983 | 28.61823 | 0.1310483 | 0.23653916 | 2.5894092 | 20 | 6 17.7 | 18.4 |
| 59511 1999 $JP_{14}$ | 13.4 | X | 228.80272 | 147.78086 | 215.38917 | 32.52417 | 0.2246502 | 0.23353598 | 2.6115611 | 20 | 4 18.5 | 17.9 |
| 59512 1999 $JW_{14}$ | 14.9 | X | 64.34237 | 266.36000 | 209.78670 | 14.73808 | 0.0694501 | 0.22869760 | 2.6482662 | 20 | 3 3.2 | 18.4 |
| 59513 1999 $JX_{14}$ | 14.6 | X | 145.36836 | 204.07406 | 124.95555 | 6.99934 | 0.0482312 | 0.21756334 | 2.7378663 | 20 | — | — |
| 59514 1999 $JY_{14}$ | 15.4 | X | 190.02969 | 189.43989 | 153.27163 | 5.14316 | 0.2063775 | 0.31780348 | 2.1266545 | 20 | 2 16.3 | 18.7 |
| 59515 1999 $JP_{15}$ | 14.7 | X | 197.61303 | 144.59780 | 159.85398 | 11.91861 | 0.1165861 | 0.22053921 | 2.7131815 | 20 | 1 14.5 | 19.1 |
| 59516 1999 $JX_{15}$ | 14.5 | X | 318.18954 | 222.91361 | 47.52973 | 14.81829 | 0.1228386 | 0.23174524 | 2.6249971 | 20 | 4 19.4 | 17.7 |
| 59517 1999 $JA_{16}$ | 14.3 | X | 79.53428 | 182.58721 | 52.55573 | 5.65781 | 0.1147968 | 0.24470679 | 2.5314656 | 20 | 9 18.8 | 17.8 |
| 59518 1999 $JX_{17}$ | 14.2 | X | 58.30774 | 66.35397 | 238.83545 | 11.48518 | 0.0850682 | 0.25213105 | 2.4815241 | 20 | 11 18.0 | 17.3 |
| 59519 1999 $JK_{18}$ | 15.5 | X | 76.99488 | 331.45020 | 233.03747 | 7.01046 | 0.1596822 | 0.24261253 | 2.5460127 | 20 | 8 5.5 | 19.1 |
| 59520 1999 $JY_{18}$ | 15.1 | X | 259.98822 | 24.49913 | 269.51174 | 4.88157 | 0.1339929 | 0.27582067 | 2.3373200 | 20 | 2 23.7 | 18.5 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59521 1999 $JS_{20}$ | 15.4 | $X$ | 160.29429 | 94.11592 | 210.49075 | 5.46765 | 0.1188928 | 0.31095650 | 2.1577591 | 20 | — | — |
| 59522 1999 $JR_{21}$ | 14.1 | $X$ | 160.21597 | 68.95579 | 258.49797 | 5.58121 | 0.1396192 | 0.26666141 | 2.3905396 | 20 | 1 1.1 | 17.6 |
| 59523 1999 $JM_{22}$ | 14.2 | $X$ | 280.28535 | 78.83673 | 231.16276 | 12.92864 | 0.0852517 | 0.23406382 | 2.6076333 | 20 | 4 19.5 | 17.8 |
| 59524 1999 $JU_{22}$ | 14.4 | $X$ | 55.22574 | 350.48326 | 223.25557 | 12.74390 | 0.0344811 | 0.24020310 | 2.5630101 | 20 | 6 30.0 | 17.9 |
| 59525 1999 $JE_{23}$ | 13.9 | $X$ | 331.99730 | 291.12268 | 215.09769 | 23.42185 | 0.2372305 | 0.17717701 | 3.1395288 | 20 | — | — |
| 59526 1999 $JS_{23}$ | 14.2 | $X$ | 220.07626 | 102.10894 | 217.66609 | 8.35318 | 0.2053070 | 0.22566398 | 2.6719473 | 20 | 2 18.0 | 18.9 |
| 59527 1999 $JE_{24}$ | 13.8 | $X$ | 98.93647 | 355.66403 | 40.31024 | 13.74203 | 0.1634481 | 0.22249002 | 2.6972986 | 20 | 1 31.3 | 17.6 |
| 59528 1999 $JK_{24}$ | 14.3 | $X$ | 132.21008 | 286.69888 | 33.46398 | 9.34795 | 0.1617090 | 0.21460456 | 2.7629737 | 20 | — | — |
| 59529 1999 $JT_{24}$ | 14.5 | $X$ | 194.64261 | 256.90055 | 30.64185 | 14.83041 | 0.1609257 | 0.21864922 | 2.7287941 | 20 | — | — |
| 59530 1999 $JU_{24}$ | 12.8 | $X$ | 337.37950 | 143.71843 | 25.24190 | 11.84358 | 0.0360025 | 0.17760491 | 3.1344841 | 20 | 1 24.5 | 17.3 |
| 59531 1999 $JW_{25}$ | 14.3 | $X$ | 327.00020 | 278.52413 | 40.17171 | 8.05299 | 0.2107481 | 0.23907475 | 2.5710680 | 20 | 7 1.9 | 16.6 |
| 59532 1999 $JD_{26}$ | 15.2 | $X$ | 281.97098 | 210.25185 | 44.62228 | 15.46303 | 0.0962591 | 0.22739727 | 2.6583524 | 20 | 2 18.7 | 19.2 |
| 59533 1999 $JT_{26}$ | 15.3 | $X$ | 61.24159 | 154.57845 | 60.64684 | 1.58845 | 0.0601683 | 0.24084282 | 2.5584695 | 20 | 7 17.2 | 18.5 |
| 59534 1999 $JH_{27}$ | 15.9 | $X$ | 167.65871 | 218.50066 | 89.41078 | 2.49886 | 0.1703685 | 0.26426592 | 2.4049642 | 20 | — | — |
| 59535 1999 $JQ_{27}$ | 14.3 | $X$ | 338.61515 | 44.58318 | 217.98742 | 13.11632 | 0.0634875 | 0.23567641 | 2.5957248 | 20 | 5 15.3 | 17.3 |
| 59536 1999 $JP_{28}$ | 15.6 | $X$ | 37.86476 | 286.43150 | 254.48098 | 1.20229 | 0.1275795 | 0.23452766 | 2.6041940 | 20 | 4 30.0 | 18.5 |
| 59537 1999 $JQ_{29}$ | 15.7 | $X$ | 32.41866 | 208.85574 | 21.80080 | 5.01582 | 0.0855725 | 0.28574006 | 2.2829091 | 20 | 6 30.8 | 18.0 |
| 59538 1999 $JR_{29}$ | 15.5 | $X$ | 2.03822 | 142.04033 | 89.99741 | 3.20431 | 0.1024645 | 0.23532836 | 2.5982835 | 20 | 5 9.4 | 18.3 |
| 59539 1999 $JU_{30}$ | 15.6 | $X$ | 349.99307 | 297.10407 | 308.10396 | 3.02857 | 0.2124992 | 0.23417881 | 2.6067796 | 20 | 4 25.9 | 17.8 |
| 59540 1999 $JC_{31}$ | 15.0 | $X$ | 184.77213 | 209.70862 | 8.61383 | 1.61508 | 0.0234116 | 0.25720590 | 2.4487743 | 20 | 12 26.4 | 18.3 |
| 59541 1999 $JE_{31}$ | 14.7 | $X$ | 294.91806 | 105.98157 | 235.86786 | 1.85763 | 0.3292995 | 0.23641126 | 2.5903430 | 20 | 5 15.6 | 18.0 |
| 59542 1999 $JG_{31}$ | 14.8 | $X$ | 255.30253 | 104.52663 | 225.41166 | 9.78263 | 0.2681447 | 0.23036606 | 2.6354638 | 20 | 3 26.1 | 19.3 |
| 59543 1999 $JU_{31}$ | 15.2 | $X$ | 35.90669 | 173.29965 | 64.62109 | 3.38111 | 0.1009308 | 0.23982674 | 2.5656908 | 20 | 7 17.2 | 18.2 |
| 59544 1999 $JH_{32}$ | 14.9 | $X$ | 22.01608 | 46.73344 | 202.38711 | 8.34490 | 0.1203914 | 0.23913244 | 2.5706545 | 20 | 7 9.8 | 17.9 |
| 59545 1999 $JZ_{32}$ | 15.0 | $X$ | 349.24139 | 221.55942 | 63.73358 | 3.11550 | 0.1809812 | 0.23813826 | 2.5778042 | 20 | 7 2.8 | 17.1 |
| 59546 1999 $JV_{34}$ | 14.7 | $X$ | 49.82261 | 127.95573 | 232.68147 | 14.33717 | 0.3043537 | 0.25388265 | 2.4700972 | 20 | — | — |
| 59547 1999 $JS_{35}$ | 14.8 | $X$ | 78.86412 | 319.52818 | 200.50283 | 7.30055 | 0.1350454 | 0.23726669 | 2.5841132 | 20 | 6 7.0 | 18.2 |
| 59548 1999 $JU_{35}$ | 14.8 | $X$ | 305.21486 | 256.99021 | 58.89871 | 15.48680 | 0.1182874 | 0.23670258 | 2.5882172 | 20 | 5 28.9 | 17.9 |
| 59549 1999 $JE_{36}$ | 15.1 | $X$ | 248.24973 | 321.36492 | 211.96915 | 11.73943 | 0.0562268 | 0.21305790 | 2.7763291 | 20 | 12 31.5 | 19.0 |
| 59550 1999 $JH_{37}$ | 14.7 | $X$ | 132.10025 | 212.65051 | 258.04349 | 2.49065 | 0.0768483 | 0.23699273 | 2.5861043 | 20 | 5 29.8 | 18.4 |
| 59551 1999 $JL_{37}$ | 14.0 | $X$ | 347.31342 | 72.90562 | 232.05742 | 12.47310 | 0.1665532 | 0.24000223 | 2.5644399 | 20 | 7 25.4 | 16.7 |
| 59552 1999 $JM_{38}$ | 14.5 | $X$ | 64.71477 | 28.04635 | 229.62464 | 13.94891 | 0.1377880 | 0.24550399 | 2.5259826 | 20 | 9 26.5 | 18.2 |
| 59553 1999 $JP_{40}$ | 15.3 | $X$ | 31.28166 | 100.38174 | 216.69421 | 10.73434 | 0.1284638 | 0.24779662 | 2.5103781 | 20 | 11 4.3 | 18.4 |
| 59554 1999 $JW_{40}$ | 15.3 | $X$ | 42.13894 | 199.65984 | 61.29799 | 14.40435 | 0.1173986 | 0.24274083 | 2.5451155 | 20 | 9 9.8 | 18.8 |
| 59555 1999 $JE_{41}$ | 15.1 | $X$ | 1.92176 | 199.51684 | 118.79562 | 4.68916 | 0.2073627 | 0.24303556 | 2.5430574 | 20 | 9 30.6 | 17.4 |
| 59556 1999 $JF_{41}$ | 14.7 | $X$ | 39.51954 | 208.65011 | 71.05138 | 12.11501 | 0.0332291 | 0.24540384 | 2.5266698 | 20 | 9 17.9 | 18.2 |
| 59557 1999 $JH_{41}$ | 15.5 | $X$ | 252.58339 | 179.50865 | 73.48263 | 10.72765 | 0.1585916 | 0.22222522 | 2.6994408 | 20 | 1 3.9 | 19.8 |
| 59558 1999 $JR_{41}$ | 14.8 | $X$ | 263.44614 | 118.71522 | 209.23061 | 10.96585 | 0.2536930 | 0.23064245 | 2.6333579 | 20 | 4 2.6 | 18.9 |
| 59559 1999 $JD_{42}$ | 15.0 | $X$ | 175.97851 | 68.56662 | 54.06005 | 12.85215 | 0.1048167 | 0.24436005 | 2.5338598 | 20 | 8 9.7 | 19.1 |
| 59560 1999 $JG_{42}$ | 14.7 | $X$ | 45.31190 | 127.17250 | 220.34899 | 4.73373 | 0.1238192 | 0.20664432 | 2.8334817 | 20 | 12 20.7 | 18.6 |
| 59561 1999 $JQ_{42}$ | 16.2 | $X$ | 28.21368 | 35.93103 | 237.77739 | 2.45801 | 0.2027561 | 0.24152548 | 2.5536463 | 20 | 9 9.2 | 18.9 |
| 59562 1999 $JK_{43}$ | 14.3 | $X$ | 295.12865 | 21.99379 | 241.69356 | 11.55662 | 0.2124009 | 0.22835470 | 2.6509167 | 20 | 2 16.4 | 18.4 |
| 59563 1999 $JO_{45}$ | 15.5 | $X$ | 53.97027 | 217.37712 | 67.77267 | 6.45374 | 0.0848388 | 0.24728987 | 2.5138065 | 20 | 10 18.8 | 18.8 |
| 59564 1999 $JR_{46}$ | 14.6 | $X$ | 250.19377 | 74.34186 | 71.03956 | 6.51960 | 0.0694437 | 0.25642458 | 2.4537461 | 20 | 12 9.5 | 17.4 |
| 59565 1999 $JT_{46}$ | 14.2 | $X$ | 75.94323 | 81.24989 | 74.50505 | 5.21522 | 0.0879777 | 0.23527722 | 2.5986600 | 20 | 5 20.3 | 17.6 |
| 59566 1999 $JU_{46}$ | 15.4 | $X$ | 134.14654 | 354.38731 | 179.24403 | 2.52725 | 0.1101219 | 0.24515977 | 2.5283464 | 20 | 8 26.5 | 19.2 |
| 59567 1999 $JU_{47}$ | 15.7 | $X$ | 350.95044 | 260.04928 | 8.92017 | 2.97837 | 0.1792874 | 0.23613012 | 2.5923986 | 20 | 6 9.4 | 18.1 |
| 59568 1999 $JW_{47}$ | 14.9 | $X$ | 332.27927 | 261.10971 | 22.17790 | 3.62955 | 0.0892045 | 0.23600960 | 2.5932811 | 20 | 5 31.1 | 17.7 |
| 59569 1999 $JJ_{48}$ | 14.4 | $X$ | 305.93145 | 1.03508 | 269.03032 | 6.03839 | 0.0916734 | 0.27787487 | 2.3257866 | 20 | 3 24.9 | 17.2 |
| 59570 1999 $JX_{48}$ | 14.4 | $X$ | 38.02704 | 64.87776 | 237.13814 | 4.86663 | 0.1233924 | 0.24647959 | 2.5193127 | 20 | 10 22.0 | 17.5 |
| 59571 1999 $JY_{48}$ | 14.8 | $X$ | 164.70349 | 283.05777 | 40.10583 | 2.34626 | 0.1984350 | 0.21724263 | 2.7405602 | 20 | 1 12.7 | 19.2 |
