

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-22T10:38:55.560
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427508357478120576
 2Mass ID (if available) : 05504270+2338160

Uranus 2033-01-22T10:38:55 K13.63 G16.45 PgtRgt

ICRS Star Coord at Epoch: 05h 50m 42.70288s +23:38:15.91089s

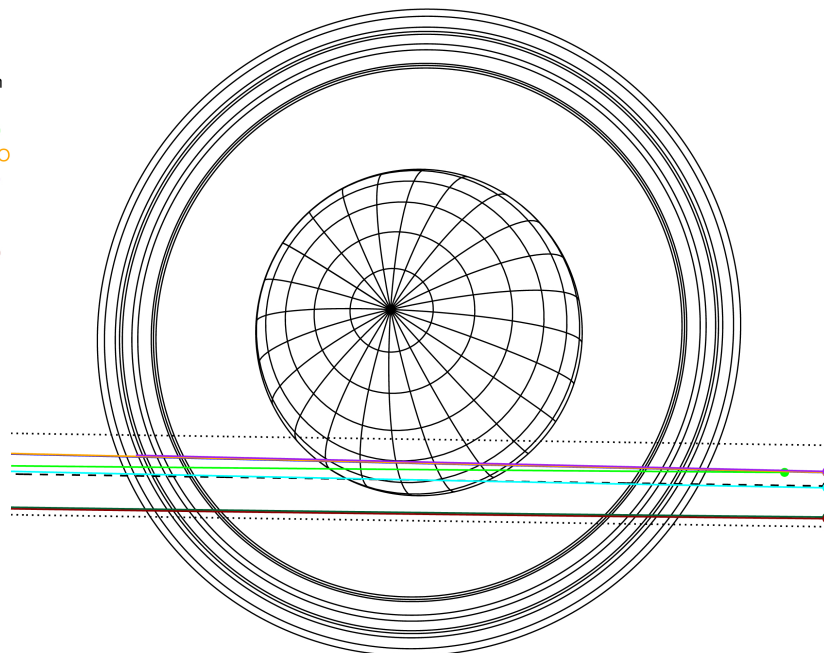
RUWE (>1.4 is poor) : 1.00
 K magnitude : 13.628
 G magnitude : 16.454
 RP magnitude : 15.546
 BP magnitude : 17.277
 DUPflag : 0
 Distance (au) : 18.193
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.23
 Sun-Target sep (deg) : 145.61
 Sun-Moon sep (deg) : 110.14
 B (ring opening deg) : 77.08
 PA of pole (deg) : 50.96

Uranus 2033-01-22T10:38:55 K13.63 G16.45
 PgtRgt



2033-01-22T10:38:55.5600 ra: 05 50 42.70288 s: +23 38 15.9111 C/A 1.744" PA 359.16 deg v_sky -18.23 km/s D 18.19 AU
 Credit: Styled after SORA/Lucky Star

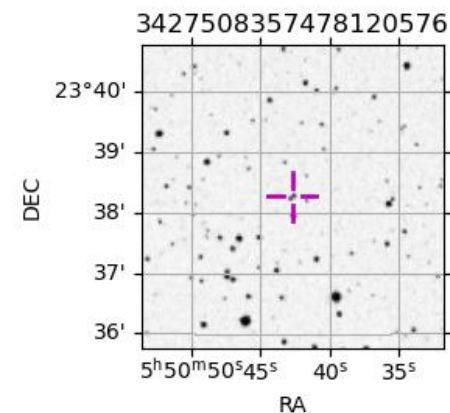
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 AAT
 MSO



