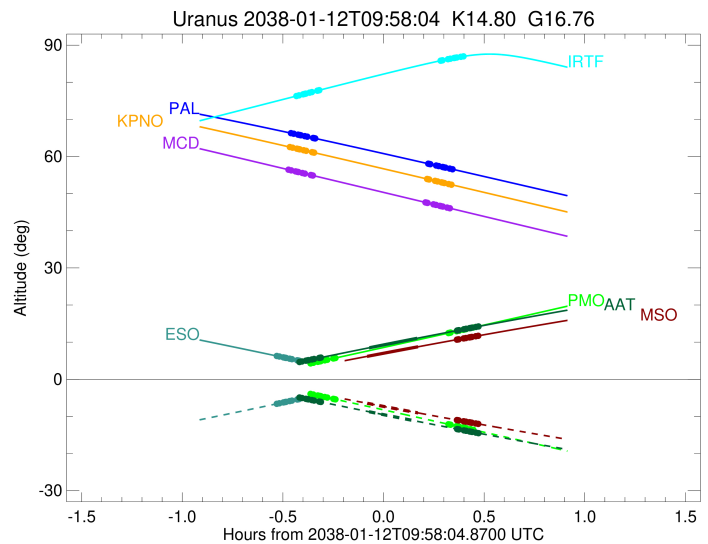
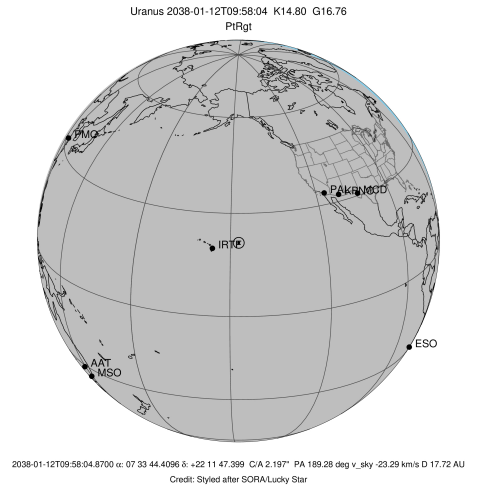



```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2038-01-12T09:56:14.800
Event type            : PtRgt
: Uranus occs: topocentric, not geocentric
: 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        : 865602868410005120
2Mass ID (if available) : 07334441+2211477
ICRS Star Coord at Epoch: 07h 33m 44.40959s +22:11:47.39928s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.800
G magnitude           : 16.759
RP magnitude          : 16.138
BP magnitude          : 17.223
DUPflag              : 0
Distance (au)         : 17.720
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -23.29
Sun-Target sep (deg)  : 179.47
Sun-Moon sep (deg)    : 102.56
B (ring opening deg) : 55.15
PA of pole (deg)      : 84.76
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.338
C/A sky separation (km) : 30044.9
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.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
  
```

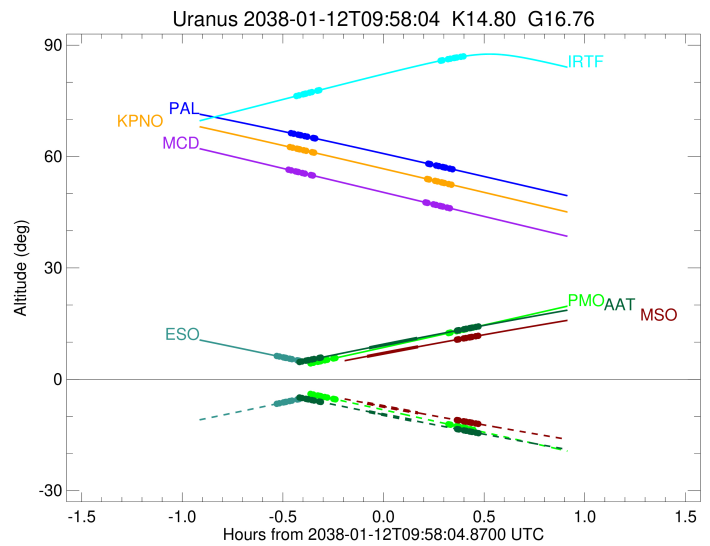
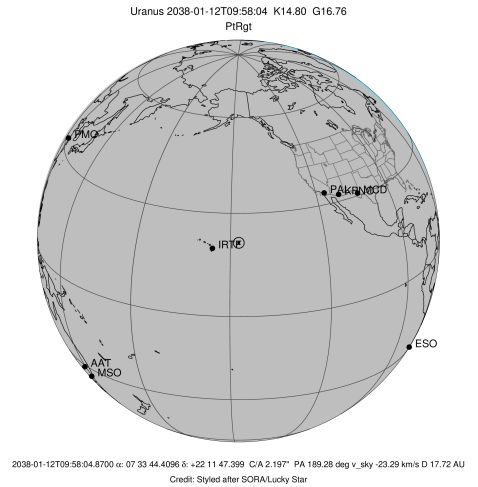