| 59572 1999 $JA_{49}$ | 15.0 | $X$ | 339.75749 | 75.25626 | 235.59999 | 6.60791 | 0.1908272 | 0.23890825 | 2.5722625 | 20 | 7 19.4 | 17.4 |
| 59573 1999 $JK_{49}$ | 14.9 | $X$ | 314.57710 | 105.75356 | 226.24536 | 7.79973 | 0.1022118 | 0.23935017 | 2.5690954 | 20 | 7 9.2 | 18.0 |
| 59574 1999 $JE_{50}$ | 14.6 | $X$ | 184.33582 | 130.12398 | 164.51208 | 5.00398 | 0.0918084 | 0.21799350 | 2.7342635 | 20 | — | — |
| 59575 1999 $JB_{51}$ | 14.4 | $X$ | 232.20086 | 119.35292 | 214.50307 | 11.54033 | 0.1448043 | 0.22835133 | 2.6509428 | 20 | 3 19.3 | 18.7 |
| 59576 1999 $JM_{51}$ | 15.1 | $X$ | 318.71770 | 176.34345 | 61.06466 | 12.90160 | 0.0347145 | 0.22917902 | 2.6445563 | 20 | 3 23.0 | 18.8 |
| 59577 1999 $JS_{51}$ | 15.1 | $X$ | 227.84914 | 240.65161 | 204.91894 | 2.21016 | 0.0173233 | 0.29126718 | 2.2539365 | 20 | 8 30.9 | 17.6 |
| 59578 1999 $JA_{53}$ | 14.3 | $X$ | 353.76771 | 299.41538 | 224.00398 | 15.36274 | 0.1499509 | 0.17886466 | 3.1197492 | 20 | 1 20.8 | 18.4 |
| 59579 1999 $JO_{53}$ | 14.3 | $X$ | 273.49748 | 268.94506 | 77.46394 | 12.77341 | 0.1947010 | 0.23451316 | 2.6043013 | 20 | 5 17.3 | 18.0 |
| 59580 1999 $JC_{54}$ | 15.7 | $X$ | 346.26290 | 202.08458 | 69.26826 | 3.37928 | 0.1422605 | 0.23574560 | 2.5952168 | 20 | 6 4.9 | 18.2 |
| 59581 1999 $JD_{54}$ | 14.5 | $X$ | 342.30182 | 14.88995 | 231.91630 | 12.66551 | 0.1240631 | 0.23286292 | 2.6165909 | 20 | 4 21.2 | 17.3 |
| 59582 1999 $JE_{55}$ | 14.5 | $X$ | 251.19851 | 359.55295 | 217.32699 | 12.37119 | 0.0835579 | 0.21765296 | 2.7371147 | 20 | — | — |
| 59583 1999 $JM_{55}$ | 15.4 | $X$ | 108.75425 | 83.72754 | 80.56902 | 12.54498 | 0.2348598 | 0.24190890 | 2.5509473 | 20 | 7 31.7 | 19.6 |
| 59584 1999 $JT_{55}$ | 15.1 | $X$ | 307.23124 | 113.12278 | 174.97267 | 5.76033 | 0.1289851 | 0.23244522 | 2.6197246 | 20 | 4 23.9 | 18.2 |
| 59585 1999 $JV_{55}$ | 14.1 | $X$ | 66.57490 | 42.40099 | 33.90750 | 13.06186 | 0.1574954 | 0.22341774 | 2.6898266 | 20 | 2 4.3 | 17.4 |
| 59586 1999 $JB_{56}$ | 14.8 | $X$ | 139.49985 | 103.69929 | 18.80235 | 5.48446 | 0.1839621 | 0.24003557 | 2.5642024 | 20 | 7 1.0 | 18.9 |
| 59587 1999 $JJ_{56}$ | 14.5 | $X$ | 136.18178 | 112.90174 | 210.72028 | 12.32238 | 0.2026482 | 0.21338024 | 2.7735325 | 20 | — | — |
| 59588 1999 $JL_{56}$ | 15.0 | $X$ | 161.56405 | 126.50571 | 164.13925 | 3.95303 | 0.1398578 | 0.21385757 | 2.7694039 | 20 | — | — |
| 59589 1999 $JU_{56}$ | 14.8 | $X$ | 338.19607 | 165.91742 | 74.36872 | 8.59747 | 0.0716169 | 0.23196184 | 2.6233628 | 20 | 4 16.1 | 18.0 |
| 59590 1999 $JL_{57}$ | 14.7 | $X$ | 18.67738 | 211.77138 | 83.66457 | 6.63683 | 0.2551797 | 0.24150109 | 2.5538183 | 20 | 10 8.6 | 17.4 |
| 59591 1999 $JR_{58}$ | 14.8 | $X$ | 171.55477 | 55.04965 | 225.51799 | 7.00540 | 0.2085184 | 0.21311803 | 2.7758069 | 20 | — | — |
| 59592 1999 $JW_{58}$ | 14.6 | $X$ | 359.23228 | 287.21115 | 225.20935 | 12.74265 | 0.1195970 | 0.22453867 | 2.6808671 | 20 | 1 10.3 | 18.0 |
| 59593 1999 $JY_{58}$ | 15.2 | $X$ | 300.03889 | 192.57888 | 93.27882 | 4.28541 | 0.1377701 | 0.23111351 | 2.6297784 | 20 | 4 9.8 | 18.6 |
| 59594 1999 $JG_{59}$ | 14.7 | $X$ | 159.81833 | 216.21062 | 87.09427 | 10.43394 | 0.1430924 | 0.21450042 | 2.7638679 | 20 | — | — |
| 59595 1999 $JK_{60}$ | 14.3 | $X$ | 90.08218 | 286.89850 | 337.05559 | 4.18887 | 0.1361923 | 0.29519479 | 2.2338993 | 20 | 11 13.2 | 17.5 |
| 59596 1999 $JR_{60}$ | 14.7 | $X$ | 5.33071 | 34.41155 | 203.81839 | 4.33927 | 0.2028985 | 0.23459847 | 2.6036699 | 20 | 5 26.2 | 16.8 |
| 59597 1999 $JY_{60}$ | 15.3 | $X$ | 103.75988 | 185.22505 | 90.84845 | 6.78465 | 0.1523690 | 0.29808517 | 2.2194352 | 20 | 12 15.2 | 18.7 |
| 59598 1999 $JL_{61}$ | 15.4 | $X$ | 49.78221 | 99.87505 | 200.31205 | 5.22554 | 0.2345733 | 0.24589445 | 2.5233078 | 20 | 11 21.2 | 18.9 |
| 59599 1999 $JM_{62}$ | 14.3 | $X$ | 148.13895 | 268.11534 | 223.06966 | 13.67935 | 0.0544445 | 0.23931922 | 2.5693169 | 20 | 7 11.1 | 18.2 |
| 59600 1999 $JX_{62}$ | 14.4 | $X$ | 165.25834 | 226.64546 | 110.51861 | 6.01786 | 0.0497602 | 0.22006977 | 2.7170385 | 20 | 1 17.7 | 18.2 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59601 1999 $JL_{63}$ | 16.3 | $X$ | 17.73774 | 122.11167 | 112.10673 | 2.55119 | 0.2046522 | 0.28272101 | 2.2991325 | 20 | 6 21.5 | 17.6 |
| 59602 1999 $JW_{63}$ | 14.3 | $X$ | 205.39307 | 77.13831 | 215.63310 | 12.07225 | 0.1458200 | 0.21858544 | 2.7293248 | 20 | 1 7.4 | 18.9 |
| 59603 1999 $JX_{63}$ | 14.0 | $X$ | 127.79704 | 150.85767 | 164.82405 | 6.45347 | 0.0561879 | 0.21210039 | 2.7846786 | 20 | — | — |
| 59604 1999 $JQ_{64}$ | 15.3 | $X$ | 319.28505 | 228.30946 | 86.55143 | 14.35788 | 0.1674979 | 0.23603907 | 2.5930653 | 20 | 6 14.9 | 17.9 |
| 59605 1999 $JZ_{64}$ | 15.1 | $X$ | 31.99835 | 184.70177 | 77.02171 | 6.06581 | 0.0948284 | 0.28692078 | 2.2766418 | 20 | 8 22.1 | 17.5 |
| 59606 1999 $JK_{65}$ | 15.2 | $X$ | 243.32824 | 57.16961 | 57.15116 | 11.33551 | 0.2103336 | 0.25641019 | 2.4538378 | 20 | 10 3.3 | 18.6 |
| 59607 1999 $JV_{65}$ | 14.4 | $X$ | 130.35076 | 106.60583 | 196.61005 | 3.14110 | 0.0282153 | 0.26195748 | 2.4190723 | 20 | — | — |
| 59608 1999 $JQ_{66}$ | 14.7 | $X$ | 32.24717 | 67.18657 | 190.93581 | 3.98683 | 0.0960049 | 0.24241454 | 2.5473988 | 20 | 8 7.3 | 17.8 |
| 59609 1999 $JB_{67}$ | 15.3 | $X$ | 60.45195 | 115.02093 | 122.04744 | 5.56526 | 0.1032562 | 0.24391757 | 2.5369232 | 20 | 8 23.9 | 18.5 |
| 59610 1999 $JE_{67}$ | 15.5 | $X$ | 354.40574 | 130.04762 | 117.80601 | 4.04196 | 0.1810428 | 0.23592192 | 2.5939236 | 20 | 5 16.2 | 17.8 |
| 59611 1999 $JY_{67}$ | 15.0 | $X$ | 299.63558 | 92.07802 | 197.51055 | 12.74387 | 0.1692568 | 0.23322749 | 2.6138634 | 20 | 4 6.8 | 18.3 |
| 59612 1999 $JZ_{67}$ | 15.4 | $X$ | 18.23920 | 60.98844 | 108.11280 | 4.58470 | 0.1311280 | 0.27813505 | 2.3243359 | 20 | 3 1.9 | 17.5 |
| 59613 1999 $JS_{68}$ | 14.7 | $X$ | 20.47906 | 217.79077 | 189.77210 | 5.62484 | 0.0863710 | 0.26117489 | 2.4239023 | 20 | — | — |
| 59614 1999 $JR_{69}$ | 15.4 | $X$ | 357.00113 | 81.38756 | 129.40525 | 3.83437 | 0.1241291 | 0.23299513 | 2.6156010 | 20 | 3 30.3 | 18.2 |
| 59615 1999 $JT_{69}$ | 14.7 | $X$ | 359.00962 | 132.18312 | 122.26340 | 6.26265 | 0.1458562 | 0.23716142 | 2.5848779 | 20 | 6 6.3 | 17.2 |
| 59616 1999 $JY_{69}$ | 14.3 | $X$ | 96.15024 | 277.59257 | 191.54309 | 12.23093 | 0.1229702 | 0.23398147 | 2.6082451 | 20 | 4 20.9 | 17.8 |
| 59617 1999 $JM_{70}$ | 15.5 | $X$ | 30.34326 | 103.48288 | 182.39293 | 4.66093 | 0.1497235 | 0.24433505 | 2.5340326 | 20 | 9 23.1 | 18.4 |
| 59618 1999 $JR_{70}$ | 15.4 | $X$ | 316.57602 | 174.51251 | 121.79725 | 4.74973 | 0.1484107 | 0.23600294 | 2.5933299 | 20 | 5 17.5 | 18.3 |
| 59619 1999 $JG_{71}$ | 15.5 | $X$ | 31.46283 | 145.40863 | 150.61516 | 5.95131 | 0.2304469 | 0.24482890 | 2.5306238 | 20 | 10 24.9 | 18.6 |
| 59620 1999 $JY_{71}$ | 16.1 | $X$ | 173.42336 | 114.12985 | 89.29999 | 5.16825 | 0.1440916 | 0.25450509 | 2.4660681 | 20 | 11 14.1 | 19.9 |
| 59621 1999 $JN_{72}$ | 14.6 | $X$ | 155.02261 | 136.09940 | 197.58747 | 13.00292 | 0.2021555 | 0.21833785 | 2.7313878 | 20 | 1 13.9 | 19.2 |
| 59622 1999 $JX_{72}$ | 14.2 | $X$ | 114.71622 | 271.54738 | 62.49958 | 15.78458 | 0.2125496 | 0.21294877 | 2.7772776 | 20 | — | — |
| 59623 1999 $JE_{73}$ | 14.9 | $X$ | 168.52265 | 241.51597 | 73.17402 | 12.61554 | 0.1966338 | 0.21776220 | 2.7361993 | 20 | 1 5.6 | 19.4 |
| 59624 1999 $JS_{73}$ | 14.8 | $X$ | 342.72305 | 359.85875 | 208.03873 | 13.21292 | 0.1041965 | 0.22958022 | 2.6414744 | 20 | 2 27.0 | 18.2 |
| 59625 1999 $JU_{73}$ | 14.7 | $X$ | 142.37903 | 128.28962 | 200.62845 | 11.75758 | 0.1631799 | 0.21598669 | 2.7511740 | 20 | — | — |
| 59626 1999 $JA_{75}$ | 13.7 | $X$ | 132.43522 | 212.35547 | 109.57053 | 17.70408 | 0.2255418 | 0.25845165 | 2.4408992 | 20 | — | — |
| 59627 1999 $JH_{76}$ | 14.1 | $X$ | 183.28430 | 84.88293 | 228.18720 | 11.10488 | 0.1560023 | 0.21952630 | 2.7215209 | 20 | 1 11.7 | 18.7 |
| 59628 1999 $JP_{76}$ | 14.2 | $X$ | 345.28321 | 139.19910 | 206.81817 | 10.91729 | 0.1020865 | 0.24418131 | 2.5350962 | 20 | 9 24.2 | 17.0 |
| 59629 1999 $JV_{76}$ | 14.0 | $X$ | 301.38522 | 225.70736 | 95.23834 | 15.35040 | 0.1192661 | 0.23479778 | 2.6021963 | 20 | 6 2.4 | 17.2 |
| 59630 1999 $JK_{77}$ | 15.1 | $X$ | 280.55818 | 143.45701 | 145.39697 | 13.94824 | 0.2086500 | 0.22887058 | 2.6469317 | 20 | 3 10.6 | 19.1 |
| 59631 1999 $JY_{77}$ | 14.8 | $X$ | 264.13980 | 59.06554 | 136.08686 | 6.93242 | 0.0675861 | 0.26343232 | 2.4100350 | 20 | — | — |
| 59632 1999 $JZ_{77}$ | 14.1 | $X$ | 151.95270 | 191.51108 | 109.93839 | 10.92388 | 0.2273205 | 0.21209407 | 2.7847339 | 20 | — | — |
| 59633 1999 $JC_{78}$ | 13.7 | $X$ | 60.10178 | 22.12467 | 207.17668 | 12.91689 | 0.1162748 | 0.24037885 | 2.5617606 | 20 | 8 8.5 | 17.3 |