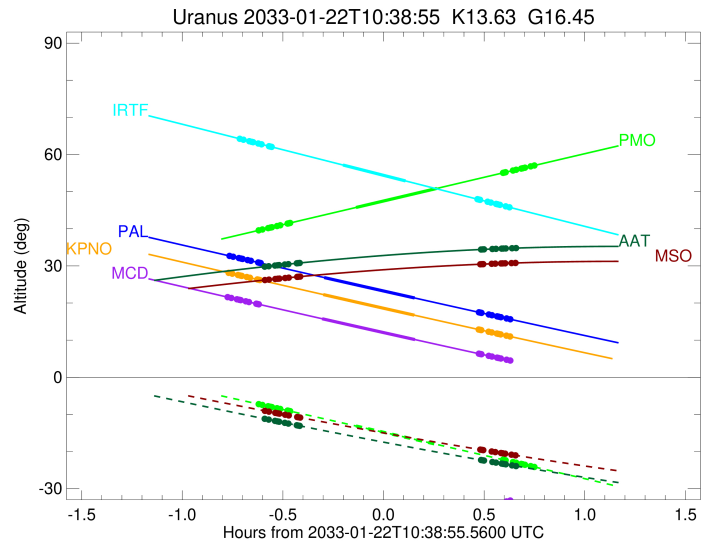
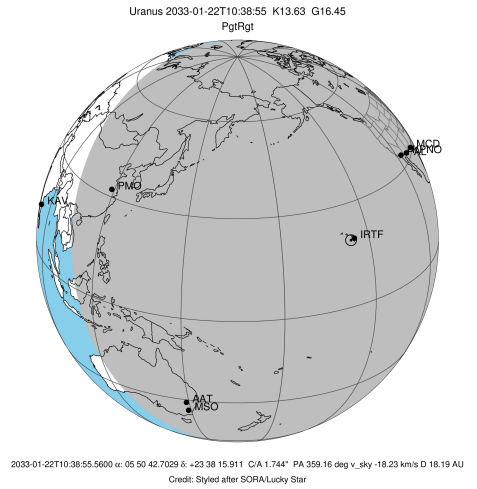
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	JAN 22 09:53 - JAN 22 11:16	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	JAN 22 10:02 - JAN 22 11:24	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	JAN 22 09:53 - JAN 22 11:16	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	JAN 22 09:52 - JAN 22 11:13	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	JAN 22 09:56 - JAN 22 11:16	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1	+++++		+++++	JAN 22 10:03 - JAN 22 11:18	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	JAN 22 10:04 - JAN 22 11:18	PnnRie

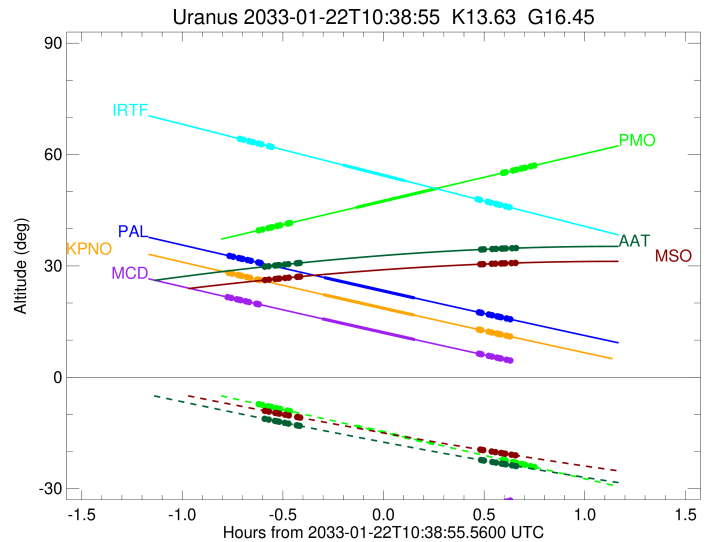
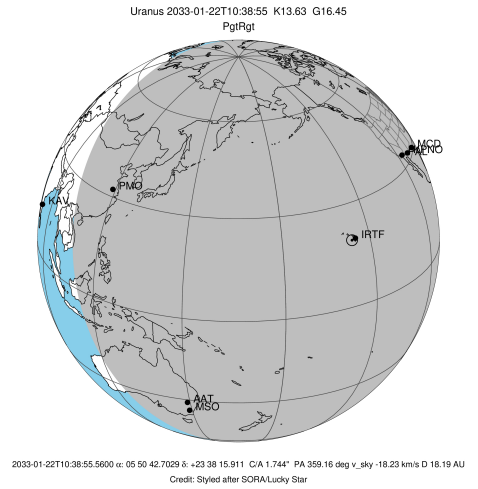


