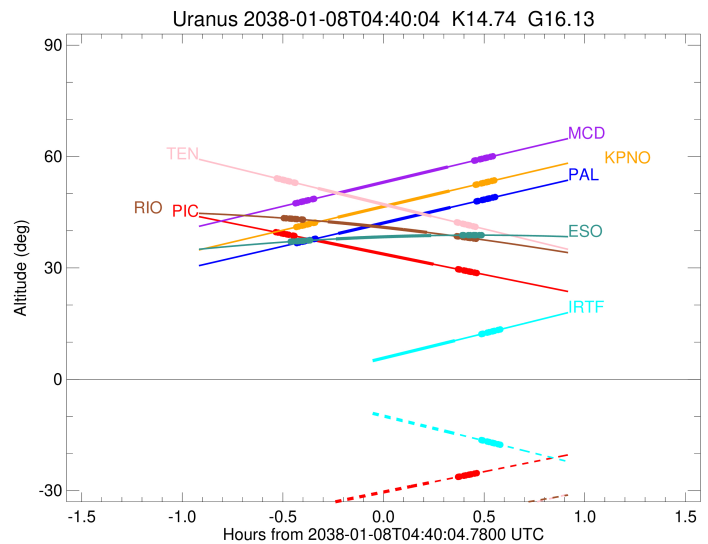
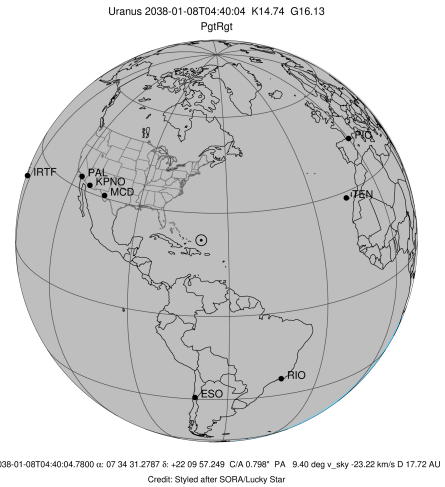


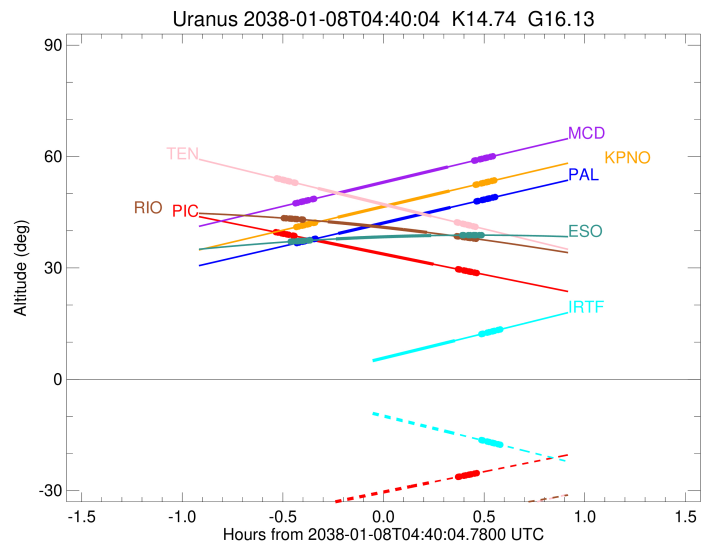
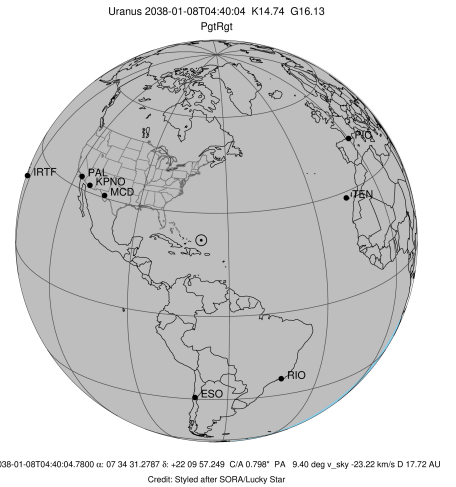


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2038-01-08T04:37:32.210  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 865599810393249536  
 2Mass ID (if available) : 07343128+2209570  
 ICRS Star Coord at Epoch: 07h 34m 31.27871s +22:09:57.24860s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.741  
 G magnitude : 16.127  
 RP magnitude : 15.675  
 BP magnitude : 16.418  
 DUPflag : 0  
 Distance (au) : 17.724  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 175.64  
 Sun-Moon sep (deg) : 152.83  
 B (ring opening deg) : 54.98  
 PA of pole (deg) : 84.90  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.506  
 C/A sky separation (km) : 6501.0  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



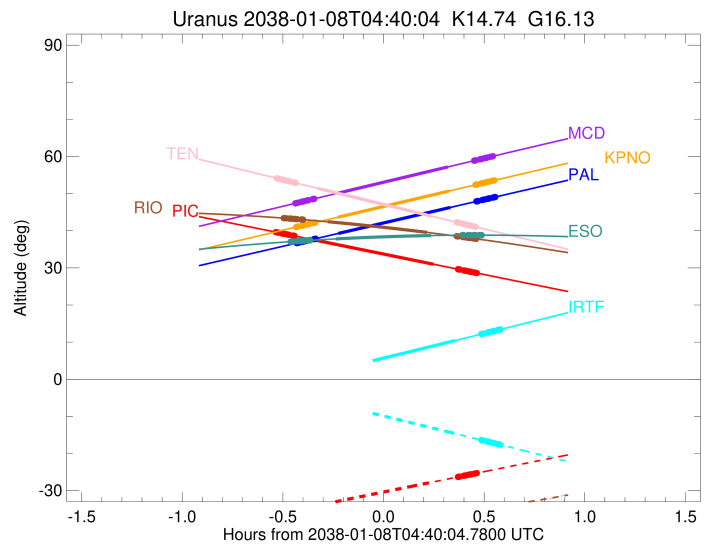
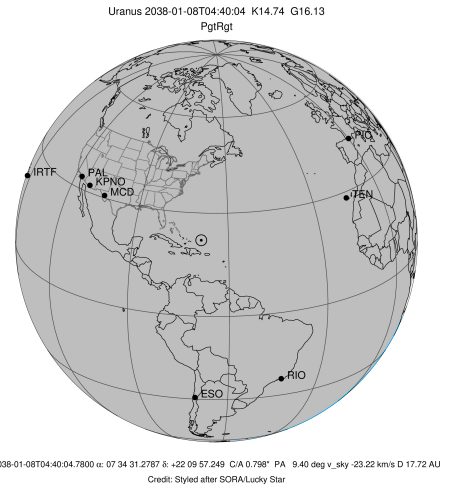
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-08T04:08:02.200		39.62	-36.25	51077.13	-28.00		
lambda	I	2038-01-08T04:08:39.684		39.51	-36.14	50026.71	-28.02		
delta	I	2038-01-08T04:09:41.323		39.32	-35.95	48300.35	-28.00		
gamma	I	2038-01-08T04:10:05.214		39.25	-35.88	47631.55	-27.99		
eta	I	2038-01-08T04:10:21.488		39.20	-35.83	47176.12	-27.98		
beta	I	2038-01-08T04:11:16.463		39.03	-35.66	45641.06	-27.96		
alpha	I	2038-01-08T04:11:50.129		38.93	-35.55	44701.45	-27.95		
4	I	2038-01-08T04:13:05.543		38.70	-35.32	42574.37	-27.90		
5	I	2038-01-08T04:13:15.010		38.67	-35.29	42298.17	-27.89		
6	I	2038-01-08T04:13:33.605		38.61	-35.24	41818.04	-27.91		
Uranus	I	2038-01-08T04:20:11.384		37.39	-34.02	25167.59		-35.02	-36.27
Uranus	E	2038-01-08T04:54:58.081		30.99	-27.65	25258.34		30.10	31.26
6	E	2038-01-08T05:02:18.751		29.64	-26.30	41867.16	27.84		
5	E	2038-01-08T05:02:31.938		29.60	-26.26	42189.87	27.82		
4	E	2038-01-08T05:02:44.611		29.56	-26.23	42554.47	27.82		
alpha	E	2038-01-08T05:04:02.003		29.33	-25.99	44726.35	27.87		
beta	E	2038-01-08T05:04:36.201		29.22	-25.89	45680.35	27.88		
eta	E	2038-01-08T05:05:29.928		29.06	-25.72	47176.12	27.90		
gamma	E	2038-01-08T05:05:45.875		29.01	-25.68	47621.03	27.90		
delta	E	2038-01-08T05:06:10.218		28.93	-25.60	48300.35	27.91		