| 59634 1999 $JS_{79}$ | 15.0 | $X$ | 347.87748 | 72.69804 | 193.92443 | 6.65696 | 0.0865923 | 0.23572402 | 2.5953753 | 20 | 6 4.4 | 18.0 |
| 59635 1999 $JJ_{80}$ | 14.5 | $X$ | 263.15007 | 132.13115 | 164.87542 | 11.10408 | 0.2308556 | 0.22694429 | 2.6618886 | 20 | 2 27.9 | 18.8 |
| 59636 1999 $JJ_{81}$ | 15.0 | $X$ | 236.51147 | 40.30901 | 209.79798 | 5.43375 | 0.2387873 | 0.26316429 | 2.4116711 | 20 | — | — |
| 59637 1999 $JF_{82}$ | 13.6 | $X$ | 337.27077 | 297.25992 | 171.52532 | 12.90547 | 0.0673435 | 0.17083215 | 3.2167920 | 20 | — | — |
| 59638 1999 $JH_{82}$ | 14.4 | $X$ | 349.91224 | 107.00116 | 179.22330 | 13.31712 | 0.1848964 | 0.23879129 | 2.5731024 | 20 | 7 4.4 | 17.0 |
| 59639 1999 $JS_{83}$ | 14.8 | $X$ | 43.60114 | 74.98030 | 163.39509 | 12.66699 | 0.1150279 | 0.24019672 | 2.5630554 | 20 | 7 30.2 | 17.9 |
| 59640 1999 $JH_{84}$ | 14.6 | $X$ | 304.32727 | 168.03773 | 114.42848 | 16.11200 | 0.1152091 | 0.23179608 | 2.6246133 | 20 | 4 20.9 | 18.3 |
| 59641 1999 $JS_{85}$ | 15.4 | $X$ | 347.45154 | 181.99742 | 169.91324 | 5.34035 | 0.2099494 | 0.29229661 | 2.2486414 | 20 | 11 6.3 | 17.0 |
| 59642 1999 $JZ_{86}$ | 14.5 | $X$ | 355.89765 | 188.20888 | 145.68801 | 13.78142 | 0.1954987 | 0.24633423 | 2.5203037 | 20 | 10 13.8 | 17.0 |
| 59643 1999 $JA_{87}$ | 14.7 | $X$ | 284.46715 | 236.82908 | 98.24737 | 13.03168 | 0.1692937 | 0.23767940 | 2.5811209 | 20 | 5 21.2 | 18.2 |
| 59644 1999 $JS_{88}$ | 14.5 | $X$ | 70.17647 | 182.08732 | 124.58107 | 7.62677 | 0.0622135 | 0.25362842 | 2.4717475 | 20 | 12 3.3 | 17.9 |
| 59645 1999 $JH_{89}$ | 15.0 | $X$ | 209.80164 | 39.32584 | 187.08987 | 9.15507 | 0.0937064 | 0.21495188 | 2.7599966 | 20 | — | — |
| 59646 1999 $JX_{89}$ | 14.8 | $X$ | 297.00979 | 207.60386 | 99.53532 | 15.34470 | 0.1744727 | 0.23458109 | 2.6037986 | 20 | 5 3.3 | 18.4 |
| 59647 1999 $JY_{89}$ | 15.0 | $X$ | 5.80088 | 155.17114 | 151.87859 | 12.72443 | 0.1708292 | 0.24331338 | 2.5411212 | 20 | 9 15.7 | 17.5 |
| 59648 1999 $JA_{90}$ | 14.2 | $X$ | 257.48899 | 144.91543 | 173.89652 | 12.93333 | 0.0481766 | 0.23255403 | 2.6189074 | 20 | 4 11.2 | 17.8 |
| 59649 1999 $JB_{90}$ | 15.2 | $X$ | 231.15339 | 240.46304 | 140.54934 | 6.00672 | 0.1107179 | 0.28359213 | 2.2944218 | 20 | 5 23.5 | 18.4 |
| 59650 1999 $JZ_{90}$ | 15.0 | $X$ | 201.44675 | 70.32447 | 189.43430 | 10.86863 | 0.1515616 | 0.21640724 | 2.7476085 | 20 | — | — |
| 59651 1999 $JK_{91}$ | 13.3 | $X$ | 150.75134 | 260.17296 | 97.52731 | 21.20225 | 0.1823870 | 0.17619775 | 3.1511504 | 20 | 2 16.4 | 18.6 |
| 59652 1999 $JM_{92}$ | 14.9 | $X$ | 222.69232 | 178.73521 | 116.52316 | 11.41896 | 0.0679935 | 0.22445929 | 2.6814992 | 20 | 1 29.8 | 18.9 |
| 59653 1999 $JZ_{92}$ | 15.0 | $X$ | 296.16117 | 197.42009 | 110.95478 | 13.52968 | 0.1744470 | 0.23395711 | 2.6084262 | 20 | 5 2.9 | 18.6 |
| 59654 1999 $JB_{94}$ | 14.6 | $X$ | 309.01635 | 204.48039 | 141.11573 | 8.71583 | 0.2111576 | 0.23924308 | 2.5698619 | 20 | 7 4.6 | 17.3 |
| 59655 1999 $JN_{94}$ | 14.9 | $X$ | 195.12678 | 297.96885 | 152.87439 | 14.95178 | 0.0810750 | 0.24193884 | 2.5507368 | 20 | 7 14.7 | 18.8 |
| 59656 1999 $JT_{94}$ | 15.1 | $X$ | 113.98521 | 165.81027 | 158.85337 | 12.94985 | 0.1995152 | 0.25810773 | 2.4430670 | 20 | — | — |
| 59657 1999 $JC_{95}$ | 14.4 | $X$ | 215.18191 | 86.27615 | 188.91084 | 12.07693 | 0.1283640 | 0.21948432 | 2.7218679 | 20 | — | — |
| 59658 1999 $JE_{95}$ | 14.5 | $X$ | 316.52745 | 241.35458 | 91.62877 | 13.17279 | 0.2228357 | 0.23836479 | 2.5761708 | 20 | 6 28.6 | 17.0 |
| 59659 1999 $JM_{95}$ | 14.8 | $X$ | 299.87044 | 226.37545 | 128.80977 | 7.57606 | 0.0876502 | 0.24062714 | 2.5599981 | 20 | 7 22.0 | 17.7 |
| 59660 1999 $JE_{96}$ | 15.0 | $X$ | 39.81672 | 191.64257 | 104.53961 | 15.80197 | 0.1716725 | 0.24576034 | 2.5242257 | 20 | 11 1.8 | 18.6 |
| 59661 1999 $JG_{96}$ | 13.8 | $X$ | 280.17564 | 248.89846 | 116.00840 | 14.80088 | 0.2694487 | 0.23771215 | 2.5808839 | 20 | 6 8.7 | 17.5 |
| 59662 1999 $JN_{96}$ | 14.5 | $X$ | 287.52878 | 115.42126 | 194.44930 | 12.73377 | 0.1677480 | 0.23227394 | 2.6210123 | 20 | 4 19.1 | 18.0 |
| 59663 1999 $JY_{96}$ | 14.0 | $X$ | 127.84747 | 247.71385 | 92.82367 | 17.48644 | 0.1482682 | 0.16897739 | 3.2402883 | 20 | — | — |
| 59664 1999 $JB_{97}$ | 14.8 | $X$ | 240.35950 | 175.76522 | 151.46366 | 12.95726 | 0.1625171 | 0.22836950 | 2.6508022 | 20 | 3 23.0 | 19.0 |
| 59665 1999 $JF_{97}$ | 14.5 | $X$ | 295.27698 | 244.99047 | 122.30436 | 14.47186 | 0.1869107 | 0.24049558 | 2.5609316 | 20 | 7 16.4 | 17.4 |
| 59666 1999 $JH_{97}$ | 14.4 | $X$ | 135.22429 | 175.99040 | 172.75356 | 13.23788 | 0.2436313 | 0.21579233 | 2.7528257 | 20 | 1 18.6 | 18.9 |
| 59667 1999 $JQ_{97}$ | 14.4 | $X$ | 214.08580 | 216.36681 | 112.46009 | 13.53491 | 0.1749515 | 0.22465544 | 2.6799381 | 20 | 3 2.5 | 19.0 |
| 59668 1999 $JG_{98}$ | 14.2 | $X$ | 253.29336 | 265.01049 | 98.94542 | 11.21010 | 0.1483031 | 0.18868493 | 3.0105412 | 20 | 5 23.6 | 18.8 |
| 59669 1999 $JM_{99}$ | 14.8 | $X$ | 45.46425 | 36.02020 | 112.61129 | 12.83851 | 0.1327309 | 0.23009686 | 2.6375190 | 20 | 4 5.5 | 18.0 |
| 59670 1999 $JP_{99}$ | 15.5 | $X$ | 239.60522 | 57.43040 | 197.35421 | 17.72223 | 0.1020759 | 0.21980090 | 2.7192537 | 20 | — | — |
| 59671 1999 $JW_{99}$ | 15.1 | $X$ | 261.58268 | 157.93171 | 186.14999 | 14.21658 | 0.2859266 | 0.23063516 | 2.6334134 | 20 | 4 20.6 | 19.4 |
| 59672 1999 $JG_{100}$ | 14.9 | $X$ | 298.41441 | 110.02747 | 148.51917 | 13.70512 | 0.1761458 | 0.22771375 | 2.6558888 | 20 | 2 24.7 | 18.4 |
| 59673 1999 $JR_{100}$ | 14.8 | $X$ | 28.88319 | 193.54309 | 92.83702 | 16.06496 | 0.1400839 | 0.24223830 | 2.5486342 | 20 | 9 29.5 | 18.2 |
| 59674 1999 $JY_{100}$ | 14.5 | $X$ | 282.62110 | 206.37994 | 140.77181 | 14.60741 | 0.1187352 | 0.23568354 | 2.5956724 | 20 | 6 11.4 | 18.1 |
| 59675 1999 $JC_{101}$ | 15.1 | $X$ | 312.90316 | 127.53653 | 132.08178 | 12.99739 | 0.1642107 | 0.22937797 | 2.6430269 | 20 | 3 22.1 | 18.5 |
| 59676 1999 $JE_{101}$ | 14.5 | $X$ | 97.86112 | 227.36490 | 150.78884 | 12.83128 | 0.0215385 | 0.21786140 | 2.7353686 | 20 | — | — |
| 59677 1999 $JH_{101}$ | 14.9 | $X$ | 308.16678 | 75.80214 | 153.88713 | 10.83047 | 0.0433074 | 0.22555102 | 2.6728394 | 20 | 2 19.4 | 18.5 |
| 59678 1999 $JM_{101}$ | 14.0 | $X$ | 139.67683 | 211.42191 | 179.80555 | 10.76178 | 0.0193267 | 0.18192417 | 3.0846728 | 20 | 2 23.0 | 18.4 |
| 59679 1999 $JM_{102}$ | 15.0 | $X$ | 275.47016 | 140.85034 | 185.47850 | 8.42716 | 0.2414950 | 0.23321615 | 2.6139482 | 20 | 4 16.1 | 18.8 |
| 59680 1999 $JW_{102}$ | 14.3 | $X$ | 0.46752 | 299.74821 | 199.45868 | 12.43078 | 0.1076955 | 0.17765000 | 3.1339537 | 20 | 1 7.6 | 18.5 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59681 1999 $JC_{103}$ | 14.9 | $X$ | 162.26772 | 219.84332 | 86.61034 | 8.44284 | 0.1884679 | 0.21556532 | 2.7547580 | 20 | — | — |
| 59682 1999 $JF_{103}$ | 14.5 | $X$ | 127.30386 | 253.53613 | 93.15531 | 5.99343 | 0.0640618 | 0.21878615 | 2.7276553 | 20 | — | — |
| 59683 1999 $JQ_{104}$ | 14.6 | $X$ | 59.06018 | 124.79331 | 148.64809 | 13.63209 | 0.1693470 | 0.24454703 | 2.5325680 | 20 | 10 23.7 | 18.3 |
| 59684 1999 $JB_{107}$ | 15.0 | $X$ | 344.89829 | 115.73513 | 210.73507 | 7.96257 | 0.0742446 | 0.24295103 | 2.5436472 | 20 | 8 23.4 | 18.0 |
| 59685 1999 $JR_{108}$ | 14.6 | $X$ | 138.56721 | 347.07287 | 100.30838 | 6.99702 | 0.2559322 | 0.23715183 | 2.5849475 | 20 | 5 22.1 | 19.0 |
| 59686 1999 $JS_{108}$ | 15.4 | $X$ | 84.94294 | 210.44199 | 104.17248 | 7.36176 | 0.1323059 | 0.25488142 | 2.4636401 | 20 | — | — |
| 59687 1999 $JU_{108}$ | 15.3 | $X$ | 113.27497 | 62.25692 | 116.52444 | 3.52204 | 0.1537232 | 0.24385305 | 2.5373707 | 20 | 8 15.4 | 19.1 |
| 59688 1999 $JO_{110}$ | 15.5 | $X$ | 336.65798 | 179.46807 | 108.49221 | 5.59732 | 0.0563350 | 0.23847315 | 2.5753903 | 20 | 6 17.8 | 18.6 |
| 59689 1999 $JS_{111}$ | 15.2 | $X$ | 146.68889 | 219.88492 | 166.61671 | 4.87035 | 0.0949369 | 0.27261333 | 2.3556169 | 20 | 2 24.9 | 18.3 |
| 59690 1999 $JD_{112}$ | 15.1 | $X$ | 357.43074 | 349.98644 | 72.96107 | 7.01495 | 0.1473085 | 0.25934108 | 2.4353152 | 20 | — | — |
| 59691 1999 $JM_{113}$ | 14.9 | $X$ | 329.98325 | 317.16115 | 235.19163 | 8.26971 | 0.0779792 | 0.22561374 | 2.6723439 | 20 | 1 24.3 | 18.4 |
| 59692 1999 $JC_{114}$ | 14.9 | $X$ | 71.43313 | 261.99641 | 104.79603 | 3.10844 | 0.1944131 | 0.25805722 | 2.4433857 | 20 | — | — |
| 59693 1999 $JA_{116}$ | 15.4 | $X$ | 318.94451 | 49.93365 | 214.60089 | 11.92053 | 0.1438109 | 0.23160962 | 2.6260218 | 20 | 4 3.8 | 18.5 |
| 59694 1999 $JF_{116}$ | 15.1 | $X$ | 149.18969 | 259.24217 | 84.82701 | 6.45349 | 0.2387591 | 0.26392293 | 2.4070473 | 20 | 1 22.0 | 18.8 |