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T09:30:22.003		66.33	-66.09	51337.83	-23.11		
lambda	I	2038-01-12T09:31:19.432		66.14	-65.90	50026.71	-22.66		
delta	I	2038-01-12T09:32:36.424		65.89	-65.65	48300.35	-22.17		
gamma	I	2038-01-12T09:33:06.764		65.79	-65.56	47630.67	-21.97		
eta	I	2038-01-12T09:33:27.523		65.72	-65.49	47176.12	-21.82		
beta	I	2038-01-12T09:34:38.535		65.49	-65.26	45646.21	-21.30		
alpha	I	2038-01-12T09:35:21.979		65.35	-65.12	44725.40	-20.95		
4	I	2038-01-12T09:37:05.492		65.01	-64.78	42604.55	-20.01		
5	I	2038-01-12T09:37:23.235		64.95	-64.72	42246.62	-19.77		
6	I	2038-01-12T09:37:47.284		64.87	-64.64	41797.12	-19.60		

No planet occultations

6	E	2038-01-12T10:11:23.419		58.07	-57.90	41820.98	19.57		
5	E	2038-01-12T10:11:41.302		58.01	-57.84	42156.16	19.74		
4	E	2038-01-12T10:12:03.413		57.94	-57.77	42602.49	19.98		
alpha	E	2038-01-12T10:13:47.562		57.58	-57.41	44751.08	20.92		
beta	E	2038-01-12T10:14:31.616		57.43	-57.26	45676.20	21.26		
eta	E	2038-01-12T10:15:41.377		57.19	-57.02	47176.12	21.79		
gamma	E	2038-01-12T10:16:01.802		57.12	-56.95	47622.53	21.93		
delta	E	2038-01-12T10:16:32.566		57.01	-56.85	48300.35	22.14		
lambda	E	2038-01-12T10:17:49.696		56.75	-56.58	50026.71	22.62		
epsilon	E	2038-01-12T10:18:51.330		56.54	-56.37	51431.85	23.07		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-12T10:02:24.820
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 865602868410005120
 2Mass ID (if available) : 07334441+2211477
 ICRS Star Coord at Epoch: 07h 33m 44.40959s +22:11:47.39928s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.800
 G magnitude : 16.759
 RP magnitude : 16.138
 BP magnitude : 17.223
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 179.47
 Sun-Moon sep (deg) : 102.17
 B (ring opening deg) : 55.15
 PA of pole (deg) : 84.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.366
 C/A sky separation (km) : 30401.3
 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



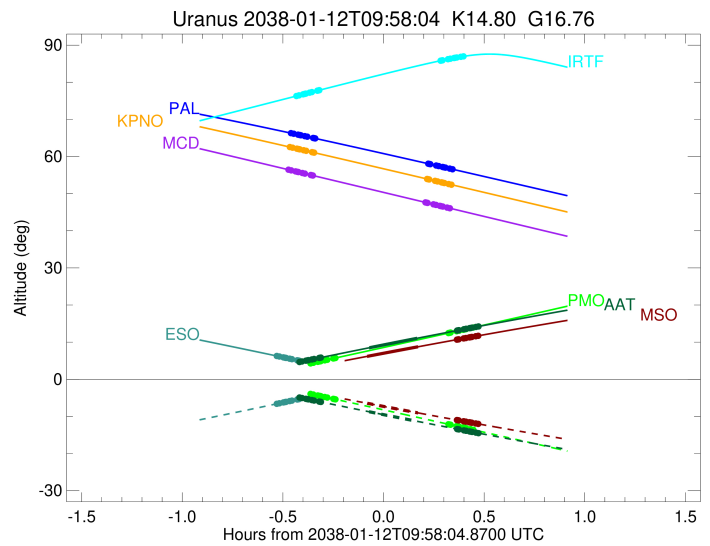
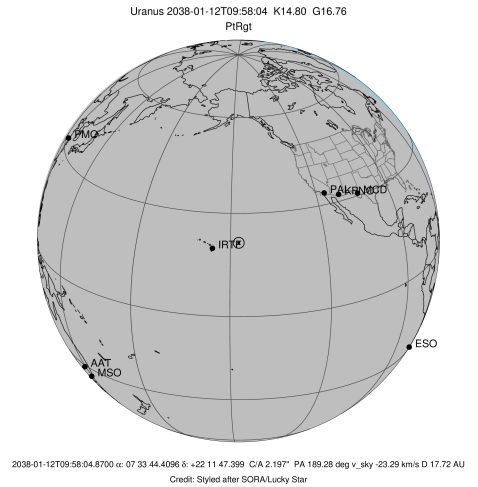
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T09:36:11.510		4.25x	-3.92x	51344.67	-22.56		
lambda	I	2038-01-12T09:37:10.663		4.44x	-4.12x	50026.71	-22.11		
delta	I	2038-01-12T09:38:29.605		4.70x	-4.37x	48300.35	-21.62		
gamma	I	2038-01-12T09:39:00.735		4.80x	-4.47x	47630.61	-21.41		
eta	I	2038-01-12T09:39:22.037		4.87x	-4.54x	47176.12	-21.26		
beta	I	2038-01-12T09:40:34.941		5.11	-4.78x	45646.49	-20.73		
alpha	I	2038-01-12T09:41:19.573		5.25	-4.93x	44726.12	-20.37		
4	I	2038-01-12T09:43:06.126		5.60	-5.28	42605.24	-19.42		
5	I	2038-01-12T09:43:24.559		5.66	-5.34	42244.78	-19.18		
6	I	2038-01-12T09:43:49.216		5.74	-5.42	41796.81	-19.00		