lambda	E	2038-01-08T05:07:12.055		28.74	-25.41	50026.71	27.93		
epsilon	E	2038-01-08T05:07:50.894		28.62	-25.30	51111.51	27.91		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2038-01-08T04:43:17.410  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 865599810393249536  
 2Mass ID (if available) : 07343128+2209570  
 ICRS Star Coord at Epoch: 07h 34m 31.27871s +22:09:57.24860s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.741  
 G magnitude : 16.127  
 RP magnitude : 15.675  
 BP magnitude : 16.418  
 DUPflag : 0  
 Distance (au) : 17.724  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 175.64  
 Sun-Moon sep (deg) : 153.95  
 B (ring opening deg) : 54.98  
 PA of pole (deg) : 84.90  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.707  
 C/A sky separation (km) : 9092.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



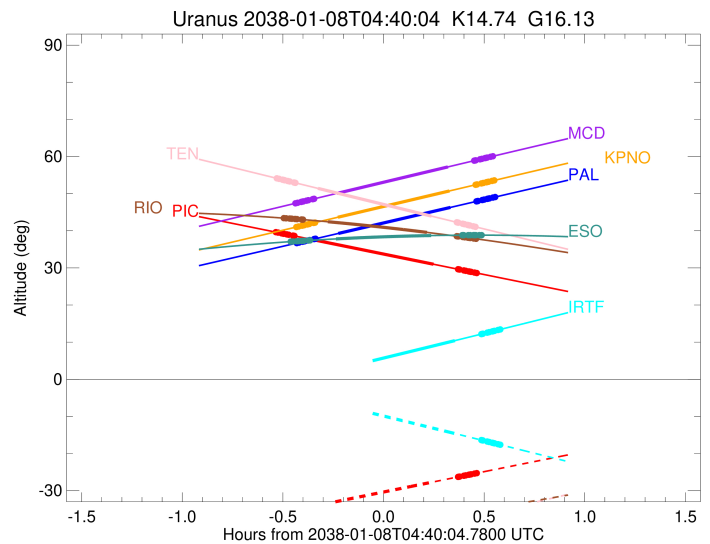
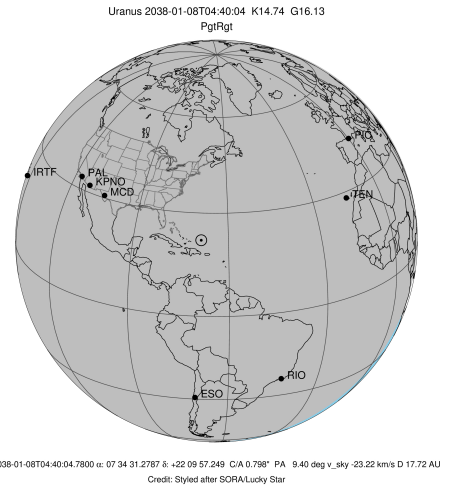
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-08T04:14:17.142		36.70	-40.71	51059.54	-27.79		
lambda	I	2038-01-08T04:14:54.266		36.83	-40.84	50026.71	-27.81		
delta	I	2038-01-08T04:15:56.379		37.05	-41.06	48300.35	-27.78		
gamma	I	2038-01-08T04:16:20.464		37.13	-41.14	47631.51	-27.76		
eta	I	2038-01-08T04:16:36.870		37.19	-41.20	47176.12	-27.75		
beta	I	2038-01-08T04:17:32.318		37.38	-41.39	45641.07	-27.72		
alpha	I	2038-01-08T04:18:06.359		37.50	-41.51	44699.95	-27.69		
4	I	2038-01-08T04:19:22.532		37.77	-41.78	42571.87	-27.61		
5	I	2038-01-08T04:19:31.919		37.80	-41.81	42300.83	-27.61		
6	I	2038-01-08T04:19:50.660		37.86	-41.88	41820.20	-27.62		
Uranus	I	2038-01-08T04:26:36.703		39.28	-43.29	25172.39		-34.77	-36.01
Uranus	E	2038-01-08T05:00:02.982		46.30	-50.28	25299.01		27.77	28.87
6	E	2038-01-08T05:07:47.603		47.92	-51.89	41869.23	27.70		
5	E	2038-01-08T05:08:00.950		47.97	-51.94	42194.64	27.69		
4	E	2038-01-08T05:08:13.418		48.01	-51.98	42551.57	27.69		
alpha	E	2038-01-08T05:09:31.192		48.28	-52.25	44724.13	27.77		
beta	E	2038-01-08T05:10:05.543		48.40	-52.37	45679.92	27.80		
eta	E	2038-01-08T05:10:59.413		48.59	-52.55	47176.12	27.84		
gamma	E	2038-01-08T05:11:15.394		48.65	-52.61	47621.10	27.85		
delta	E	2038-01-08T05:11:39.776		48.73	-52.69	48300.35	27.87		
lambda	E	2038-01-08T05:12:41.685		48.95	-52.91	50026.71	27.90		