| 59695 1999 $JU_{116}$ | 15.8 | $X$ | 191.45304 | 168.02214 | 29.32418 | 2.99449 | 0.0840421 | 0.30166117 | 2.2018603 | 20 | 12 10.0 | 18.4 |
| 59696 1999 $JW_{116}$ | 15.4 | $X$ | 353.10285 | 356.71478 | 243.48835 | 11.16992 | 0.1494205 | 0.23353960 | 2.6115340 | 20 | 4 30.2 | 18.2 |
| 59697 1999 $JS_{117}$ | 15.0 | $X$ | 51.65121 | 16.06036 | 148.91088 | 5.40327 | 0.1738543 | 0.23397511 | 2.6082924 | 20 | 5 10.6 | 17.9 |
| 59698 1999 $JJ_{118}$ | 15.8 | $X$ | 224.14547 | 178.89255 | 130.55858 | 4.29010 | 0.1716061 | 0.27103829 | 2.3647339 | 20 | 2 9.2 | 19.6 |
| 59699 1999 $JU_{118}$ | 15.8 | $X$ | 338.46040 | 170.98692 | 115.17932 | 3.95548 | 0.1382130 | 0.23601923 | 2.5932106 | 20 | 6 12.6 | 18.3 |
| 59700 1999 $JX_{118}$ | 14.4 | $X$ | 159.59213 | 94.59984 | 226.41300 | 8.43825 | 0.1055070 | 0.21707133 | 2.7420018 | 20 | — | — |
| 59701 1999 $JP_{119}$ | 14.9 | $X$ | 54.90737 | 81.30978 | 64.23255 | 10.10812 | 0.0476998 | 0.22980790 | 2.6397295 | 20 | 4 4.8 | 18.3 |
| 59702 1999 $JZ_{119}$ | 15.2 | $X$ | 316.24369 | 101.93587 | 222.48295 | 14.36240 | 0.1604386 | 0.23686849 | 2.5870085 | 20 | 6 22.9 | 18.2 |
| 59703 1999 $JB_{120}$ | 15.3 | $X$ | 71.46689 | 45.59071 | 189.53267 | 3.26990 | 0.1667075 | 0.24289340 | 2.5440496 | 20 | 9 12.3 | 18.8 |
| 59704 1999 $JJ_{120}$ | 15.1 | $X$ | 207.95436 | 145.01078 | 55.18456 | 10.58950 | 0.0155169 | 0.25601611 | 2.4563553 | 20 | — | — |
| 59705 1999 $JM_{120}$ | 15.0 | $X$ | 330.02796 | 197.57840 | 60.68736 | 15.11651 | 0.0619007 | 0.23217319 | 2.6217705 | 20 | 4 29.3 | 18.3 |
| 59706 1999 $JT_{120}$ | 14.4 | $X$ | 90.81120 | 287.55109 | 226.58937 | 6.30957 | 0.1385186 | 0.23635457 | 2.5907572 | 20 | 6 14.8 | 17.9 |
| 59707 1999 $JX_{121}$ | 14.9 | $X$ | 327.68057 | 268.18343 | 83.76847 | 11.78796 | 0.2865661 | 0.23965349 | 2.5669271 | 20 | 8 29.0 | 16.8 |
| 59708 1999 $JC_{123}$ | 15.4 | $X$ | 259.56847 | 231.34655 | 87.86218 | 7.56101 | 0.1497105 | 0.27611614 | 2.3356523 | 20 | 4 1.1 | 18.8 |
| 59709 1999 $JL_{123}$ | 14.5 | $X$ | 313.65288 | 85.84241 | 228.52895 | 12.27571 | 0.0377565 | 0.23626567 | 2.5914071 | 20 | 6 20.4 | 17.9 |
| 59710 1999 $JV_{123}$ | 15.4 | $X$ | 82.90491 | 1.29596 | 213.67760 | 4.12192 | 0.1651058 | 0.24217113 | 2.5491055 | 20 | 8 28.6 | 19.2 |
| 59711 1999 $JC_{126}$ | 15.5 | $X$ | 9.99982 | 312.73130 | 233.20746 | 12.58894 | 0.0977046 | 0.23159073 | 2.6261645 | 20 | 3 11.9 | 18.9 |
| 59712 1999 $JN_{126}$ | 15.8 | $X$ | 20.64629 | 250.90326 | 41.74726 | 2.86687 | 0.1195259 | 0.24394798 | 2.5367124 | 20 | 9 13.7 | 18.6 |
| 59713 1999 $JA_{127}$ | 15.1 | $X$ | 270.93156 | 80.60311 | 239.69957 | 12.22036 | 0.1184911 | 0.23152545 | 2.6266582 | 20 | 4 15.6 | 18.9 |
| 59714 1999 $JG_{128}$ | 14.4 | $X$ | 107.28409 | 103.10221 | 34.70760 | 14.06790 | 0.1329244 | 0.23716832 | 2.5848277 | 20 | 6 9.9 | 18.3 |
| 59715 1999 $JM_{129}$ | 15.2 | $X$ | 15.05960 | 122.22436 | 127.58323 | 16.05723 | 0.1405450 | 0.23779091 | 2.5803139 | 20 | 7 1.9 | 17.9 |
| 59716 1999 $JP_{131}$ | 14.3 | $X$ | 319.07528 | 281.62759 | 47.21428 | 14.85641 | 0.1358011 | 0.23798963 | 2.5788774 | 20 | 7 11.8 | 17.4 |
| 59717 1999 $JR_{137}$ | 15.5 | $X$ | 205.28473 | 61.14562 | 178.85730 | 9.11199 | 0.1100304 | 0.21410625 | 2.7672591 | 20 | — | — |
| 59718 1999 $KG_{1}$ | 14.0 | $X$ | 222.12630 | 355.14639 | 238.86386 | 25.25387 | 0.1182837 | 0.21467434 | 2.7623749 | 20 | — | — |
| 59719 1999 $KN_{3}$ | 15.1 | $X$ | 67.77174 | 103.19950 | 152.35835 | 1.57060 | 0.2118021 | 0.24486491 | 2.5303757 | 20 | 10 11.9 | 18.7 |
| 59720 1999 $KH_{5}$ | 16.2 | $X$ | 219.65409 | 245.91322 | 148.16958 | 6.35687 | 0.0739480 | 0.23563195 | 2.5960513 | 20 | 5 30.9 | 20.1 |
| 59721 1999 $KM_{5}$ | 15.2 | $X$ | 81.10934 | 167.04489 | 222.73046 | 10.93107 | 0.1177675 | 0.26546099 | 2.3977408 | 20 | — | — |
| 59722 1999 $KR_{6}$ | 15.1 | $X$ | 279.90300 | 125.32246 | 156.98307 | 18.46812 | 0.3345600 | 0.22553023 | 2.6730036 | 20 | 2 15.1 | 19.5 |
| 59723 1999 $KO_{8}$ | 14.1 | $X$ | 332.33604 | 357.91071 | 239.46289 | 17.11747 | 0.1359857 | 0.23189708 | 2.6238511 | 20 | 3 14.1 | 17.6 |
| 59724 1999 $KV_{13}$ | 14.8 | $X$ | 224.42391 | 175.09353 | 96.44047 | 4.66205 | 0.1482309 | 0.21901286 | 2.7257727 | 20 | 1 1.4 | 19.3 |
| 59725 1999 $KX_{13}$ | 15.3 | $X$ | 276.31861 | 154.62941 | 96.50997 | 11.07280 | 0.1781883 | 0.22380977 | 2.6866846 | 20 | 1 22.9 | 19.4 |
| 59726 1999 $KA_{14}$ | 14.9 | $X$ | 35.82677 | 129.00202 | 80.64490 | 6.80183 | 0.1720901 | 0.23540978 | 2.5976844 | 20 | 6 14.5 | 17.5 |
| 59727 1999 $KC_{15}$ | 15.3 | $X$ | 298.39599 | 340.67404 | 228.64369 | 14.96849 | 0.1086255 | 0.22223856 | 2.6993328 | 20 | 1 1.5 | 19.4 |
| 59728 1999 $KW_{15}$ | 14.6 | $X$ | 45.91955 | 333.04054 | 231.12204 | 13.17389 | 0.0838174 | 0.23538782 | 2.5978460 | 20 | 6 10.9 | 17.8 |
| 59729 1999 $LN$ | 14.3 | $X$ | 152.35483 | 64.11108 | 248.71220 | 14.41389 | 0.2117544 | 0.21027921 | 2.8007337 | 20 | — | — |
| 59730 1999 $LW$ | 15.7 | $X$ | 126.51634 | 169.15461 | 212.48575 | 4.27071 | 0.0880241 | 0.26730269 | 2.3867146 | 20 | 1 23.7 | 18.7 |
| 59731 1999 $LL_{2}$ | 15.3 | $X$ | 277.47785 | 91.39330 | 199.83575 | 11.02424 | 0.1768412 | 0.22836400 | 2.6508448 | 20 | 3 9.8 | 19.3 |
| 59732 1999 $LO_{2}$ | 14.9 | $X$ | 357.26781 | 36.38620 | 158.79722 | 13.52999 | 0.0907024 | 0.22874454 | 2.6479039 | 20 | 3 10.9 | 18.0 |
| 59733 1999 $LR_{2}$ | 15.3 | $X$ | 3.90263 | 133.86603 | 166.15065 | 9.46946 | 0.1269933 | 0.24043310 | 2.5613753 | 20 | 8 23.4 | 17.9 |
| 59734 1999 $LT_{2}$ | 15.6 | $X$ | 19.89757 | 71.48109 | 87.05854 | 5.65611 | 0.1612730 | 0.27446053 | 2.3450357 | 20 | 2 17.9 | 17.5 |
| 59735 1999 $LY_{3}$ | 15.2 | $X$ | 285.10625 | 160.37764 | 151.60339 | 4.75827 | 0.2781099 | 0.22978039 | 2.6399401 | 20 | 4 4.1 | 19.0 |
| 59736 1999 $LA_{5}$ | 14.8 | $X$ | 261.89827 | 83.69446 | 150.25230 | 15.87452 | 0.0876732 | 0.22051290 | 2.7133973 | 20 | — | — |
| 59737 1999 $LC_{6}$ | 13.8 | $X$ | 345.61361 | 42.48565 | 223.37488 | 32.19904 | 0.2097361 | 0.23102620 | 2.6304410 | 20 | 5 20.0 | 16.2 |
| 59738 1999 $LH_{8}$ | 15.3 | $X$ | 162.17630 | 130.14534 | 169.85108 | 8.86301 | 0.1282482 | 0.21499137 | 2.7596586 | 20 | — | — |
| 59739 1999 $LP_{8}$ | 14.7 | $X$ | 307.93539 | 251.74444 | 108.07871 | 15.50683 | 0.1306645 | 0.24174555 | 2.5520963 | 20 | 8 8.2 | 17.6 |
| 59740 1999 $LC_{9}$ | 14.6 | $X$ | 208.57145 | 65.27132 | 198.43518 | 8.44455 | 0.1161750 | 0.21650112 | 2.7468142 | 20 | — | — |
| 59741 1999 $LE_{9}$ | 14.7 | $X$ | 90.77815 | 120.95256 | 104.34037 | 13.35064 | 0.1184440 | 0.24443069 | 2.5333716 | 20 | 9 23.2 | 18.6 |
| 59742 1999 $LN_{9}$ | 14.5 | $X$ | 131.21423 | 200.04979 | 110.36765 | 10.78263 | 0.1382055 | 0.21112734 | 2.7932280 | 20 | — | — |
| 59743 1999 $LV_{9}$ | 15.1 | $X$ | 237.53561 | 194.12777 | 125.63249 | 13.03021 | 0.1870496 | 0.22572890 | 2.6714350 | 20 | 3 11.0 | 19.6 |
| 59744 1999 $LG_{10}$ | 13.7 | $X$ | 267.14350 | 295.46740 | 204.30766 | 13.11081 | 0.0893770 | 0.25637781 | 2.4540444 | 20 | 12 23.7 | 16.8 |
| 59745 1999 $LF_{13}$ | 14.6 | $X$ | 69.05657 | 278.77421 | 231.62924 | 11.74354 | 0.1061971 | 0.23125063 | 2.6287388 | 20 | 5 4.9 | 17.8 |
| 59746 1999 $LN_{13}$ | 14.0 | $X$ | 216.85423 | 195.94913 | 108.25026 | 15.24783 | 0.1510572 | 0.22050178 | 2.7134885 | 20 | 2 3.1 | 18.4 |
| 59747 1999 $LV_{13}$ | 14.4 | $X$ | 43.10980 | 26.34940 | 239.87477 | 11.50144 | 0.1615628 | 0.24068418 | 2.5595936 | 20 | 9 10.7 | 17.8 |
| 59748 1999 $LE_{14}$ | 13.7 | $X$ | 283.32775 | 74.82848 | 236.12115 | 13.99580 | 0.1069701 | 0.22971240 | 2.6404610 | 20 | 4 21.5 | 17.3 |
| 59749 1999 $LZ_{15}$ | 16.2 | $X$ | 167.74811 | 121.05997 | 205.87775 | 20.15495 | 0.0915571 | 0.35716733 | 1.9673799 | 20 | — | — |
| 59750 1999 $LX_{16}$ | 15.3 | $X$ | 329.77281 | 42.29936 | 277.13125 | 4.05845 | 0.2927835 | 0.23700217 | 2.5860356 | 20 | 6 27.6 | 17.1 |
| 59751 1999 $LU_{18}$ | 15.4 | $X$ | 261.92698 | 185.84615 | 83.07520 | 9.06079 | 0.1646075 | 0.22367665 | 2.6877505 | 20 | 2 1.7 | 19.6 |
| 59752 1999 $LW_{19}$ | 14.9 | $X$ | 240.40176 | 229.11115 | 66.14486 | 13.12012 | 0.2711938 | 0.22216018 | 2.6999677 | 20 | 2 10.3 | 19.9 |
| 59753 1999 $LA_{28}$ | 16.0 | $X$ | 15.37498 | 111.11361 | 244.51511 | 5.87259 | 0.1444898 | 0.29504015 | 2.2346798 | 20 | 12 18.8 | 18.4 |
| 59754 1999 $LR_{31}$ | 15.8 | $X$ | 295.02183 | 218.09175 | 108.17292 | 6.29316 | 0.2224875 | 0.27736778 | 2.3286204 | 20 | 5 12.8 | 18.5 |
| 59755 1999 $LY_{32}$ | 14.3 | $X$ | 328.48072 | 247.01111 | 111.27017 | 13.64391 | 0.1983229 | 0.24453619 | 2.5326429 | 20 | 9 18.8 | 16.7 |
| 59756 1999 $LL_{35}$ | 14.5 | $X$ | 147.00998 | 281.54237 | 167.26680 | 21.98791 | 0.1096337 | 0.23426164 | 2.6061651 | 20 | 5 24.7 | 18.9 |