No planet occultations

6	E	2038-01-12T10:17:25.099	12.44	-12.11	41820.83	19.05		
5	E	2038-01-12T10:17:43.472	12.50	-12.17	42156.21	19.23		
4	E	2038-01-12T10:18:06.178	12.58	-12.25	42602.60	19.47		
alpha	E	2038-01-12T10:19:52.922	12.94	-12.61	44751.10	20.43		
beta	E	2038-01-12T10:20:37.998	13.09	-12.76	45676.18	20.79		
eta	E	2038-01-12T10:21:49.304	13.33	-13.00	47176.12	21.33		
gamma	E	2038-01-12T10:22:10.163	13.40	-13.07	47622.53	21.48		
delta	E	2038-01-12T10:22:41.571	13.51	-13.18	48300.35	21.69		
lambda	E	2038-01-12T10:24:00.252	13.77	-13.44	50026.71	22.19		
epsilon	E	2038-01-12T10:25:03.063	13.99	-13.65	51431.73	22.64		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-12T09:55:54.690
Event type           : PtRgt
: Uranus occs: topocentric, not geocentric
: 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       : 865602868410005120
2Mass ID (if available) : 07334441+2211477
ICRS Star Coord at Epoch: 07h 33m 44.40959s +22:11:47.39928s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.800
G magnitude           : 16.759
RP magnitude          : 16.138
BP magnitude          : 17.223
DUPflag              : 0
Distance (au)         : 17.720
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -23.29
Sun-Target sep (deg) : 179.47
Sun-Moon sep (deg)   : 102.52
B (ring opening deg) : 55.15
PA of pole (deg)     : 84.76
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.340
C/A sky separation (km) : 30072.7
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
  
```



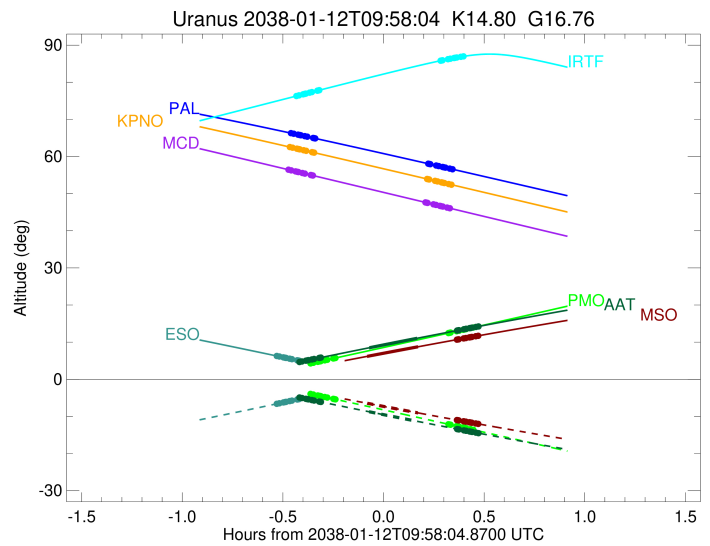
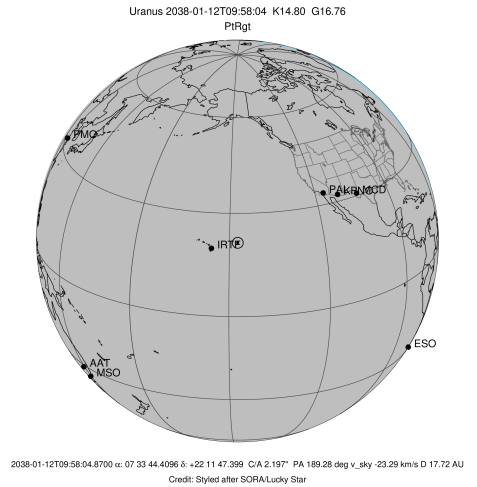
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T09:30:01.769		62.58	-62.39	51337.93	-23.09		
lambda	I	2038-01-12T09:30:59.260		62.38	-62.19	50026.71	-22.64		
delta	I	2038-01-12T09:32:16.332		62.11	-61.93	48300.35	-22.15		
gamma	I	2038-01-12T09:32:46.706		62.01	-61.82	47630.67	-21.94		
eta	I	2038-01-12T09:33:07.489		61.94	-61.75	47176.12	-21.80		
beta	I	2038-01-12T09:34:18.584		61.69	-61.51	45646.21	-21.27		
alpha	I	2038-01-12T09:35:02.083		61.54	-61.36	44725.42	-20.92		
4	I	2038-01-12T09:36:45.737		61.18	-61.00	42604.57	-19.98		
5	I	2038-01-12T09:37:03.510		61.12	-60.94	42246.57	-19.74		
6	I	2038-01-12T09:37:27.593		61.03	-60.86	41797.11	-19.57		

No planet occultations

6	E	2038-01-12T10:11:03.009		53.96	-53.82	41820.93	19.54		
5	E	2038-01-12T10:11:20.923		53.90	-53.76	42156.18	19.71		
4	E	2038-01-12T10:11:43.074		53.82	-53.68	42602.53	19.95		
alpha	E	2038-01-12T10:13:27.387		53.45	-53.31	44751.09	20.88		
beta	E	2038-01-12T10:14:11.507		53.29	-53.16	45676.18	21.23		
eta	E	2038-01-12T10:15:21.369		53.05	-52.91	47176.12	21.76		
gamma	E	2038-01-12T10:15:41.821		52.97	-52.84	47622.53	21.90		
delta	E	2038-01-12T10:16:12.627		52.87	-52.73	48300.35	22.11		
lambda	E	2038-01-12T10:17:29.861		52.59	-52.46	50026.71	22.59		
epsilon	E	2038-01-12T10:18:31.586		52.37	-52.24	51432.14	23.04		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-12T09:55:28.920
Event type           : PtRgt
: Uranus occs: topocentric, not geocentric
: 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       : 865602868410005120
2Mass ID (if available) : 07334441+2211477
ICRS Star Coord at Epoch: 07h 33m 44.40959s +22:11:47.39928s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.800
G magnitude           : 16.759
RP magnitude          : 16.138
BP magnitude          : 17.223
DUPflag              : 0
Distance (au)        : 17.720
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.29
Sun-Target sep (deg) : 179.47
Sun-Moon sep (deg)   : 102.44
B (ring opening deg) : 55.15
PA of pole (deg)     : 84.76
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.350
C/A sky separation (km) : 30204.8
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
  