epsilon	E	2038-01-08T05:13:19.692		49.08	-53.04	51087.66	27.89		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2038-01-08T04:43:04.870  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : KPNO  
 Location : Kitt Peak Natl Obs  
 Latitude (deg) : 31.96333  
 E. Longitude (deg) : 248.40000  
 Altitude (km) : 2.120  
 Gaia source ID : 865599810393249536  
 2Mass ID (if available) : 07343128+2209570  
 ICRS Star Coord at Epoch: 07h 34m 31.27871s +22:09:57.24860s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.741  
 G magnitude : 16.127  
 RP magnitude : 15.675  
 BP magnitude : 16.418  
 DUPflag : 0  
 Distance (au) : 17.724  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 175.64  
 Sun-Moon sep (deg) : 153.94  
 B (ring opening deg) : 54.98  
 PA of pole (deg) : 84.90  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.726  
 C/A sky separation (km) : 9327.3  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



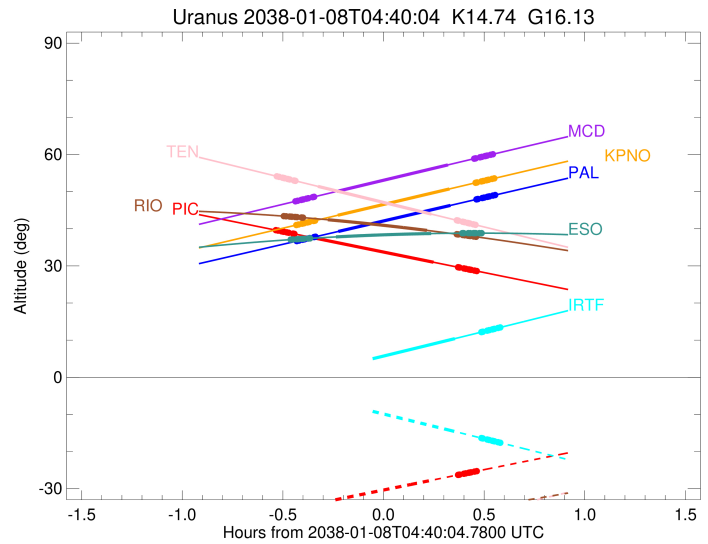
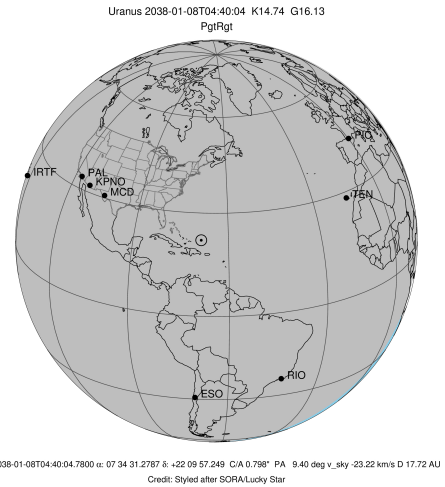
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-08T04:14:09.329		41.02	-45.10	51057.51	-27.80		
lambda	I	2038-01-08T04:14:46.362		41.15	-45.23	50026.71	-27.82		
delta	I	2038-01-08T04:15:48.447		41.37	-45.45	48300.35	-27.79		
gamma	I	2038-01-08T04:16:12.523		41.46	-45.53	47631.51	-27.77		
eta	I	2038-01-08T04:16:28.923		41.52	-45.59	47176.12	-27.76		
beta	I	2038-01-08T04:17:24.352		41.71	-45.79	45641.08	-27.72		
alpha	I	2038-01-08T04:17:58.392		41.84	-45.91	44699.78	-27.69		
4	I	2038-01-08T04:19:14.556		42.11	-46.18	42571.59	-27.61		
5	I	2038-01-08T04:19:23.923		42.14	-46.21	42301.11	-27.61		
6	I	2038-01-08T04:19:42.656		42.21	-46.28	41820.44	-27.62		
Uranus	I	2038-01-08T04:26:29.333		43.65	-47.72	25173.33		-34.72	-35.96
Uranus	E	2038-01-08T04:59:45.471		50.74	-54.77	25302.47		27.56	28.66
6	E	2038-01-08T05:07:32.093		52.39	-56.41	41869.38	27.69		
5	E	2038-01-08T05:07:45.448		52.44	-56.45	42195.01	27.68		
4	E	2038-01-08T05:07:57.897		52.48	-56.50	42551.36	27.69		
alpha	E	2038-01-08T05:09:15.678		52.76	-56.77	44723.96	27.77		
beta	E	2038-01-08T05:09:50.031		52.88	-56.89	45679.89	27.80		
eta	E	2038-01-08T05:10:43.896		53.07	-57.08	47176.12	27.84		
gamma	E	2038-01-08T05:10:59.875		53.12	-57.13	47621.11	27.86		
delta	E	2038-01-08T05:11:24.252		53.21	-57.22	48300.35	27.87		