| 59757 1999 $ME$ | 14.9 | $X$ | 230.72591 | 191.05221 | 98.73946 | 13.04507 | 0.1295132 | 0.22021197 | 2.7158687 | 20 | 1 30.4 | 19.3 |
| 59758 1999 $MH$ | 15.2 | $X$ | 238.28121 | 343.63727 | 105.55556 | 9.93675 | 0.0382980 | 0.28744872 | 2.2738534 | 20 | 9 22.7 | 18.1 |
| 59759 1999 $MR$ | 15.3 | $X$ | 304.19438 | 228.97005 | 80.50263 | 4.59201 | 0.2055178 | 0.23048243 | 2.6345766 | 20 | 5 6.3 | 18.4 |
| 59760 1999 $MU$ | 15.1 | $X$ | 281.08042 | 180.20494 | 146.49138 | 14.35269 | 0.1932485 | 0.23140930 | 2.6275370 | 20 | 5 3.6 | 19.0 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59761 1999 $MZ$ | 15.4 | $X$ | 229.24670 | 223.26910 | 100.99824 | 7.69029 | 0.1483573 | 0.26905526 | 2.3763390 | 20 | 3 7.4 | 19.1 |
| 59762 1999 $NB_{1}$ | 15.5 | $X$ | 324.51952 | 149.86899 | 134.64087 | 7.03484 | 0.1385431 | 0.27671493 | 2.3322816 | 20 | 5 15.6 | 17.9 |
| 59763 1999 $NF_{2}$ | 13.8 | $X$ | 226.66490 | 117.66969 | 211.11326 | 15.32909 | 0.1018103 | 0.17529690 | 3.1619371 | 20 | 3 13.6 | 18.8 |
| 59764 1999 $NK_{3}$ | 14.7 | $X$ | 247.46262 | 45.41811 | 263.13510 | 11.10872 | 0.2452379 | 0.22227420 | 2.6990443 | 20 | 2 22.8 | 19.5 |
| 59765 1999 $NN_{4}$ | 14.8 | $X$ | 182.60432 | 204.58295 | 105.66926 | 10.49336 | 0.1871016 | 0.21357411 | 2.7718537 | 20 | 1 12.2 | 19.2 |
| 59766 1999 $NW_{6}$ | 15.3 | $X$ | 265.94570 | 14.76167 | 265.08215 | 1.16451 | 0.2712520 | 0.22192447 | 2.7018791 | 20 | 2 7.2 | 19.8 |
| 59767 1999 $NR_{10}$ | 13.0 | $X$ | 304.56967 | 30.01327 | 308.11662 | 8.52996 | 0.1001019 | 0.18375823 | 3.0641135 | 20 | 7 1.2 | 16.9 |
| 59768 1999 $NV_{10}$ | 14.2 | $X$ | 268.13986 | 52.25769 | 304.13207 | 8.07221 | 0.1060091 | 0.18096669 | 3.0955438 | 20 | 6 2.9 | 18.7 |
| 59769 1999 $NG_{15}$ | 16.0 | $X$ | 252.52492 | 343.56596 | 303.95839 | 2.15826 | 0.1626768 | 0.26893066 | 2.3770729 | 20 | 2 8.3 | 19.7 |
| 59770 1999 $NS_{15}$ | 14.8 | $X$ | 145.86042 | 227.96798 | 112.26897 | 10.40256 | 0.1710373 | 0.21241607 | 2.7819190 | 20 | 1 13.5 | 18.9 |
| 59771 1999 $NX_{17}$ | 14.8 | $X$ | 315.98222 | 225.03956 | 57.38642 | 4.54537 | 0.1691602 | 0.22960868 | 2.6412561 | 20 | 4 23.0 | 17.7 |
| 59772 1999 $NN_{18}$ | 14.7 | $X$ | 243.68256 | 217.18078 | 100.79874 | 15.20766 | 0.2145435 | 0.22304447 | 2.6928267 | 20 | 3 15.7 | 19.4 |
| 59773 1999 $NZ_{21}$ | 14.8 | $X$ | 336.69455 | 319.92121 | 357.54367 | 1.68533 | 0.1352689 | 0.18797423 | 3.0181247 | 20 | 7 22.8 | 18.1 |
| 59774 1999 $NH_{29}$ | 16.2 | $X$ | 204.51159 | 85.30358 | 183.59130 | 0.88321 | 0.1696592 | 0.26031416 | 2.4292424 | 20 | — | — |
| 59775 1999 $NL_{29}$ | 14.9 | $X$ | 194.39244 | 331.06780 | 285.74533 | 6.90326 | 0.1765739 | 0.21046052 | 2.7991250 | 20 | — | — |
| 59776 1999 $NE_{33}$ | 14.7 | $X$ | 321.36863 | 132.98054 | 113.38493 | 12.40712 | 0.1443190 | 0.22536362 | 2.6743208 | 20 | 3 21.9 | 18.2 |
| 59777 1999 $NK_{35}$ | 15.6 | $X$ | 171.22967 | 204.21306 | 86.77610 | 6.24686 | 0.1426521 | 0.25820835 | 2.4424323 | 20 | — | — |
| 59778 1999 $NO_{39}$ | 14.9 | $X$ | 334.87556 | 24.48899 | 325.65544 | 8.21670 | 0.2016023 | 0.23660054 | 2.5889613 | 20 | 9 9.4 | 17.0 |
| 59779 1999 $NU_{40}$ | 14.0 | $X$ | 269.87963 | 355.11856 | 356.66325 | 5.11804 | 0.1894591 | 0.18087483 | 3.0965918 | 20 | 5 17.9 | 18.7 |
| 59780 1999 $NB_{42}$ | 13.8 | $X$ | 320.83498 | 287.73196 | 114.22158 | 10.84466 | 0.0969032 | 0.19280988 | 2.9674486 | 20 | 10 26.4 | 17.6 |
| 59781 1999 $NU_{42}$ | 13.9 | $X$ | 64.41275 | 164.07194 | 316.18998 | 15.06273 | 0.0639156 | 0.17206431 | 3.2014166 | 20 | 3 12.1 | 18.4 |
| 59782 1999 $NG_{43}$ | 14.9 | $X$ | 228.05345 | 191.48895 | 118.05936 | 14.16040 | 0.1713107 | 0.22275845 | 2.6951312 | 20 | 2 19.3 | 19.4 |
| 59783 1999 $NN_{43}$ | 14.8 | $X$ | 46.19102 | 154.02785 | 212.95525 | 4.79592 | 0.1743310 | 0.29907608 | 2.2145301 | 20 | — | — |
| 59784 1999 $NV_{44}$ | 14.8 | $X$ | 240.74516 | 163.94551 | 129.34190 | 13.79864 | 0.1548577 | 0.22208166 | 2.7006040 | 20 | 2 10.6 | 19.2 |
| 59785 1999 $NG_{49}$ | 15.3 | $X$ | 42.88816 | 28.03566 | 257.70625 | 3.80508 | 0.1692563 | 0.28747621 | 2.2737085 | 20 | 10 21.4 | 18.0 |
| 59786 1999 $NY_{52}$ | 14.8 | $X$ | 119.48826 | 79.50630 | 213.76136 | 14.23156 | 0.1451778 | 0.20326857 | 2.8647665 | 20 | 12 30.3 | 19.7 |
| 59787 1999 $NO_{55}$ | 14.4 | $X$ | 176.22504 | 119.86369 | 223.82942 | 12.20840 | 0.2188014 | 0.21437131 | 2.7649775 | 20 | 2 11.3 | 19.3 |
| 59788 1999 $ND_{56}$ | 13.7 | $X$ | 353.88469 | 70.48872 | 224.02611 | 15.43623 | 0.2109039 | 0.18608086 | 3.0385630 | 20 | 7 17.9 | 17.1 |
| 59789 1999 $NO_{56}$ | 14.0 | $X$ | 353.76191 | 9.39413 | 242.35758 | 13.70212 | 0.1843340 | 0.22828707 | 2.6514403 | 20 | 5 19.4 | 16.5 |
| 59790 1999 $NR_{56}$ | 13.7 | $X$ | 278.85294 | 57.87180 | 267.92426 | 11.22512 | 0.1615648 | 0.17866071 | 3.1221231 | 20 | 4 28.3 | 18.4 |
| 59791 1999 $NN_{59}$ | 14.9 | $X$ | 179.70758 | 136.62307 | 208.76902 | 8.14819 | 0.2873252 | 0.21528155 | 2.7571782 | 20 | 2 19.7 | 20.1 |
| 59792 1999 $NL_{60}$ | 14.5 | $X$ | 282.51702 | 1.75690 | 214.79538 | 11.55801 | 0.1446027 | 0.21812981 | 2.7331242 | 20 | — | — |
| 59793 Clapiès | 14.3 | $X$ | 314.01147 | 182.14566 | 131.66798 | 10.97573 | 0.0360810 | 0.18332406 | 3.0689495 | 20 | 6 20.4 | 18.5 |
| 59794 1999 $OE_{1}$ | 15.3 | $X$ | 300.31932 | 175.87615 | 111.40237 | 7.51206 | 0.1593201 | 0.22656392 | 2.6648670 | 20 | 4 10.8 | 18.9 |
| 59795 1999 $OE_{2}$ | 13.0 | $X$ | 350.09566 | 357.81042 | 246.54342 | 15.40000 | 0.0635653 | 0.17393433 | 3.1784289 | 20 | 5 8.3 | 17.3 |
| 59796 1999 $OJ_{3}$ | 14.3 | $X$ | 332.36299 | 109.36326 | 225.87455 | 28.21974 | 0.2492892 | 0.23039991 | 2.6352056 | 20 | 7 24.6 | 17.4 |
| 59797 1999 $PX$ | 16.2 | $X$ | 304.40751 | 99.36886 | 152.13486 | 5.21933 | 0.1460245 | 0.31609665 | 2.1343032 | 20 | 2 15.3 | 18.6 |
| 59798 1999 $PO_{1}$ | 14.3 | $X$ | 265.02482 | 321.92915 | 23.91903 | 21.97668 | 0.0371175 | 0.18133677 | 3.0913307 | 20 | 5 20.3 | 19.0 |
| 59799 1999 $PC_{2}$ | 16.1 | $X$ | 269.52308 | 131.54155 | 135.92676 | 4.18001 | 0.1029810 | 0.31240218 | 2.1510971 | 20 | 1 31.4 | 19.0 |
| 59800 Astropis | 14.2 | $X$ | 285.01563 | 240.99525 | 177.55135 | 21.63107 | 0.0777877 | 0.23319788 | 2.6140847 | 20 | 9 28.2 | 17.3 |
| 59801 1999 $PY_{4}$ | 15.3 | $X$ | 268.75649 | 233.05862 | 80.87394 | 1.06040 | 0.3166005 | 0.22490398 | 2.6779633 | 20 | 3 17.4 | 19.7 |
| 59802 1999 $PZ_{5}$ | 14.7 | $X$ | 256.78726 | 165.39908 | 137.26645 | 10.07484 | 0.0606980 | 0.17456105 | 3.1708168 | 20 | 3 24.7 | 19.4 |
| 59803 1999 $QH_{2}$ | 15.1 | $X$ | 258.84869 | 32.35650 | 305.77353 | 0.44742 | 0.2574288 | 0.17600357 | 3.1534678 | 20 | 4 13.9 | 20.1 |
| 59804 Dickjoyce | 13.2 | $X$ | 121.76330 | 48.13698 | 44.92290 | 9.36347 | 0.0590378 | 0.17271184 | 3.1934098 | 20 | 4 25.3 | 17.8 |
| 59805 1999 $RZ_{6}$ | 14.3 | $X$ | 48.53942 | 302.98529 | 358.75871 | 6.60785 | 0.2014784 | 0.19136819 | 2.9823336 | 20 | 11 4.1 | 18.5 |
| 59806 1999 $RQ_{10}$ | 13.7 | $X$ | 206.66640 | 28.64363 | 339.50629 | 18.04710 | 0.1507046 | 0.17391876 | 3.1786186 | 20 | 4 3.8 | 19.1 |
| 59807 1999 $RH_{13}$ | 14.9 | $X$ | 104.28299 | 178.91262 | 163.09774 | 2.10969 | 0.0882637 | 0.20386951 | 2.8591341 | 20 | — | — |
| 59808 1999 $RU_{13}$ | 14.7 | $X$ | 317.65885 | 336.48896 | 28.56122 | 3.67222 | 0.1511038 | 0.18636010 | 3.0355270 | 20 | 8 23.4 | 18.1 |
| 59809 1999 $RW_{16}$ | 14.4 | $X$ | 198.34641 | 176.04438 | 208.47027 | 4.74883 | 0.1774565 | 0.17228266 | 3.1987110 | 20 | 4 22.9 | 19.6 |
| 59810 1999 $RM_{17}$ | 14.6 | $X$ | 199.90952 | 146.27189 | 298.91545 | 4.18156 | 0.1257203 | 0.17864905 | 3.1222589 | 20 | 7 8.4 | 19.6 |
| 59811 1999 $RV_{17}$ | 13.6 | $X$ | 279.12046 | 327.84667 | 334.49952 | 7.58023 | 0.1225422 | 0.17523236 | 3.1627134 | 20 | 4 4.9 | 18.2 |
| 59812 1999 $RA_{18}$ | 13.8 | $X$ | 332.45430 | 228.54285 | 343.69845 | 14.94552 | 0.0365238 | 0.16903051 | 3.2396094 | 20 | 3 7.3 | 18.2 |
| 59813 1999 $RU_{18}$ | 16.6 | $X$ | 181.28979 | 129.75931 | 248.60789 | 1.11588 | 0.1897841 | 0.31201992 | 2.1528536 | 20 | 3 24.7 | 19.8 |
| 59814 1999 $RX_{18}$ | 16.3 | $X$ | 344.36487 | 283.28282 | 7.05828 | 2.11998 | 0.2030569 | 0.27784423 | 2.3259576 | 20 | 7 1.7 | 17.6 |
| 59815 1999 $RQ_{19}$ | 13.8 | $X$ | 15.66581 | 184.21881 | 353.26161 | 9.65008 | 0.0526110 | 0.16934490 | 3.2355986 | 20 | 3 21.3 | 18.2 |
| 59816 1999 $RO_{20}$ | 15.8 | $X$ | 318.64228 | 128.72393 | 195.79719 | 5.73065 | 0.1351240 | 0.27682815 | 2.3316456 | 20 | 7 4.5 | 18.0 |
| 59817 1999 $RC_{21}$ | 14.1 | $X$ | 238.28279 | 218.14768 | 181.48434 | 17.56587 | 0.0899453 | 0.17840774 | 3.1250736 | 20 | 6 24.6 | 19.1 |