```



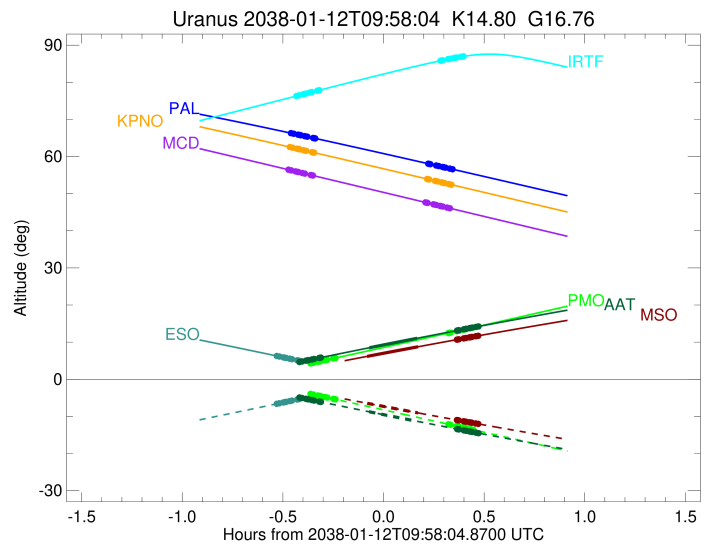
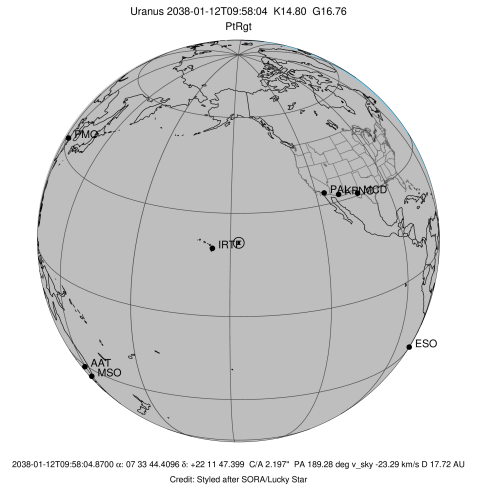
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T09:29:37.285		56.48	-56.33	51338.92	-23.01		
lambda	I	2038-01-12T09:30:35.022		56.27	-56.12	50026.71	-22.56		
delta	I	2038-01-12T09:31:52.387		56.00	-55.85	48300.35	-22.06		
gamma	I	2038-01-12T09:32:22.884		55.89	-55.74	47630.66	-21.85		
eta	I	2038-01-12T09:32:43.753		55.81	-55.67	47176.12	-21.71		
beta	I	2038-01-12T09:33:55.158		55.56	-55.41	45646.26	-21.17		
alpha	I	2038-01-12T09:34:38.859		55.40	-55.25	44725.54	-20.82		
4	I	2038-01-12T09:36:23.061		55.02	-54.88	42604.69	-19.86		
5	I	2038-01-12T09:36:40.962		54.96	-54.82	42246.25	-19.63		
6	I	2038-01-12T09:37:05.164		54.87	-54.73	41797.05	-19.45		