lambda	E	2038-01-08T05:12:26.147		53.43	-57.44	50026.71	27.91		
epsilon	E	2038-01-08T05:13:04.082		53.56	-57.57	51085.95	27.89		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2038-01-08T04:42:43.090  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MCD  
 Location : McDonald Obs. 2.7m  
 Latitude (deg) : 30.67158  
 E. Longitude (deg) : 255.97844  
 Altitude (km) : 2.075  
 Gaia source ID : 865599810393249536  
 2Mass ID (if available) : 07343128+2209570  
 ICRS Star Coord at Epoch: 07h 34m 31.27871s +22:09:57.24860s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.741  
 G magnitude : 16.127  
 RP magnitude : 15.675  
 BP magnitude : 16.418  
 DUPflag : 0  
 Distance (au) : 17.724  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 175.64  
 Sun-Moon sep (deg) : 153.91  
 B (ring opening deg) : 54.98  
 PA of pole (deg) : 84.90  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.744  
 C/A sky separation (km) : 9562.7  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-08T04:13:52.929		47.41	-51.54	51055.38	-27.83		
lambda	I	2038-01-08T04:14:29.853		47.55	-51.67	50026.71	-27.85		
delta	I	2038-01-08T04:15:31.886		47.77	-51.89	48300.35	-27.81		
gamma	I	2038-01-08T04:15:55.944		47.86	-51.98	47631.50	-27.79		
eta	I	2038-01-08T04:16:12.331		47.92	-52.04	47176.12	-27.78		
beta	I	2038-01-08T04:17:07.722		48.12	-52.24	45641.08	-27.74		
alpha	I	2038-01-08T04:17:41.749		48.24	-52.36	44699.61	-27.71		
4	I	2038-01-08T04:18:57.874		48.51	-52.63	42571.30	-27.63		
5	I	2038-01-08T04:19:07.217		48.55	-52.67	42301.40	-27.62		
6	I	2038-01-08T04:19:25.934		48.61	-52.73	41820.70	-27.63		
Uranus	I	2038-01-08T04:26:13.164		50.08	-54.19	25174.39		-34.66	-35.90
Uranus	E	2038-01-08T04:59:18.320		57.21	-61.27	25305.87		27.36	28.45
6	E	2038-01-08T05:07:06.818		58.88	-62.92	41869.52	27.70		
5	E	2038-01-08T05:07:20.178		58.93	-62.97	42195.37	27.69		
4	E	2038-01-08T05:07:32.607		58.98	-63.01	42551.15	27.69		
alpha	E	2038-01-08T05:08:50.377		59.25	-63.29	44723.80	27.78		
beta	E	2038-01-08T05:09:24.724		59.38	-63.41	45679.85	27.81		
eta	E	2038-01-08T05:10:18.572		59.57	-63.60	47176.12	27.85		
gamma	E	2038-01-08T05:10:34.544		59.63	-63.65	47621.11	27.87		
delta	E	2038-01-08T05:10:58.912		59.71	-63.74	48300.35	27.88		
lambda	E	2038-01-08T05:12:00.778		59.93	-63.96	50026.71	27.92		