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-22T10:34:19.680
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3427508357478120576
 2Mass ID (if available) : 05504270+2338160
 ICRS Star Coord at Epoch: 05h 50m 42.70288s +23:38:15.91089s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 13.628
 G magnitude : 16.454
 RP magnitude : 15.546
 BP magnitude : 17.277
 DUPflag : 0
 Distance (au) : 18.193
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.23
 Sun-Target sep (deg) : 145.61
 Sun-Moon sep (deg) : 110.74
 B (ring opening deg) : 77.08
 PA of pole (deg) : 50.96
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.554
 C/A sky separation (km) : 20499.8
 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	2033-01-22T09:53:24.877		32.61	-61.12	50754.85	-17.05		
lambda	I	2033-01-22T09:54:07.599		32.46	-60.98	50026.71	-17.02		
delta	I	2033-01-22T09:55:49.431		32.11	-60.65	48300.35	-16.89		
gamma	I	2033-01-22T09:56:29.421		31.97	-60.52	47626.18	-16.83		
eta	I	2033-01-22T09:56:56.192		31.88	-60.43	47176.12	-16.79		
beta	I	2033-01-22T09:58:27.350		31.56	-60.13	45651.46	-16.65		
alpha	I	2033-01-22T09:59:25.222		31.36	-59.94	44692.47	-16.55		
4	I	2033-01-22T10:01:33.345		30.92	-59.52	42579.75	-16.31		
5	I	2033-01-22T10:02:00.251		30.83	-59.43	42154.88	-16.27		
6	I	2033-01-22T10:02:18.370		30.77	-59.37	41858.31	-16.24		
Uranus	I	2033-01-22T10:21:14.653		26.86	-55.57	25049.76		-12.34	-12.90
Uranus	E	2033-01-22T10:48:13.185		21.36	-50.04	25558.81		-0.24	-0.25
6	E	2033-01-22T11:07:22.723		17.50	-46.07	41858.06	16.14		
5	E	2033-01-22T11:07:48.933		17.41	-45.98	42279.39	16.17		
4	E	2033-01-22T11:08:04.588		17.36	-45.92	42528.95	16.20		
alpha	E	2033-01-22T11:10:18.394		16.91	-45.46	44715.61	16.44		
beta	E	2033-01-22T11:11:15.189		16.72	-45.26	45652.65	16.53		
eta	E	2033-01-22T11:12:46.975		16.41	-44.94	47176.12	16.67		
gamma	E	2033-01-22T11:13:13.710		16.33	-44.85	47622.17	16.70		
delta	E	2033-01-22T11:13:54.247		16.19	-44.71	48300.35	16.76		
lambda	E	2033-01-22T11:15:36.888		15.85	-44.35	50026.71	16.88		
epsilon	E	2033-01-22T11:16:54.550		15.59	-44.08	51341.08	16.91		