| 59818 1999 $RF_{21}$ | 15.1 | $X$ | 98.70512 | 182.74560 | 131.14165 | 2.91697 | 0.2049904 | 0.19942540 | 2.9014543 | 20 | — | — |
| 59819 1999 $RH_{22}$ | 14.0 | $X$ | 284.32835 | 237.87729 | 173.11507 | 9.53990 | 0.0476489 | 0.18666934 | 3.0321736 | 20 | 9 12.6 | 18.0 |
| 59820 1999 $RT_{23}$ | 15.2 | $X$ | 277.87000 | 320.84204 | 46.82549 | 3.46828 | 0.1043849 | 0.22799427 | 2.6537098 | 20 | 7 3.2 | 18.6 |
| 59821 1999 $RR_{25}$ | 15.9 | $X$ | 286.83524 | 8.85628 | 242.20357 | 3.82554 | 0.1101851 | 0.31053638 | 2.1597048 | 20 | 1 28.1 | 18.7 |
| 59822 1999 $RK_{26}$ | 14.0 | $X$ | 242.96863 | 270.80378 | 152.95182 | 9.29749 | 0.1163713 | 0.18054766 | 3.1003316 | 20 | 7 26.9 | 18.7 |
| 59823 1999 $RU_{26}$ | 14.4 | $X$ | 219.73811 | 204.34616 | 158.70329 | 5.47053 | 0.1104996 | 0.17227534 | 3.1988016 | 20 | 4 21.2 | 19.3 |
| 59824 1999 $RQ_{27}$ | 13.5 | $X$ | 235.02958 | 306.34501 | 357.42990 | 9.41131 | 0.1117661 | 0.16873526 | 3.2433874 | 20 | 2 26.7 | 18.5 |
| 59825 1999 $RV_{27}$ | 14.1 | $X$ | 270.68927 | 217.47487 | 172.44440 | 5.33844 | 0.2140935 | 0.18034751 | 3.1026249 | 20 | 7 3.7 | 18.6 |
| 59826 1999 $RU_{29}$ | 16.3 | $X$ | 311.55031 | 135.56884 | 177.95151 | 22.67138 | 0.0784177 | 0.37069434 | 1.9192229 | 20 | 6 16.1 | 18.6 |
| 59827 1999 $RF_{32}$ | 14.6 | $X$ | 331.79740 | 245.68211 | 167.24284 | 12.31957 | 0.1645433 | 0.24084239 | 2.5584726 | 20 | 12 12.0 | 17.4 |
| 59828 Ossikar | 15.2 | $X$ | 302.30209 | 45.18868 | 176.10394 | 3.35566 | 0.0307359 | 0.21278039 | 2.7787426 | 20 | 2 4.3 | 18.9 |
| 59829 1999 $RZ_{32}$ | 14.4 | $X$ | 251.75146 | 318.31709 | 17.53610 | 3.53357 | 0.1873951 | 0.17377478 | 3.1803741 | 20 | 4 11.5 | 19.2 |
| 59830 Reynek | 14.8 | $X$ | 183.85527 | 46.47052 | 18.10565 | 3.43503 | 0.1861861 | 0.17419292 | 3.1752826 | 20 | 5 27.5 | 20.1 |
| 59831 1999 $RR_{36}$ | 14.2 | $X$ | 334.68626 | 69.34728 | 0.23340 | 1.71335 | 0.0457964 | 0.19445983 | 2.9506392 | 20 | 12 15.9 | 18.1 |
| 59832 1999 $RW_{36}$ | 16.6 | $X$ | 57.22220 | 200.77187 | 108.99873 | 2.77158 | 0.1947894 | 0.28990065 | 2.2610140 | 20 | 12 14.3 | 19.8 |
| 59833 Danimatter | 13.9 | $X$ | 344.98616 | 334.23526 | 324.18577 | 9.46217 | 0.0612338 | 0.18306762 | 3.0718148 | 20 | 7 14.0 | 17.9 |
| 59834 1999 $RE_{37}$ | 16.0 | $X$ | 102.83317 | 311.34546 | 78.53006 | 2.07887 | 0.1924960 | 0.30230089 | 2.1987529 | 20 | 1 13.3 | 17.9 |
| 59835 1999 $RJ_{40}$ | 14.2 | $X$ | 263.17043 | 147.10431 | 243.20804 | 8.35561 | 0.0886931 | 0.18230464 | 3.0803796 | 20 | 7 11.9 | 18.6 |
| 59836 1999 $RN_{44}$ | 15.8 | $X$ | 315.11261 | 126.94171 | 193.78616 | 12.65252 | 0.2909237 | 0.27699758 | 2.3306947 | 20 | 5 26.2 | 18.0 |
| 59837 1999 $RP_{44}$ | 14.2 | $X$ | 26.17071 | 309.95273 | 282.04306 | 8.92069 | 0.0544508 | 0.18174355 | 3.0867163 | 20 | 6 15.1 | 18.3 |
| 59838 1999 $RU_{45}$ | 14.9 | $X$ | 175.27880 | 213.17210 | 200.22874 | 6.01317 | 0.0686516 | 0.21986331 | 2.7187392 | 20 | 5 5.3 | 18.8 |
| 59839 1999 $RS_{47}$ | 15.3 | $X$ | 346.50945 | 128.61911 | 154.23338 | 7.46747 | 0.1991345 | 0.27953730 | 2.3165564 | 20 | 6 23.8 | 16.9 |
| 59840 1999 $RD_{49}$ | 12.9 | $X$ | 221.78003 | 71.29474 | 331.37926 | 8.25051 | 0.0736116 | 0.18115552 | 3.0933923 | 20 | 6 11.5 | 17.6 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59841 1999 $RH_{54}$ | 15.8 | $X$ | 135.27695 | 346.43615 | 47.92927 | 3.24264 | 0.1876980 | 0.26156560 | 2.4214879 | 20 | 3 6.9 | 19.3 |
| 59842 1999 $RT_{55}$ | 15.3 | $X$ | 349.38932 | 187.36803 | 140.22414 | 5.66362 | 0.2744773 | 0.23589763 | 2.5941017 | 20 | 9 20.1 | 16.9 |
| 59843 1999 $RD_{59}$ | 13.7 | $X$ | 72.02316 | 239.72962 | 329.69758 | 11.29391 | 0.0970486 | 0.18386827 | 3.0628909 | 20 | 7 27.8 | 18.0 |
| 59844 1999 $RU_{60}$ | 14.7 | $X$ | 283.41155 | 171.37890 | 175.45821 | 9.96247 | 0.1015791 | 0.18134366 | 3.0912524 | 20 | 6 12.3 | 19.1 |
| 59845 1999 $RC_{61}$ | 14.2 | $X$ | 244.95120 | 246.50593 | 160.65118 | 10.16862 | 0.1182417 | 0.18216770 | 3.0819232 | 20 | 7 8.3 | 18.9 |
| 59846 1999 $RA_{64}$ | 14.9 | $X$ | 53.24218 | 286.19287 | 40.56903 | 2.47338 | 0.0958322 | 0.19597405 | 2.9354206 | 20 | 11 28.3 | 18.9 |
| 59847 1999 $RT_{71}$ | 14.6 | $X$ | 276.49630 | 254.55972 | 80.99859 | 2.72080 | 0.1502299 | 0.17851296 | 3.1238455 | 20 | 5 12.6 | 18.9 |
| 59848 1999 $RT_{73}$ | 15.4 | $X$ | 333.05551 | 86.35898 | 177.30955 | 7.31741 | 0.1589070 | 0.22549940 | 2.6732472 | 20 | 4 28.8 | 18.3 |
| 59849 1999 $RE_{78}$ | 15.3 | $X$ | 75.95359 | 15.68877 | 221.84760 | 1.90760 | 0.1146003 | 0.23552412 | 2.5968436 | 20 | 9 12.6 | 18.8 |
| 59850 1999 $RJ_{80}$ | 16.5 | $X$ | 16.90420 | 327.51577 | 145.61930 | 0.13441 | 0.0344276 | 0.30351412 | 2.1928897 | 20 | — | — |
| 59851 1999 $RO_{80}$ | 14.6 | $X$ | 313.28011 | 95.06461 | 184.34453 | 10.98881 | 0.1977226 | 0.17899412 | 3.1182448 | 20 | 4 13.9 | 18.5 |
| 59852 1999 $RN_{82}$ | 14.0 | $X$ | 284.04140 | 116.07696 | 326.53042 | 8.62010 | 0.0168847 | 0.19182631 | 2.9775834 | 20 | 10 23.0 | 18.3 |
| 59853 1999 $RP_{82}$ | 14.5 | $X$ | 344.92845 | 147.72723 | 181.73470 | 19.01099 | 0.1260797 | 0.18562351 | 3.0435520 | 20 | 8 19.9 | 18.2 |
| 59854 1999 $RY_{85}$ | 13.9 | $X$ | 298.66215 | 251.82775 | 34.02043 | 5.62006 | 0.1194990 | 0.17528489 | 3.1620816 | 20 | 4 12.9 | 18.1 |
| 59855 1999 $RD_{86}$ | 14.6 | $X$ | 10.81839 | 136.96093 | 155.28051 | 12.89017 | 0.3067184 | 0.23502815 | 2.6004956 | 20 | 9 24.6 | 16.8 |
| 59856 1999 $RJ_{92}$ | 16.2 | $X$ | 63.25565 | 77.23096 | 356.33738 | 7.36880 | 0.1274162 | 0.30190613 | 2.2006692 | 20 | — | — |
| 59857 1999 $RF_{93}$ | 14.4 | $X$ | 286.85633 | 357.82918 | 46.69816 | 3.72667 | 0.1028985 | 0.18512077 | 3.0490599 | 20 | 9 2.1 | 18.3 |
| 59858 1999 $RT_{93}$ | 14.5 | $X$ | 40.09544 | 217.53424 | 84.97395 | 3.49821 | 0.3172867 | 0.19177723 | 2.9780914 | 20 | 11 14.1 | 18.6 |
| 59859 1999 $RM_{94}$ | 14.4 | $X$ | 161.16601 | 209.09845 | 14.51123 | 12.14915 | 0.0918311 | 0.24206719 | 2.5498351 | 20 | 11 23.1 | 18.4 |
| 59860 1999 $RP_{94}$ | 14.5 | $X$ | 256.23136 | 251.39252 | 98.31298 | 3.07386 | 0.1966868 | 0.17566973 | 3.1574617 | 20 | 5 2.6 | 19.3 |
| 59861 1999 $RY_{95}$ | 13.8 | $X$ | 250.05800 | 244.47618 | 102.20549 | 4.88145 | 0.1493678 | 0.17444586 | 3.1722125 | 20 | 4 28.7 | 18.7 |
| 59862 1999 $RT_{97}$ | 14.7 | $X$ | 311.76082 | 173.69778 | 146.01839 | 1.35451 | 0.1729507 | 0.17998922 | 3.1067410 | 20 | 6 6.6 | 18.5 |
| 59863 1999 $RH_{98}$ | 14.1 | $X$ | 242.17404 | 257.53873 | 85.92689 | 2.59699 | 0.2067351 | 0.17322617 | 3.1870854 | 20 | 4 11.4 | 19.2 |
| 59864 1999 $RW_{102}$ | 13.8 | $X$ | 275.64319 | 342.57442 | 313.48117 | 16.99112 | 0.1177116 | 0.17464462 | 3.1698052 | 20 | 3 19.2 | 18.8 |
| 59865 1999 $RO_{103}$ | 14.4 | $X$ | 50.53175 | 98.22591 | 199.91901 | 10.34060 | 0.0922745 | 0.19201557 | 2.9756265 | 20 | 10 20.1 | 18.3 |
| 59866 1999 $RF_{105}$ | 13.8 | $X$ | 32.47949 | 281.11971 | 23.61864 | 9.58091 | 0.1108082 | 0.18717004 | 3.0267636 | 20 | 10 6.7 | 17.8 |
| 59867 1999 $RT_{105}$ | 13.5 | $X$ | 358.71550 | 350.87606 | 323.15821 | 14.65913 | 0.0705623 | 0.18516357 | 3.0485900 | 20 | 8 22.4 | 17.3 |
| 59868 1999 $RH_{106}$ | 15.4 | $X$ | 120.41352 | 191.15038 | 223.01781 | 7.23712 | 0.1614910 | 0.21237104 | 2.7823122 | 20 | 3 13.0 | 19.5 |
| 59869 1999 $RC_{108}$ | 14.0 | $X$ | 273.46534 | 173.20022 | 218.87326 | 10.08343 | 0.0779767 | 0.18276447 | 3.0752106 | 20 | 7 27.5 | 18.5 |
| 59870 1999 $RH_{109}$ | 14.3 | $X$ | 325.62897 | 119.06043 | 218.80633 | 8.81293 | 0.1019445 | 0.18294093 | 3.0732328 | 20 | 7 29.9 | 18.4 |
| 59871 1999 $RL_{111}$ | 14.3 | $X$ | 253.15786 | 48.81954 | 347.87732 | 9.66903 | 0.1263331 | 0.18216961 | 3.0819015 | 20 | 7 5.8 | 18.9 |
| 59872 1999 $RB_{112}$ | 15.0 | $X$ | 228.60642 | 131.82767 | 160.69766 | 9.40277 | 0.1498877 | 0.21750210 | 2.7383802 | 20 | 1 28.7 | 19.5 |
| 59873 1999 $RO_{112}$ | 15.6 | $X$ | 179.57086 | 141.65441 | 167.90705 | 8.21391 | 0.2080060 | 0.25983115 | 2.4322520 | 20 | 1 3.7 | 19.6 |
| 59874 1999 $RJ_{113}$ | 15.0 | $X$ | 214.54668 | 77.62927 | 225.24821 | 7.29268 | 0.1972336 | 0.21654263 | 2.7464631 | 20 | 1 26.8 | 19.8 |
| 59875 1999 $RN_{114}$ | 14.5 | $X$ | 260.37566 | 237.68319 | 52.78201 | 2.12956 | 0.1604880 | 0.17297604 | 3.1901572 | 20 | 3 1.3 | 19.5 |
| 59876 1999 $RK_{116}$ | 14.3 | $X$ | 282.77355 | 142.97467 | 200.87096 | 8.78811 | 0.1526715 | 0.18176594 | 3.0864628 | 20 | 5 30.9 | 18.7 |
| 59877 1999 $RA_{117}$ | 14.5 | $X$ | 265.63535 | 156.51938 | 151.94188 | 13.90805 | 0.1682549 | 0.22357697 | 2.6885493 | 20 | 3 25.1 | 18.6 |
| 59878 1999 $RF_{117}$ | 15.7 | $X$ | 212.26909 | 166.15456 | 187.96392 | 6.17113 | 0.1236640 | 0.26840781 | 2.3801589 | 20 | 3 25.9 | 19.2 |