epsilon	E	2038-01-08T05:12:38.636		60.07	-64.09	51084.33	27.91		

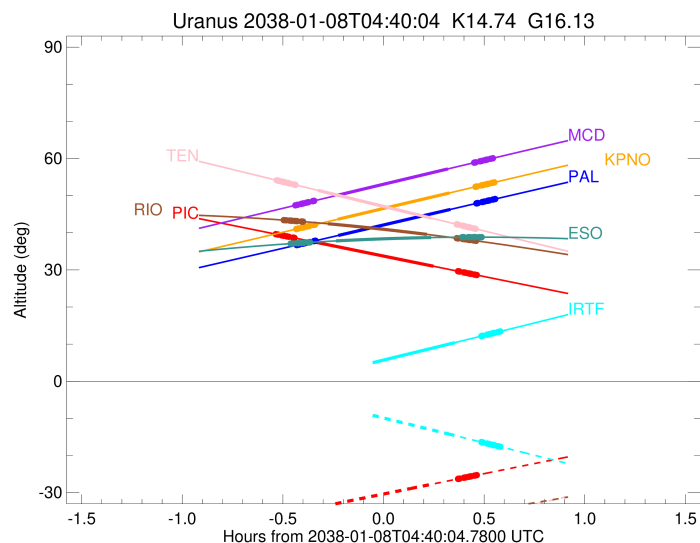
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2038-01-08T04:37:23.520  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : TEN  
 Location : Teide Obs./Tenerife  
 Latitude (deg) : 28.30050  
 E. Longitude (deg) : 343.48909  
 Altitude (km) : 2.395  
 Gaia source ID : 865599810393249536  
 2Mass ID (if available) : 07343128+2209570  
 ICRS Star Coord at Epoch: 07h 34m 31.27871s +22:09:57.24860s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.741  
 G magnitude : 16.127  
 RP magnitude : 15.675  
 BP magnitude : 16.418  
 DUPflag : 0  
 Distance (au) : 17.724  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 175.64  
 Sun-Moon sep (deg) : 152.89  
 B (ring opening deg) : 54.98  
 PA of pole (deg) : 84.90  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.651  
 C/A sky separation (km) : 8373.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-08T04:08:19.865		54.12	-50.00	51062.03	-27.99		
lambda	I	2038-01-08T04:08:56.821		53.99	-49.86	50026.71	-28.01		
delta	I	2038-01-08T04:09:58.500		53.76	-49.64	48300.35	-27.97		
gamma	I	2038-01-08T04:10:22.415		53.67	-49.55	47631.52	-27.96		
eta	I	2038-01-08T04:10:38.706		53.61	-49.49	47176.12	-27.95		
beta	I	2038-01-08T04:11:33.757		53.41	-49.29	45641.07	-27.92		
alpha	I	2038-01-08T04:12:07.540		53.28	-49.16	44700.19	-27.89		
4	I	2038-01-08T04:13:23.146		53.00	-48.89	42572.30	-27.82		
5	I	2038-01-08T04:13:32.492		52.97	-48.85	42300.39	-27.82		
6	I	2038-01-08T04:13:51.101		52.90	-48.78	41819.82	-27.83		
Uranus	I	2038-01-08T04:20:32.817		51.42	-47.31	25170.79		-34.85	-36.10
Uranus	E	2038-01-08T04:54:20.333		43.96	-39.89	25284.56		28.61	29.73
6	E	2038-01-08T05:01:56.148		42.29	-38.23	41868.50	27.76		
5	E	2038-01-08T05:02:09.433		42.24	-38.18	42192.88	27.74		
4	E	2038-01-08T05:02:21.971		42.19	-38.13	42552.62	27.75		
alpha	E	2038-01-08T05:03:39.581		41.91	-37.85	44724.95	27.81		
beta	E	2038-01-08T05:04:13.867		41.78	-37.72	45680.09	27.84		
eta	E	2038-01-08T05:05:07.671		41.58	-37.53	47176.12	27.87		
gamma	E	2038-01-08T05:05:23.635		41.52	-37.47	47621.07	27.88		
delta	E	2038-01-08T05:05:47.998		41.43	-37.38	48300.35	27.89		
lambda	E	2038-01-08T05:06:49.869		41.21	-37.16	50026.71	27.92		