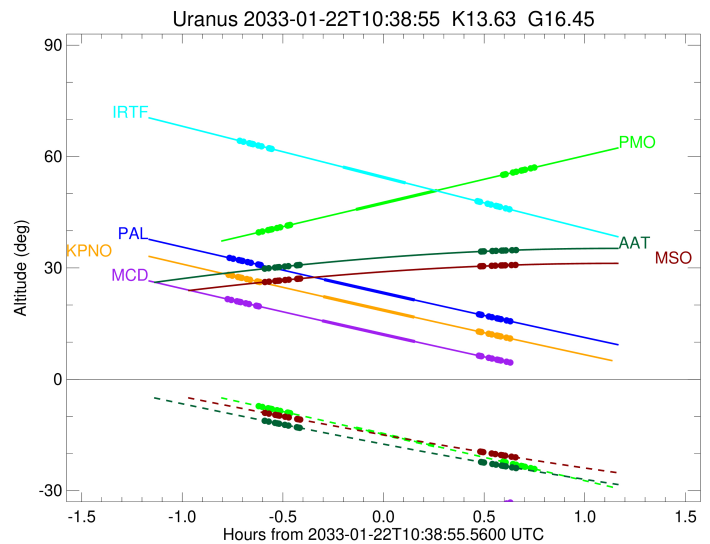
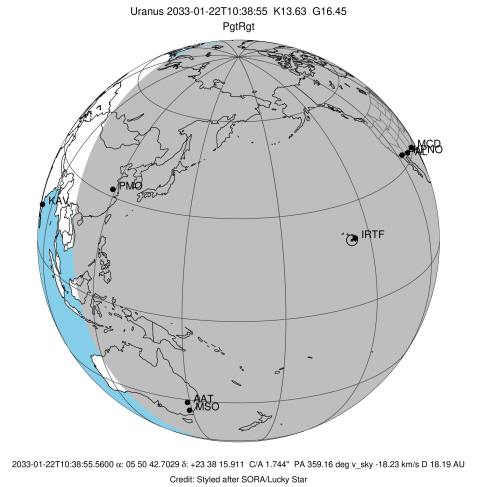
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-22T10:42:22.930
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3427508357478120576
 2Mass ID (if available) : 05504270+2338160
 ICRS Star Coord at Epoch: 05h 50m 42.70288s +23:38:15.91089s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 13.628
 G magnitude : 16.454
 RP magnitude : 15.546
 BP magnitude : 17.277
 DUPflag : 0
 Distance (au) : 18.193
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.23
 Sun-Target sep (deg) : 145.61
 Sun-Moon sep (deg) : 110.57
 B (ring opening deg) : 77.08
 PA of pole (deg) : 50.96
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.627
 C/A sky separation (km) : 21467.1
 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	2033-01-22T10:02:07.198		39.66	-7.32	50754.21	-16.93		
lambda	I	2033-01-22T10:02:50.213		39.82	-7.46	50026.71	-16.89		
delta	I	2033-01-22T10:04:32.876		40.18	-7.81	48300.35	-16.74		
gamma	I	2033-01-22T10:05:13.213		40.32	-7.94	47626.14	-16.68		
eta	I	2033-01-22T10:05:40.220		40.42	-8.03	47176.12	-16.64		
beta	I	2033-01-22T10:07:12.241		40.74	-8.34	45651.28	-16.49		
alpha	I	2033-01-22T10:08:10.700		40.95	-8.54	44692.25	-16.38		
4	I	2033-01-22T10:10:20.259		41.41	-8.98	42579.20	-16.12		
5	I	2033-01-22T10:10:47.451		41.50	-9.07	42154.93	-16.08		
6	I	2033-01-22T10:11:05.759		41.57	-9.13	41858.78	-16.04		
Uranus	I	2033-01-22T10:30:42.731		45.74	-13.13	25067.90		-12.10	-12.66
Uranus	E	2033-01-22T10:54:52.200		50.88	-18.11	25553.32		-1.27	-1.33
6	E	2033-01-22T11:14:34.715		55.07	-22.21	41859.58	16.10		
5	E	2033-01-22T11:15:00.706		55.16	-22.30	42276.62	16.14		
4	E	2033-01-22T11:15:16.488		55.22	-22.35	42528.32	16.18		
alpha	E	2033-01-22T11:17:30.317		55.69	-22.82	44714.30	16.45		
beta	E	2033-01-22T11:18:27.086		55.89	-23.02	45651.96	16.56		
eta	E	2033-01-22T11:19:58.715		56.21	-23.34	47176.12	16.71		
gamma	E	2033-01-22T11:20:25.363		56.31	-23.43	47622.05	16.75		
delta	E	2033-01-22T11:21:05.771		56.45	-23.57	48300.35	16.82		
lambda	E	2033-01-22T11:22:47.980		56.81	-23.93	50026.71	16.96		
epsilon	E	2033-01-22T11:24:04.492		57.08	-24.20	51328.34	17.00		

```

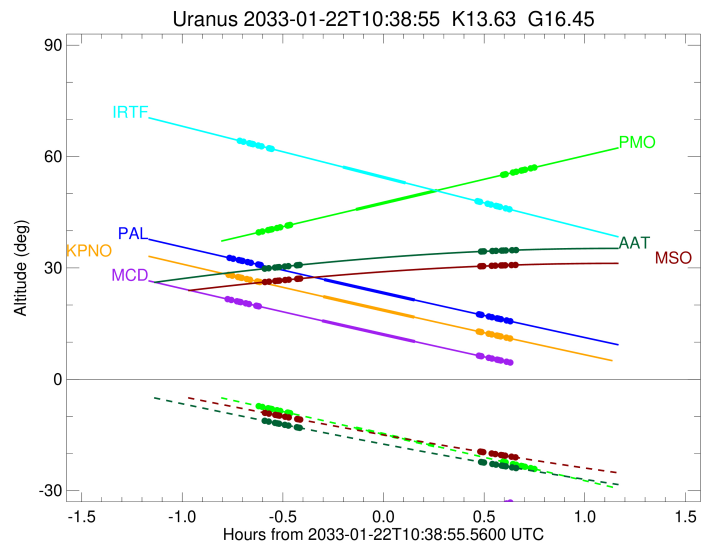
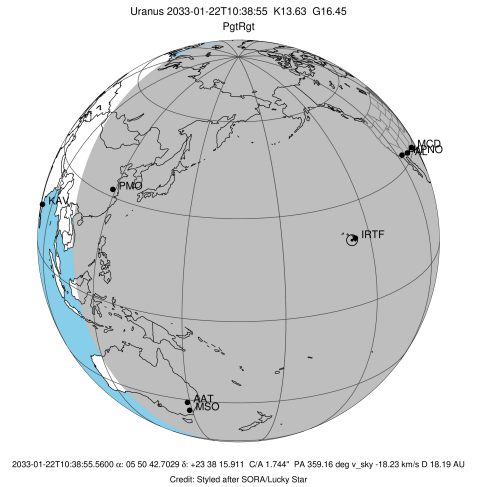