No planet occultations

6	E	2038-01-12T10:10:33.268		47.65	-47.53	41820.74	19.41		
5	E	2038-01-12T10:10:51.295		47.59	-47.47	42156.25	19.59		
4	E	2038-01-12T10:11:13.587		47.51	-47.39	42602.69	19.83		
alpha	E	2038-01-12T10:12:58.477		47.13	-47.01	44751.13	20.78		
beta	E	2038-01-12T10:13:42.814		46.97	-46.85	45676.13	21.13		
eta	E	2038-01-12T10:14:53.009		46.72	-46.60	47176.12	21.66		
gamma	E	2038-01-12T10:15:13.554		46.64	-46.53	47622.55	21.80		
delta	E	2038-01-12T10:15:44.494		46.53	-46.42	48300.35	22.01		
lambda	E	2038-01-12T10:17:02.049		46.25	-46.14	50026.71	22.50		
epsilon	E	2038-01-12T10:18:04.061		46.03	-45.92	51433.18	22.95		


```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-12T09:58:35.190
Event type           : PtRgt
: Uranus occs: topocentric, not geocentric
: 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       : 865602868410005120
2Mass ID (if available) : 07334441+2211477
ICRS Star Coord at Epoch: 07h 33m 44.40959s +22:11:47.39928s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.800
G magnitude           : 16.759
RP magnitude          : 16.138
BP magnitude          : 17.223
DUPflag               : 0
Distance (au)         : 17.720
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -23.29
Sun-Target sep (deg) : 179.47
Sun-Moon sep (deg)   : 102.77
B (ring opening deg) : 55.15
PA of pole (deg)     : 84.76
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.159
C/A sky separation (km) : 27747.8
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
  
```

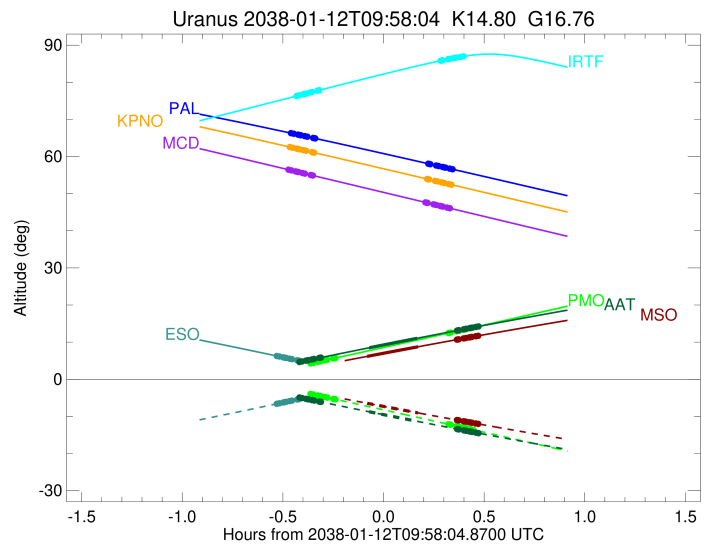
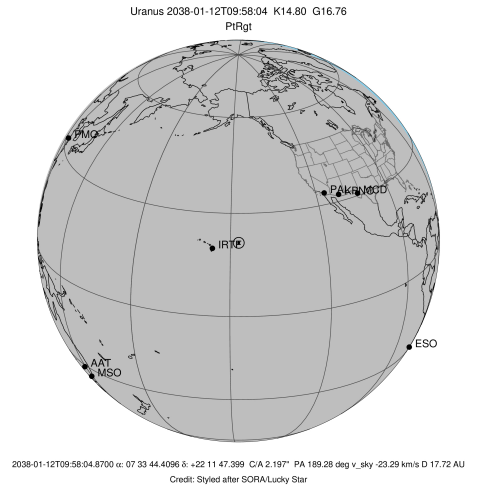