epsilon	E	2038-01-08T05:07:28.186		41.07	-37.02	51096.72	27.90		

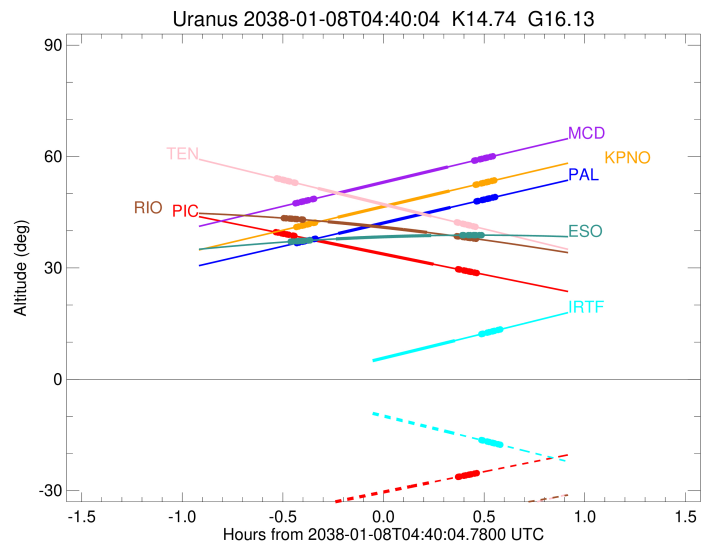
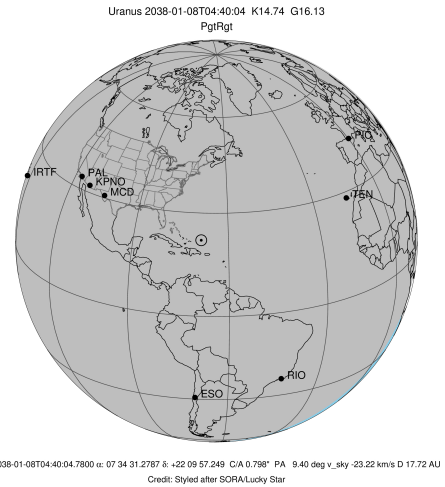
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-08T04:44:31.540
Event type          : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 865599810393249536
2Mass ID (if available) : 07343128+2209570
ICRS Star Coord at Epoch: 07h 34m 31.27871s +22:09:57.24860s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 14.741
G magnitude          : 16.127
RP magnitude         : 15.675
BP magnitude         : 16.418
DUPflag             : 0
Distance (au)       : 17.724
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -23.22
Sun-Target sep (deg) : 175.64
Sun-Moon sep (deg)  : 153.95
B (ring opening deg) : 54.98
PA of pole (deg)    : 84.90
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (" ) : 0.730
C/A sky separation (km) : 9378.3
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-08T04:15:16.302	0.30x	-4.45x	51058.45	-27.46			
lambda	I	2038-01-08T04:15:53.834	0.43x	-4.59x	50026.71	-27.48			
delta	I	2038-01-08T04:16:56.697	0.66x	-4.82x	48300.35	-27.44			
gamma	I	2038-01-08T04:17:21.075	0.75x	-4.91x	47631.51	-27.43			
eta	I	2038-01-08T04:17:37.681	0.81x	-4.97x	47176.12	-27.42			
beta	I	2038-01-08T04:18:33.805	1.01x	-5.17	45641.07	-27.38			
alpha	I	2038-01-08T04:19:08.268	1.14x	-5.30	44699.85	-27.35			
4	I	2038-01-08T04:20:25.384	1.42x	-5.58	42571.69	-27.27			
5	I	2038-01-08T04:20:34.875	1.45x	-5.61	42301.01	-27.27			
6	I	2038-01-08T04:20:53.845	1.52x	-5.68	41820.36	-27.28			
Uranus	I	2038-01-08T04:27:45.535	3.01x	-7.19	25173.14	-34.73		-35.97	
Uranus	E	2038-01-08T05:01:22.256	10.41	-14.62	25304.93	27.42		28.51	
6	E	2038-01-08T05:09:15.338	12.17	-16.38	41869.52	27.39			
5	E	2038-01-08T05:09:28.847	12.22	-16.43	42195.36	27.38			
4	E	2038-01-08T05:09:41.413	12.26	-16.48	42551.15	27.39			
alpha	E	2038-01-08T05:11:00.051	12.56	-16.77	44723.79	27.47			
beta	E	2038-01-08T05:11:34.782	12.68	-16.90	45679.85	27.50			
eta	E	2038-01-08T05:12:29.233	12.89	-17.10	47176.12	27.55			
gamma	E	2038-01-08T05:12:45.384	12.95	-17.16	47621.11	27.56			
delta	E	2038-01-08T05:13:10.025	13.04	-17.25	48300.35	27.57			
lambda	E	2038-01-08T05:14:12.585	13.27	-17.49	50026.71	27.61			
epsilon	E	2038-01-08T05:14:50.856	13.41	-17.63	51083.99	27.60			