| 59879 1999 $RM_{119}$ | 13.9 | $X$ | 304.53547 | 51.81178 | 297.12096 | 8.91156 | 0.1285533 | 0.18427133 | 3.0584229 | 20 | 7 11.4 | 17.6 |
| 59880 1999 $RS_{119}$ | 14.0 | $X$ | 259.36410 | 176.06421 | 166.08857 | 10.47353 | 0.2205391 | 0.17811597 | 3.1284855 | 20 | 4 25.7 | 19.0 |
| 59881 1999 $RZ_{121}$ | 14.2 | $X$ | 269.30117 | 112.74699 | 217.16001 | 11.04924 | 0.0793878 | 0.17841059 | 3.1250404 | 20 | 5 6.6 | 18.6 |
| 59882 1999 $RM_{122}$ | 14.3 | $X$ | 145.30978 | 220.71937 | 194.51843 | 11.14139 | 0.0424492 | 0.17051333 | 3.2208005 | 20 | 4 3.6 | 18.9 |
| 59883 1999 $RU_{123}$ | 14.8 | $X$ | 202.37079 | 84.84783 | 190.79880 | 7.25715 | 0.1901319 | 0.20953982 | 2.8073184 | 20 | — | — |
| 59884 1999 $RW_{123}$ | 14.8 | $X$ | 154.44557 | 241.57281 | 128.25322 | 0.58701 | 0.0863994 | 0.21300651 | 2.7767757 | 20 | 2 18.8 | 18.9 |
| 59885 1999 $RO_{124}$ | 15.2 | $X$ | 188.85155 | 173.79970 | 207.42960 | 11.02712 | 0.1541244 | 0.21785963 | 2.7353834 | 20 | 4 8.5 | 19.7 |
| 59886 1999 $RY_{126}$ | 15.4 | $X$ | 324.19998 | 74.53981 | 259.46520 | 5.31434 | 0.2413463 | 0.28021474 | 2.3128212 | 20 | 7 19.9 | 16.9 |
| 59887 1999 $RU_{127}$ | 14.0 | $X$ | 318.97784 | 48.48748 | 303.80926 | 8.09199 | 0.0450257 | 0.18690249 | 3.0296513 | 20 | 8 14.5 | 18.0 |
| 59888 1999 $RS_{128}$ | 13.5 | $X$ | 73.99408 | 80.80664 | 299.45218 | 7.28837 | 0.1408152 | 0.15769551 | 3.3930466 | 20 | — | — |
| 59889 1999 $RV_{129}$ | 13.9 | $X$ | 257.06667 | 264.89067 | 142.97352 | 11.07775 | 0.0846479 | 0.18452650 | 3.0556027 | 20 | 7 28.5 | 18.3 |
| 59890 1999 $RG_{133}$ | 13.1 | $X$ | 25.77775 | 300.82046 | 237.36442 | 7.67407 | 0.0416322 | 0.17282105 | 3.1920643 | 20 | 4 2.9 | 17.4 |
| 59891 1999 $RF_{135}$ | 13.7 | $X$ | 212.90467 | 227.73436 | 158.29625 | 21.63664 | 0.1574723 | 0.17557524 | 3.1585944 | 20 | 5 12.9 | 19.2 |
| 59892 1999 $RQ_{137}$ | 14.8 | $X$ | 99.64053 | 170.20727 | 164.42624 | 5.27406 | 0.1056937 | 0.20289145 | 2.8683153 | 20 | — | — |
| 59893 1999 $RY_{137}$ | 15.7 | $X$ | 304.64927 | 332.19764 | 344.37168 | 8.11362 | 0.1808714 | 0.27595513 | 2.3365607 | 20 | 5 15.9 | 18.4 |
| 59894 1999 $RQ_{138}$ | 14.1 | $X$ | 159.17761 | 245.74618 | 171.15246 | 15.29455 | 0.0439592 | 0.17174973 | 3.2053246 | 20 | 4 24.6 | 18.9 |
| 59895 1999 $RH_{140}$ | 14.9 | $X$ | 224.96030 | 159.26277 | 237.42060 | 4.60881 | 0.1450295 | 0.17793930 | 3.1305560 | 20 | 6 2.0 | 19.7 |
| 59896 1999 $RO_{140}$ | 14.9 | $X$ | 268.97473 | 300.92461 | 64.37694 | 2.26907 | 0.1823686 | 0.18057728 | 3.0999925 | 20 | 6 5.2 | 19.4 |
| 59897 1999 $RD_{142}$ | 14.3 | $X$ | 219.03284 | 169.61369 | 164.03222 | 10.97960 | 0.0709014 | 0.16925391 | 3.2367581 | 20 | 3 18.0 | 19.2 |
| 59898 1999 $RE_{142}$ | 16.6 | $X$ | 356.89545 | 297.62995 | 22.12975 | 2.77519 | 0.2188784 | 0.28211148 | 2.3024430 | 20 | 10 1.8 | 18.1 |
| 59899 1999 $RN_{142}$ | 14.6 | $X$ | 5.93656 | 266.63319 | 144.89070 | 6.70667 | 0.0884309 | 0.19717056 | 2.9235330 | 20 | — | — |
| 59900 1999 $RH_{143}$ | 13.6 | $X$ | 327.24445 | 130.54331 | 179.06414 | 10.69835 | 0.0256260 | 0.17902688 | 3.1178644 | 20 | 7 2.3 | 18.0 |
| 59901 1999 $RA_{145}$ | 15.5 | $X$ | 304.49300 | 162.36417 | 185.05207 | 12.56803 | 0.2606834 | 0.23092277 | 2.6312264 | 20 | 6 19.6 | 18.7 |
| 59902 1999 $RJ_{147}$ | 13.7 | $X$ | 249.81391 | 33.11761 | 302.94371 | 11.14856 | 0.0317799 | 0.17507856 | 3.1645654 | 20 | 4 21.6 | 18.4 |
| 59903 1999 $RO_{148}$ | 13.4 | $X$ | 33.12891 | 259.92042 | 167.14485 | 15.63015 | 0.0919477 | 0.15752958 | 3.3954289 | 20 | — | — |
| 59904 1999 $RR_{149}$ | 14.2 | $X$ | 196.34803 | 139.41431 | 285.59690 | 0.78738 | 0.1337396 | 0.17723701 | 3.1388202 | 20 | 6 9.6 | 19.3 |
| 59905 1999 $RB_{151}$ | 13.3 | $X$ | 169.07784 | 310.70987 | 124.20338 | 6.74842 | 0.1172164 | 0.17570708 | 3.1570142 | 20 | 5 28.1 | 18.3 |
| 59906 1999 $RR_{151}$ | 15.7 | $X$ | 295.59348 | 155.05574 | 117.21397 | 3.14006 | 0.2040475 | 0.27052855 | 2.3677035 | 20 | 3 1.8 | 18.9 |
| 59907 1999 $RM_{152}$ | 14.5 | $X$ | 19.91212 | 352.81284 | 334.25888 | 5.50514 | 0.2729395 | 0.19149152 | 2.9810530 | 20 | 11 7.7 | 18.0 |
| 59908 1999 $RS_{154}$ | 13.6 | $X$ | 153.35129 | 121.80963 | 284.15455 | 2.56295 | 0.0595777 | 0.17045878 | 3.2214876 | 20 | 4 1.5 | 18.3 |
| 59909 1999 $RK_{155}$ | 12.8 | $X$ | 93.98809 | 242.73418 | 313.61054 | 8.77846 | 0.0372232 | 0.18287484 | 3.0739732 | 20 | 7 28.4 | 17.2 |
| 59910 1999 $RA_{156}$ | 15.4 | $X$ | 37.15719 | 38.85382 | 247.41131 | 3.45499 | 0.1681004 | 0.28441428 | 2.2899981 | 20 | 10 13.5 | 18.0 |
| 59911 1999 $RD_{156}$ | 14.2 | $X$ | 268.34825 | 57.60231 | 265.63287 | 3.73178 | 0.1503437 | 0.17637532 | 3.1490351 | 20 | 4 16.0 | 18.9 |
| 59912 1999 $RU_{156}$ | 14.6 | $X$ | 0.78698 | 100.33273 | 187.91454 | 5.08690 | 0.1441411 | 0.18454276 | 3.0554232 | 20 | 7 24.7 | 18.1 |
| 59913 1999 $RB_{157}$ | 14.7 | $X$ | 278.98749 | 18.42919 | 347.25608 | 9.16915 | 0.1061674 | 0.18141741 | 3.0904145 | 20 | 6 30.6 | 19.0 |
| 59914 1999 $RX_{157}$ | 14.3 | $X$ | 358.46745 | 295.37333 | 357.52611 | 15.48892 | 0.1715093 | 0.18543154 | 3.0456523 | 20 | 8 4.9 | 17.8 |
| 59915 1999 $RF_{159}$ | 12.4 | $X$ | 88.67523 | 174.98725 | 349.92385 | 19.30655 | 0.0725318 | 0.17808864 | 3.1288055 | 20 | 6 14.7 | 17.2 |
| 59916 1999 $RT_{159}$ | 14.2 | $X$ | 295.85001 | 207.21987 | 133.67296 | 7.17165 | 0.1471367 | 0.18133728 | 3.0913249 | 20 | 6 14.8 | 18.3 |
| 59917 1999 $RC_{161}$ | 14.5 | $X$ | 311.27969 | 112.87155 | 211.80002 | 3.74218 | 0.1326368 | 0.18068428 | 3.0987685 | 20 | 6 18.1 | 18.5 |
| 59918 1999 $RF_{161}$ | 15.0 | $X$ | 306.56828 | 153.77767 | 295.97470 | 6.15290 | 0.0894918 | 0.29148650 | 2.2528058 | 20 | — | — |
| 59919 1999 $RP_{161}$ | 14.1 | $X$ | 277.57013 | 308.82392 | 311.00725 | 0.66681 | 0.0870671 | 0.17038339 | 3.2224378 | 20 | 2 19.9 | 18.8 |
| 59920 1999 $RO_{162}$ | 13.5 | $X$ | 143.99538 | 352.48155 | 35.99108 | 9.94819 | 0.1629433 | 0.21160070 | 2.7890608 | 20 | 3 12.8 | 17.9 |

# ELEMENTS AND OPPOSITION DATES IN 2020

ECLIPTIC AND EQUINOX 2000.0, EPOCH 2020 MAY 31.0 TT

| Planet | $H$ | $G$ | $M$ | $\omega$ | $\Omega$ | $i$ | $e$ | $\mu$ | $a$ | TE | Oppos. | $V$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m | | ° | ° | ° | ° | | ° | | | | |
| 59921 1999 $RM_{163}$ | 15.0 | X | 3.99619 | 67.08038 | 255.15003 | 3.10654 | 0.1335234 | 0.18815102 | 3.0162338 | 20 | 9 15.1 | 18.6 |
| 59922 1999 $RY_{164}$ | 14.4 | X | 117.86130 | 251.43661 | 189.71027 | 8.73329 | 0.2855674 | 0.21411083 | 2.7672196 | 20 | 4 29.7 | 19.0 |
| 59923 1999 $RY_{165}$ | 15.2 | X | 182.30875 | 315.85009 | 359.19116 | 3.93705 | 0.1970340 | 0.21127330 | 2.7919415 | 20 | 1 18.9 | 19.9 |
| 59924 1999 $RN_{167}$ | 13.8 | X | 249.63321 | 282.49306 | 141.67699 | 11.81885 | 0.0835456 | 0.18410379 | 3.0602781 | 20 | 8 9.8 | 18.0 |
| 59925 1999 $RR_{172}$ | 14.3 | X | 285.34640 | 266.80024 | 139.78978 | 10.83645 | 0.1202822 | 0.18627013 | 3.0365043 | 20 | 8 30.6 | 18.2 |
| 59926 1999 $RD_{173}$ | 14.2 | X | 246.60266 | 303.13096 | 14.13158 | 16.06647 | 0.0996711 | 0.17243838 | 3.1967850 | 20 | 3 25.8 | 19.0 |
| 59927 1999 $RP_{173}$ | 13.7 | X | 321.72495 | 238.86161 | 4.47325 | 17.80392 | 0.1108079 | 0.17322122 | 3.1871463 | 20 | 3 23.3 | 17.7 |
| 59928 1999 $RG_{174}$ | 14.7 | X | 128.39617 | 158.45975 | 112.03284 | 3.21154 | 0.0851989 | 0.19809742 | 2.9144068 | 20 | 12 11.5 | 19.1 |
| 59929 1999 $RK_{174}$ | 14.1 | X | 224.90454 | 14.56550 | 23.12359 | 3.72053 | 0.2129441 | 0.17613376 | 3.1519136 | 20 | 5 28.6 | 19.4 |
| 59930 1999 $RE_{176}$ | 14.5 | X | 156.81891 | 251.25084 | 339.19303 | 10.03465 | 0.1166864 | 0.19652889 | 2.9298931 | 20 | 11 18.4 | 19.3 |
| 59931 1999 $RZ_{179}$ | 13.7 | X | 192.58884 | 344.67837 | 124.90138 | 10.68018 | 0.0510638 | 0.18284122 | 3.0743500 | 20 | 8 4.3 | 18.2 |
| 59932 1999 $RY_{181}$ | 16.5 | X | 321.79923 | 146.13975 | 158.81407 | 2.52226 | 0.2319122 | 0.27635783 | 2.3342903 | 20 | 5 25.4 | 18.3 |
| 59933 1999 $RQ_{186}$ | 14.7 | X | 265.19255 | 79.25527 | 348.45981 | 8.93364 | 0.0409031 | 0.18739990 | 3.0242880 | 20 | 9 10.0 | 18.7 |
| 59934 1999 $RU_{186}$ | 14.6 | X | 86.98137 | 196.92746 | 196.70051 | 1.38792 | 0.0312112 | 0.20721526 | 2.8282745 | 20 | — | — |
| 59935 1999 $RR_{187}$ | 14.7 | X | 69.98268 | 288.48987 | 52.51869 | 2.48538 | 0.0879630 | 0.19838991 | 2.9115416 | 20 | — | — |
| 59936 1999 $RJ_{188}$ | 14.5 | X | 203.92140 | 342.41569 | 26.38571 | 10.29077 | 0.1342919 | 0.17184123 | 3.2041866 | 20 | 4 10.8 | 19.7 |
| 59937 1999 $RH_{189}$ | 14.9 | X | 276.54802 | 166.90521 | 179.64069 | 9.69938 | 0.1096286 | 0.17817888 | 3.1277491 | 20 | 6 2.3 | 19.4 |
| 59938 1999 $RQ_{190}$ | 14.4 | X | 309.90347 | 169.73501 | 201.62457 | 11.30722 | 0.1365103 | 0.18501287 | 3.0502452 | 20 | 8 14.5 | 18.3 |