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T09:31:59.888		76.27	-76.28	51318.96	-24.07		
lambda	I	2038-01-12T09:32:54.127		76.48	-76.49	50026.71	-23.69		
delta	I	2038-01-12T09:34:07.610		76.76	-76.77	48300.35	-23.29		
gamma	I	2038-01-12T09:34:36.459		76.87	-76.88	47630.83	-23.12		
eta	I	2038-01-12T09:34:56.176		76.95	-76.96	47176.12	-23.00		
beta	I	2038-01-12T09:36:03.396		77.21	-77.22	45645.39	-22.58		
alpha	I	2038-01-12T09:36:44.349		77.36	-77.38	44723.22	-22.30		
4	I	2038-01-12T09:38:21.016		77.73	-77.75	42602.26	-21.54		
5	I	2038-01-12T09:38:37.056		77.80	-77.81	42252.38	-21.35		
6	I	2038-01-12T09:38:59.693		77.88	-77.90	41798.27	-21.22		

No planet occultations

6	E	2038-01-12T10:15:04.816		85.81	-86.01	41824.17	21.22		
5	E	2038-01-12T10:15:21.326		85.86	-86.06	42155.26	21.35		
4	E	2038-01-12T10:15:41.673		85.93	-86.13	42599.87	21.55		
alpha	E	2038-01-12T10:17:18.858		86.23	-86.46	44750.33	22.30		
beta	E	2038-01-12T10:18:00.317		86.35	-86.60	45677.07	22.58		
eta	E	2038-01-12T10:19:06.155		86.54	-86.81	47176.12	23.01		
gamma	E	2038-01-12T10:19:25.496		86.59	-86.87	47622.29	23.13		
delta	E	2038-01-12T10:19:54.706		86.67	-86.96	48300.35	23.30		
lambda	E	2038-01-12T10:21:08.165		86.86	-87.18	50026.71	23.70		
epsilon	E	2038-01-12T10:22:06.378		87.00	-87.34	51414.69	24.08		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-12T09:53:44.600
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 865602868410005120
 2Mass ID (if available) : 07334441+2211477
 ICRS Star Coord at Epoch: 07h 33m 44.40959s +22:11:47.39928s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.800
 G magnitude : 16.759
 RP magnitude : 16.138
 BP magnitude : 17.223
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 179.47
 Sun-Moon sep (deg) : 101.71
 B (ring opening deg) : 55.15
 PA of pole (deg) : 84.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.998
 C/A sky separation (km) : 25673.6
 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



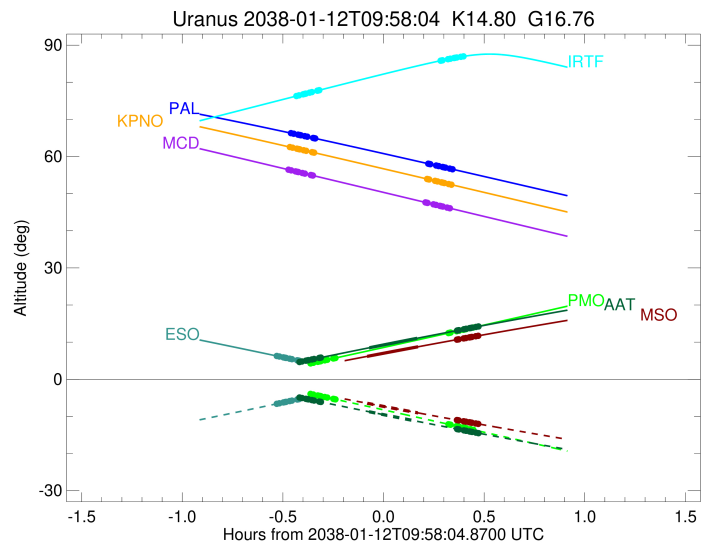
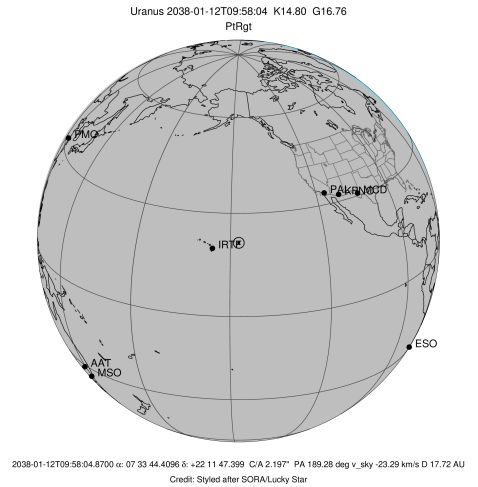
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T09:26:10.443		6.29	-6.63	51299.34	-24.48		
lambda	I	2038-01-12T09:27:02.896		6.13	-6.46	50026.71	-24.15		
delta	I	2038-01-12T09:28:14.856		5.90	-6.24	48300.35	-23.82		
gamma	I	2038-01-12T09:28:43.033		5.81	-6.15	47630.99	-23.68		
eta	I	2038-01-12T09:29:02.277		5.75	-6.08	47176.12	-23.59		
beta	I	2038-01-12T09:30:07.745		5.54	-5.88	45644.65	-23.24		
alpha	I	2038-01-12T09:30:47.535		5.41	-5.75	44721.09	-23.01		
4	I	2038-01-12T09:32:20.807		5.11	-5.45	42599.94	-22.40		
5	I	2038-01-12T09:32:35.835		5.06	-5.40	42257.76	-22.24		
6	I	2038-01-12T09:32:57.884		4.99x	-5.33	41799.56	-22.14		