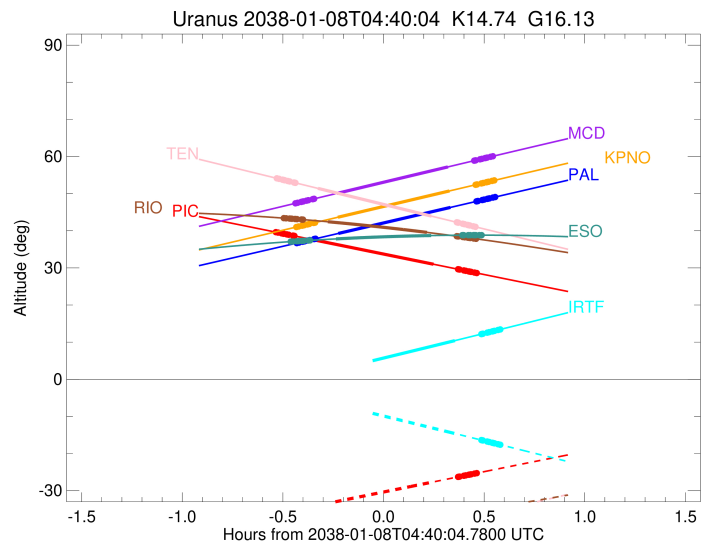
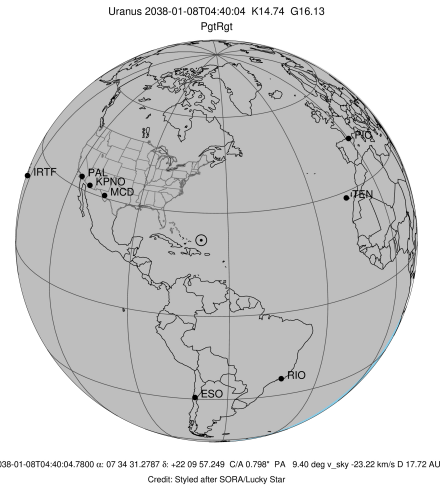
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2038-01-08T04:38:11.250  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : RIO  
 Location : Rio de Janeiro  
 Latitude (deg) : -22.89506  
 E. Longitude (deg) : 316.77708  
 Altitude (km) : 0.033  
 Gaia source ID : 865599810393249536  
 2Mass ID (if available) : 07343128+2209570  
 ICRS Star Coord at Epoch: 07h 34m 31.27871s +22:09:57.24860s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.741  
 G magnitude : 16.127  
 RP magnitude : 15.675  
 BP magnitude : 16.418  
 DUPflag : 0  
 Distance (au) : 17.724  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 175.64  
 Sun-Moon sep (deg) : 153.06  
 B (ring opening deg) : 54.98  
 PA of pole (deg) : 84.90  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.115  
 C/A sky separation (km) : 14332.2  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-08T04:10:26.718		43.40	-41.81	51015.30	-27.31		
lambda	I	2038-01-08T04:11:02.873		43.36	-41.76	50026.71	-27.32		
delta	I	2038-01-08T04:12:06.171		43.29	-41.66	48300.35	-27.23		
gamma	I	2038-01-08T04:12:30.759		43.26	-41.63	47631.38	-27.19		
eta	I	2038-01-08T04:12:47.513		43.24	-41.60	47176.12	-27.16		
beta	I	2038-01-08T04:13:44.218		43.18	-41.52	45641.34	-27.06		
alpha	I	2038-01-08T04:14:19.282		43.13	-41.46	44696.43	-26.99		
4	I	2038-01-08T04:15:37.642		43.04	-41.34	42565.70	-26.81		
5	I	2038-01-08T04:15:46.904		43.03	-41.33	42306.50	-26.80		
6	I	2038-01-08T04:16:06.014		43.01	-41.30	41825.75	-26.79		
Uranus	I	2038-01-08T04:23:32.461		42.43	-40.58	25214.23		-32.54	-33.74
Uranus	E	2038-01-08T04:52:59.237		39.57	-37.21	25385.35		22.32	23.26
6	E	2038-01-08T05:01:55.746		38.54	-36.04	41872.47	26.76		
5	E	2038-01-08T05:02:09.716		38.51	-36.01	42203.51	26.77		
4	E	2038-01-08T05:02:22.131		38.48	-35.98	42546.72	26.78		
alpha	E	2038-01-08T05:03:42.520		38.32	-35.80	44720.22	26.96		
beta	E	2038-01-08T05:04:17.963		38.25	-35.72	45678.99	27.03		
eta	E	2038-01-08T05:05:13.341		38.14	-35.59	47176.12	27.12		
gamma	E	2038-01-08T05:05:29.745		38.10	-35.55	47621.26	27.15		
delta	E	2038-01-08T05:05:54.741		38.05	-35.50	48300.35	27.19		
lambda	E	2038-01-08T05:06:58.133		37.92	-35.35	50026.71	27.28		