| 59939 1999 $RW_{192}$ | 14.7 | X | 286.07657 | 119.71537 | 152.86937 | 14.28661 | 0.1763769 | 0.17392642 | 3.1785253 | 20 | 3 4.8 | 19.2 |
| 59940 1999 $RT_{197}$ | 15.9 | X | 332.88471 | 99.97260 | 252.93298 | 6.47829 | 0.1496870 | 0.28198110 | 2.3031526 | 20 | 9 18.6 | 17.8 |
| 59941 1999 $RX_{197}$ | 13.4 | X | 216.86162 | 128.69006 | 260.63456 | 8.26143 | 0.0948026 | 0.17505040 | 3.1649048 | 20 | 5 18.7 | 18.3 |
| 59942 1999 $RZ_{197}$ | 13.8 | X | 220.77264 | 142.94748 | 308.29893 | 9.15461 | 0.0619830 | 0.18305982 | 3.0719021 | 20 | 8 11.6 | 18.2 |
| 59943 1999 $RH_{198}$ | 14.2 | X | 337.74393 | 332.55035 | 301.16907 | 16.11108 | 0.1658989 | 0.18132381 | 3.0914779 | 20 | 5 17.6 | 18.1 |
| 59944 1999 $RJ_{199}$ | 14.0 | X | 15.32175 | 18.44065 | 337.47665 | 9.86655 | 0.0949009 | 0.19101051 | 2.9860555 | 20 | 11 10.2 | 18.0 |
| 59945 1999 $RH_{202}$ | 13.8 | X | 285.10222 | 327.85653 | 296.46167 | 9.99944 | 0.0876632 | 0.16898541 | 3.2401858 | 20 | 2 29.9 | 18.6 |
| 59946 1999 $RG_{205}$ | 13.9 | X | 99.26683 | 277.56337 | 310.24132 | 15.74578 | 0.0097633 | 0.18531071 | 3.0469760 | 20 | 9 3.3 | 18.4 |
| 59947 1999 $RV_{205}$ | 14.3 | X | 23.37385 | 42.34368 | 307.73477 | 9.48331 | 0.0982192 | 0.19179779 | 2.9778786 | 20 | 11 15.9 | 18.4 |
| 59948 1999 $RX_{213}$ | 14.8 | X | 357.66946 | 180.80926 | 149.48810 | 11.03591 | 0.1097682 | 0.19041912 | 2.9922348 | 20 | 9 17.7 | 18.4 |
| 59949 1999 $RL_{215}$ | 15.6 | X | 223.81071 | 201.78421 | 127.41915 | 2.97819 | 0.2283526 | 0.26760479 | 2.3849181 | 20 | 3 3.3 | 19.5 |
| 59950 1999 $RA_{220}$ | 13.0 | X | 296.49517 | 249.33819 | 37.62220 | 11.63748 | 0.0493988 | 0.17397505 | 3.1779330 | 20 | 4 21.7 | 17.2 |
| 59951 1999 $RZ_{220}$ | 16.1 | X | 48.54896 | 300.03561 | 106.41688 | 5.63324 | 0.1545974 | 0.29677236 | 2.2259757 | 20 | — | — |
| 59952 1999 $RG_{222}$ | 14.7 | X | 339.24820 | 222.38553 | 98.96378 | 4.87485 | 0.1597320 | 0.18583571 | 3.0412347 | 20 | 8 1.2 | 17.9 |
| 59953 1999 $RB_{226}$ | 13.9 | X | 14.42575 | 268.92605 | 312.37456 | 20.88264 | 0.1341538 | 0.17841215 | 3.1250222 | 20 | 5 11.3 | 18.1 |
| 59954 1999 $RP_{226}$ | 14.6 | X | 349.18439 | 86.36698 | 242.25856 | 7.88674 | 0.0381820 | 0.18675540 | 3.0312420 | 20 | 8 24.1 | 18.8 |
| 59955 1999 $RX_{226}$ | 14.3 | X | 208.45854 | 209.76387 | 280.69601 | 9.85270 | 0.0570933 | 0.18870929 | 3.0102821 | 20 | 9 12.2 | 18.9 |
| 59956 1999 $RR_{230}$ | 13.6 | X | 43.04481 | 267.49466 | 52.68722 | 10.98429 | 0.1069782 | 0.19194898 | 2.9763147 | 20 | 11 9.2 | 17.5 |
| 59957 1999 $RH_{231}$ | 15.1 | X | 238.44234 | 273.47290 | 89.42975 | 8.06317 | 0.1869196 | 0.22210807 | 2.7003900 | 20 | 5 2.9 | 19.4 |
| 59958 1999 $RJ_{231}$ | 13.9 | X | 353.94376 | 242.77458 | 74.67001 | 10.60654 | 0.0998726 | 0.18413373 | 3.0599463 | 20 | 8 26.7 | 17.8 |
| 59959 1999 $RV_{233}$ | 14.3 | X | 300.41706 | 284.69564 | 34.05298 | 16.58221 | 0.0607385 | 0.17798699 | 3.1299967 | 20 | 5 31.6 | 18.7 |
| 59960 1999 $RY_{233}$ | 15.0 | X | 189.40206 | 171.91918 | 130.78930 | 9.06271 | 0.2073264 | 0.21025074 | 2.8009866 | 20 | 1 9.8 | 19.8 |
| 59961 1999 $RZ_{233}$ | 14.4 | X | 50.04403 | 270.56594 | 27.16909 | 12.31734 | 0.2630715 | 0.19235077 | 2.9721685 | 20 | 11 9.4 | 18.7 |
| 59962 1999 $RL_{234}$ | 14.3 | X | 245.80461 | 307.92264 | 31.02383 | 10.89643 | 0.1252051 | 0.17388392 | 3.1790433 | 20 | 4 16.1 | 19.1 |
| 59963 1999 $RZ_{234}$ | 13.9 | X | 5.09592 | 257.69585 | 37.60876 | 9.14379 | 0.0663373 | 0.18356416 | 3.0662728 | 20 | 8 12.1 | 18.0 |
| 59964 1999 $RM_{235}$ | 13.8 | X | 355.31251 | 148.21308 | 102.93556 | 6.90574 | 0.1502789 | 0.17815684 | 3.1280069 | 20 | 5 25.4 | 17.3 |
| 59965 1999 $RJ_{236}$ | 14.2 | X | 265.95072 | 304.11945 | 66.03682 | 10.72046 | 0.0972655 | 0.17839131 | 3.1252655 | 20 | 6 19.2 | 18.7 |
| 59966 1999 $RS_{238}$ | 14.5 | X | 351.07844 | 265.87000 | 39.89582 | 11.18278 | 0.1148908 | 0.18248827 | 3.0783128 | 20 | 8 5.4 | 18.4 |
| 59967 1999 $RP_{240}$ | 13.5 | X | 259.61780 | 213.74314 | 118.31469 | 15.01059 | 0.0889721 | 0.17355325 | 3.1830799 | 20 | 5 2.7 | 18.4 |
| 59968 1999 $RC_{241}$ | 13.8 | X | 325.83012 | 185.34332 | 105.25407 | 10.91840 | 0.1267105 | 0.17828717 | 3.1264824 | 20 | 5 29.6 | 17.8 |
| 59969 1999 $RV_{246}$ | 14.7 | X | 243.40051 | 186.77943 | 187.36698 | 15.39559 | 0.0792813 | 0.17881095 | 3.1203739 | 20 | 6 1.4 | 19.5 |
| 59970 1999 $RZ_{246}$ | 16.1 | X | 215.74463 | 322.78438 | 14.59657 | 2.30352 | 0.2080263 | 0.26493823 | 2.4008939 | 20 | 3 7.2 | 20.0 |
| 59971 1999 $RP_{247}$ | 15.8 | X | 166.66206 | 299.06303 | 53.67538 | 4.92921 | 0.1982726 | 0.30714189 | 2.1755881 | 20 | 2 10.9 | 19.1 |
| 59972 1999 $RL_{248}$ | 14.8 | X | 54.58192 | 73.56525 | 238.27307 | 8.74963 | 0.0903451 | 0.19496329 | 2.9455574 | 20 | 11 10.6 | 18.8 |
| 59973 1999 $RY_{252}$ | 13.8 | X | 9.54835 | 241.24491 | 232.52523 | 9.38637 | 0.1081886 | 0.15690534 | 3.4044286 | 20 | — | — |
| 59974 1999 $RM_{254}$ | 14.8 | X | 287.96798 | 110.71352 | 128.92770 | 10.23023 | 0.2537088 | 0.21939287 | 2.7226242 | 20 | 1 12.1 | 19.0 |
| 59975 1999 $SE$ | 14.3 | X | 230.53999 | 171.83025 | 195.11789 | 12.01699 | 0.2034354 | 0.17295057 | 3.1904704 | 20 | 4 29.4 | 19.6 |
| 59976 1999 $SU_4$ | 14.2 | X | 308.65589 | 106.83960 | 208.57581 | 17.85852 | 0.1237940 | 0.18046576 | 3.1012694 | 20 | 6 3.1 | 18.4 |
| 59977 1999 $SD_5$ | 13.7 | X | 211.85896 | 260.47731 | 137.58194 | 18.92273 | 0.2078746 | 0.17389541 | 3.1789033 | 20 | 5 24.2 | 19.3 |
| 59978 1999 $SR_5$ | 15.9 | X | 1.43160 | 272.26913 | 13.85973 | 21.15344 | 0.0776432 | 0.37346953 | 1.9097034 | 20 | 8 27.3 | 17.8 |
| 59979 1999 $SV_5$ | 16.1 | X | 236.11506 | 256.87190 | 168.51511 | 24.49962 | 0.1887645 | 0.37008611 | 1.9213251 | 20 | 7 23.1 | 18.9 |
| 59980 1999 $SG_6$ | 13.2 | X | 228.60200 | 305.09240 | 142.59398 | 11.75634 | 0.0294987 | 0.18452602 | 3.0556080 | 20 | 8 21.8 | 17.4 |
| 59981 1999 $SZ_6$ | 14.5 | X | 298.46932 | 336.04727 | 12.74171 | 11.15603 | 0.3781403 | 0.18282012 | 3.0745865 | 20 | 5 19.4 | 18.9 |
| 59982 1999 $SF_9$ | 13.1 | X | 283.16409 | 326.92982 | 109.09633 | 11.72939 | 0.0797380 | 0.19102797 | 2.9858736 | 20 | 10 15.9 | 17.2 |
| 59983 1999 $SN_{10}$ | 13.5 | X | 312.12812 | 353.57001 | 57.74892 | 11.21241 | 0.0904231 | 0.19278590 | 2.9676945 | 20 | 10 23.4 | 17.2 |
| 59984 1999 $SZ_{10}$ | 14.6 | X | 56.19449 | 249.86492 | 76.97291 | 9.85460 | 0.1786926 | 0.19259987 | 2.9696052 | 20 | 12 12.1 | 18.9 |
| 59985 1999 $SN_{11}$ | 12.8 | X | 352.10074 | 263.66664 | 41.42607 | 15.85435 | 0.1037946 | 0.18027070 | 3.1035062 | 20 | 8 8.2 | 16.9 |
| 59986 1999 $SE_{15}$ | 13.7 | X | 329.71608 | 39.84779 | 208.11857 | 23.30826 | 0.0845963 | 0.17275884 | 3.1928305 | 20 | 4 11.9 | 17.8 |
| 59987 1999 $SG_{16}$ | 13.5 | X | 264.20377 | 122.21047 | 235.89162 | 12.66192 | 0.0488065 | 0.17874352 | 3.1211586 | 20 | 6 8.9 | 18.0 |
| 59988 1999 $SH_{16}$ | 13.8 | X | 32.51810 | 339.68157 | 286.37083 | 11.53630 | 0.1697914 | 0.23366847 | 2.6105738 | 20 | 8 25.2 | 17.0 |
| 59989 1999 $SL_{16}$ | 15.6 | X | 333.99033 | 1.43302 | 264.46770 | 5.01324 | 0.2098394 | 0.27348601 | 2.3506031 | 20 | 4 18.5 | 17.7 |
| 59990 1999 $SA_{17}$ | 14.3 | X | 335.87056 | 93.14387 | 193.63419 | 25.88663 | 0.1883492 | 0.18244361 | 3.0788152 | 20 | 6 2.9 | 18.2 |
| 59991 1999 $SP_{18}$ | 13.4 | X | 221.48914 | 297.44537 | 49.01885 | 12.50695 | 0.0580160 | 0.17126794 | 3.2113329 | 20 | 4 8.8 | 18.3 |
| 59992 1999 $SZ_{18}$ | 14.2 | X | 32.23204 | 268.09088 | 79.22016 | 11.68965 | 0.1100710 | 0.19292898 | 2.9662271 | 20 | 11 29.7 | 18.1 |
| 59993 1999 $SL_{20}$ | 13.4 | X | 264.13570 | 300.81530 | 83.40455 | 14.64481 | 0.1461547 | 0.17833230 | 3.1259550 | 20 | 6 28.2 | 18.0 |
| 59994 1999 $SH_{22}$ | 15.6 | X | 15.10822 | 115.25964 | 171.39381 | 4.90349 | 0.3001148 | 0.23713056 | 2.5851021 | 20 | 9 22.2 | 17.8 |
| 59995 1999 $SP_{24}$ | 14.7 | X | 303.76650 | 120.62400 | 222.93165 | 8.91156 | 0.1062639 | 0.18244597 | 3.0787886 | 20 | 7 4.2 | 18.8 |
| 59996 1999 $TZ$ | 15.5 | X | 44.61863 | 178.04774 | 188.12250 | 4.69127 | 0.2916215 | 0.24352089 | 2.5396775 | 20 | — | — |
| 59997 1999 $TN_1$ | 14.1 | X | 313.47810 | 107.39833 | 205.34149 | 15.43280 | 0.2382128 | 0.17881415 | 3.1203367 | 20 | 5 21.8 | 17.9 |
| 59998 1999 $TS_2$ | 13.0 | X | 239.75567 | 253.15693 | 76.38824 | 23.79488 | 0.1276687 | 0.17089975 | 3.2159437 | 20 | 4 11.3 | 18.4 |
| 59999 1999 $TP_3$ | 13.2 | X | 317.91632 | 11.96057 | 17.68503 | 10.76887 | 0.0978941 | 0.18544621 | 3.0454916 | 20 | 9 30.1 | 16.8 |
| 60000 Miminko | 14.6 | X | 165.29526 | 289.76468 | 192.24212 | 9.31561 | 0.0257783 | 0.17785345 | 3.1315633 | 20 | 7 16.9 | 19.3 |