No planet occultations

6	E	2038-01-12T10:11:41.848		-2.61x	2.27x	41826.71	22.07		
5	E	2038-01-12T10:11:57.745		-2.66x	2.33x	42154.90	22.17		
4	E	2038-01-12T10:12:17.242		-2.73x	2.39x	42597.70	22.33		
alpha	E	2038-01-12T10:13:51.425		-3.04x	2.70x	44749.63	22.94		
beta	E	2038-01-12T10:14:31.842		-3.18x	2.84x	45677.71	23.16		
eta	E	2038-01-12T10:15:36.149		-3.39x	3.06x	47176.12	23.50		
gamma	E	2038-01-12T10:15:55.086		-3.46x	3.12x	47622.12	23.60		
delta	E	2038-01-12T10:16:23.742		-3.55x	3.21x	48300.35	23.74		
lambda	E	2038-01-12T10:17:35.974		-3.80x	3.46x	50026.71	24.06		
epsilon	E	2038-01-12T10:18:32.810		-3.99x	3.65x	51400.75	24.38		

```

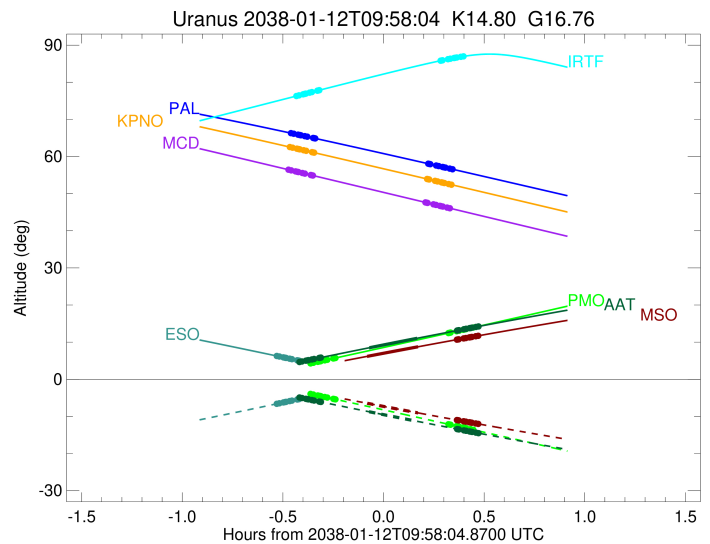
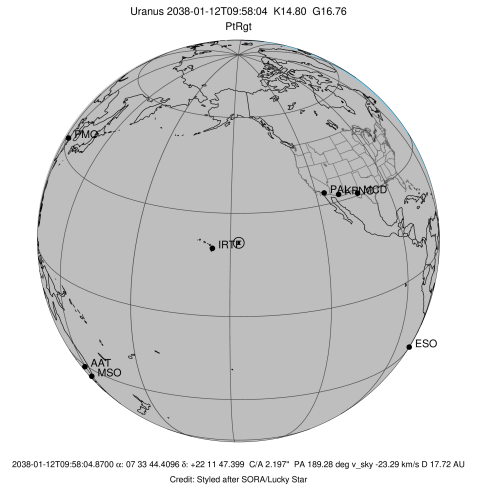
target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2038-01-12T10:01:06.130
Event type            : PtRgt
: Uranus occs: topocentric, not geocentric
: Ring occs: geocentric, topocentric
Observer code         : AAT
Location              : Siding Spring (AAT)
Latitude (deg)        : -31.27703
E. Longitude (deg)    : 149.06608
Altitude (km)         : 1.164
Gaia source ID        : 865602868410005120
2Mass ID (if available) : 07334441+2211477
ICRS Star Coord at Epoch: 07h 33m 44.40959s +22:11:47.39928s
RUWE (>1.4 is poor)  : 0.99
K magnitude           : 14.800
G magnitude           : 16.759
RP magnitude          : 16.138
BP magnitude          : 17.223
DUPflag              : 0
Distance (au)         : 17.720
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -23.29
Sun-Target sep (deg)  : 179.47
Sun-Moon sep (deg)    : 102.15
B (ring opening deg)  : 55.15
PA of pole (deg)      : 84.76
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.820
C/A sky separation (km) : 23386.9
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	2038-01-12T09:32:56.855		4.63x	-4.90x	51283.65	-25.18		
lambda	I	2038-01-12T09:33:47.136		4.79x	-5.06	50026.71	-24.91		
delta	I	2038-01-12T09:34:56.794		5.01	-5.27	48300.35	-24.65		
gamma	I	2038-01-12T09:35:24.004		5.09	-5.36	47631.09	-24.54		
eta	I	2038-01-12T09:35:42.572		5.15	-5.42	47176.12	-24.46		
beta	I	2038-01-12T09:36:45.617		5.35	-5.61	45644.10	-24.19		
alpha	I	2038-01-12T09:37:23.853		5.46	-5.73	44719.33	-24.01		
4	I	2038-01-12T09:38:52.937		5.74	-6.01	42597.91	-23.52		
5	I	2038-01-12T09:39:06.933		5.78	-6.05	42262.14	-23.39		
6	I	2038-01-12T09:39:28.133		5.85	-6.12	41800.77	-23.32		
Uranus	I	2038-01-12T09:53:48.304		8.48	-8.75	25549.23		-5.11	-5.35
Uranus	E	2038-01-12T10:08:08.756		11.05	-11.33	25409.32		20.49	21.37
6	E	2038-01-12T10:20:00.771		13.13	-13.41	41829.91	23.38		
5	E	2038-01-12T10:20:15.818		13.17	-13.46	42154.87	23.45		
4	E	2038-01-12T10:20:34.109		13.22	-13.51	42594.87	23.59		
alpha	E	2038-01-12T10:22:03.625		13.48	-13.77	44748.60	24.08		
beta	E	2038-01-12T10:22:42.232		13.59	-13.88	45678.45	24.26		
eta	E	2038-01-12T10:23:43.710		13.77	-14.05	47176.12	24.54		
gamma	E	2038-01-12T10:24:01.849		13.82	-14.11	47621.92	24.62		
delta	E	2038-01-12T10:24:29.348		13.90	-14.19	48300.35	24.73		
lambda	E	2038-01-12T10:25:38.784		14.10	-14.38	50026.71	24.99		
epsilon	E	2038-01-12T10:26:32.773		14.25	-14.54	51381.21	25.27		