epsilon	E	2038-01-08T05:07:35.540		37.84	-35.26	51048.02	27.26		



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2038-01-08T04:39:59.660  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : ESO  
 Location : European Southern Obs. (3.6m)  
 Latitude (deg) : -29.26097  
 E. Longitude (deg) : 289.26831  
 Altitude (km) : 2.400  
 Gaia source ID : 865599810393249536  
 2Mass ID (if available) : 07343128+2209570  
 ICRS Star Coord at Epoch: 07h 34m 31.27871s +22:09:57.24860s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.741  
 G magnitude : 16.127  
 RP magnitude : 15.675  
 BP magnitude : 16.418  
 DUPflag : 0  
 Distance (au) : 17.724  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 175.64  
 Sun-Moon sep (deg) : 153.39  
 B (ring opening deg) : 54.98  
 PA of pole (deg) : 84.90  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.195  
 C/A sky separation (km) : 15362.9  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-08T04:12:30.333		37.08	-37.91	51008.11	-27.10		
lambda	I	2038-01-08T04:13:06.494		37.12	-37.94	50026.71	-27.11		
delta	I	2038-01-08T04:14:10.292		37.19	-37.98	48300.35	-27.01		
gamma	I	2038-01-08T04:14:35.085		37.21	-38.00	47631.34	-26.96		
eta	I	2038-01-08T04:14:51.979		37.23	-38.01	47176.12	-26.93		
beta	I	2038-01-08T04:15:49.180		37.28	-38.04	45641.41	-26.82		
alpha	I	2038-01-08T04:16:24.600		37.32	-38.06	44695.87	-26.74		
4	I	2038-01-08T04:17:43.762		37.39	-38.11	42564.64	-26.53		
5	I	2038-01-08T04:17:53.057		37.40	-38.12	42307.34	-26.52		
6	I	2038-01-08T04:18:12.327		37.42	-38.13	41826.74	-26.50		
Uranus	I	2038-01-08T04:25:52.217		37.81	-38.37	25226.72		-31.86	-33.05
Uranus	E	2038-01-08T04:54:16.564		38.71	-38.67	25405.65		20.89	21.79
6	E	2038-01-08T05:03:33.247		38.81	-38.57	41873.15	26.51		
5	E	2038-01-08T05:03:47.380		38.81	-38.57	42205.66	26.53		
4	E	2038-01-08T05:03:59.793		38.81	-38.56	42545.64	26.54		
alpha	E	2038-01-08T05:05:20.873		38.82	-38.54	44719.29	26.75		
beta	E	2038-01-08T05:05:56.600		38.82	-38.53	45678.74	26.83		
eta	E	2038-01-08T05:06:52.369		38.82	-38.51	47176.12	26.94		
gamma	E	2038-01-08T05:07:08.883		38.82	-38.51	47621.31	26.97		
delta	E	2038-01-08T05:07:34.035		38.82	-38.50	48300.35	27.02		
lambda	E	2038-01-08T05:08:37.801		38.82	-38.48	50026.71	27.13		
epsilon	E	2038-01-08T05:09:15.068		38.82	-38.46	51038.66	27.12		