```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-12T10:00:54.680
Event type           : PtRgt
: Uranus occs: topocentric, not geocentric
: Ring occs: geocentric, topocentric
Observer code        : MSO
Location              : Mt. Stromlo Observatory
Latitude (deg)       : -35.32000
E. Longitude (deg)   : 149.00833
Altitude (km)        : 0.770
Gaia source ID       : 865602868410005120
2Mass ID (if available) : 07334441+2211477
ICRS Star Coord at Epoch: 07h 33m 44.40959s +22:11:47.39928s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.800
G magnitude           : 16.759
RP magnitude          : 16.138
BP magnitude          : 17.223
DUPflag              : 0
Distance (au)        : 17.720
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.29
Sun-Target sep (deg) : 179.47
Sun-Moon sep (deg)   : 102.11
B (ring opening deg) : 55.15
PA of pole (deg)     : 84.76
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.799
C/A sky separation (km) : 23125.2
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	2038-01-12T09:32:41.018		2.56x	-2.86x	51281.36	-25.25		
lambda	I	2038-01-12T09:33:31.069		2.71x	-3.00x	50026.71	-24.98		
delta	I	2038-01-12T09:34:40.518		2.92x	-3.21x	48300.35	-24.73		
gamma	I	2038-01-12T09:35:07.639		3.00x	-3.29x	47631.11	-24.62		
eta	I	2038-01-12T09:35:26.147		3.05x	-3.35x	47176.12	-24.55		
beta	I	2038-01-12T09:36:28.972		3.24x	-3.53x	45644.02	-24.28		
alpha	I	2038-01-12T09:37:07.069		3.35x	-3.65x	44719.09	-24.10		
4	I	2038-01-12T09:38:35.769		3.61x	-3.91x	42597.63	-23.63		
5	I	2038-01-12T09:38:49.660		3.65x	-3.95x	42262.72	-23.50		
6	I	2038-01-12T09:39:10.791		3.72x	-4.01x	41800.94	-23.43		
Uranus	I	2038-01-12T09:53:12.495		6.17	-6.47	25545.94		-5.91	-6.19
Uranus	E	2038-01-12T10:08:21.832		8.75	-9.05	25399.86		21.16	22.07
6	E	2038-01-12T10:19:57.140		10.67	-10.98	41830.22	23.49		
5	E	2038-01-12T10:20:12.120		10.71	-11.02	42154.89	23.56		
4	E	2038-01-12T10:20:30.312		10.76	-11.07	42594.58	23.69		
alpha	E	2038-01-12T10:21:59.463		11.01	-11.32	44748.49	24.17		
beta	E	2038-01-12T10:22:37.932		11.11	-11.42	45678.52	24.35		
eta	E	2038-01-12T10:23:39.198		11.28	-11.59	47176.12	24.62		
gamma	E	2038-01-12T10:23:57.278		11.33	-11.64	47621.90	24.69		
delta	E	2038-01-12T10:24:24.692		11.40	-11.71	48300.35	24.80		
lambda	E	2038-01-12T10:25:33.929		11.59	-11.90	50026.71	25.06		
epsilon	E	2038-01-12T10:26:27.702		11.73	-12.04	51379.32	25.33		