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-01-22T10:34:10.000
Event type          : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : KPNO
Location            : Kitt Peak Natl Obs
Latitude (deg)      : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)       : 2.120
Gaia source ID      : 3427508357478120576
2Mass ID (if available) : 05504270+2338160
ICRS Star Coord at Epoch: 05h 50m 42.70288s +23:38:15.91089s
RUWE (>1.4 is poor) : 1.00
K magnitude         : 13.628
G magnitude         : 16.454
RP magnitude        : 15.546
BP magnitude        : 17.277
DUPflag            : 0
Distance (au)       : 18.193
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -18.23
Sun-Target sep (deg) : 145.61
Sun-Moon sep (deg)  : 110.68
B (ring opening deg) : 77.08
PA of pole (deg)    : 50.96
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.549
C/A sky separation (km) : 20435.4
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	2033-01-22T09:53:09.337		28.05	-57.35	50754.94	-17.04		
lambda	I	2033-01-22T09:53:52.107		27.90	-57.20	50026.71	-17.00		
delta	I	2033-01-22T09:55:34.036		27.54	-56.85	48300.35	-16.87		
gamma	I	2033-01-22T09:56:14.062		27.40	-56.71	47626.19	-16.81		
eta	I	2033-01-22T09:56:40.858		27.31	-56.62	47176.12	-16.78		
beta	I	2033-01-22T09:58:12.093		26.99	-56.30	45651.48	-16.64		
alpha	I	2033-01-22T09:59:10.011		26.79	-56.10	44692.50	-16.54		
4	I	2033-01-22T10:01:18.226		26.35	-55.66	42579.81	-16.30		
5	I	2033-01-22T10:01:45.155		26.26	-55.57	42154.88	-16.26		
6	I	2033-01-22T10:02:03.289		26.19	-55.50	41858.25	-16.23		
Uranus	I	2033-01-22T10:20:58.709		22.28	-51.55	25048.53		-12.35	-12.92
Uranus	E	2033-01-22T10:48:09.768		16.72	-45.80	25558.89		-0.18	-0.19
6	E	2033-01-22T11:07:18.630		12.86	-41.74	41857.99	16.12		
5	E	2033-01-22T11:07:44.877		12.77	-41.65	42279.53	16.15		
4	E	2033-01-22T11:08:00.541		12.72	-41.59	42528.98	16.19		
alpha	E	2033-01-22T11:10:14.481		12.27	-41.12	44715.68	16.42		
beta	E	2033-01-22T11:11:11.335		12.08	-40.92	45652.68	16.51		
eta	E	2033-01-22T11:12:43.224		11.78	-40.59	47176.12	16.65		
gamma	E	2033-01-22T11:13:09.989		11.69	-40.50	47622.18	16.68		
delta	E	2033-01-22T11:13:50.575		11.55	-40.35	48300.35	16.74		
lambda	E	2033-01-22T11:15:33.344		11.21	-39.99	50026.71	16.86		
epsilon	E	2033-01-22T11:16:51.141		10.96	-39.71	51341.67	16.89		

```

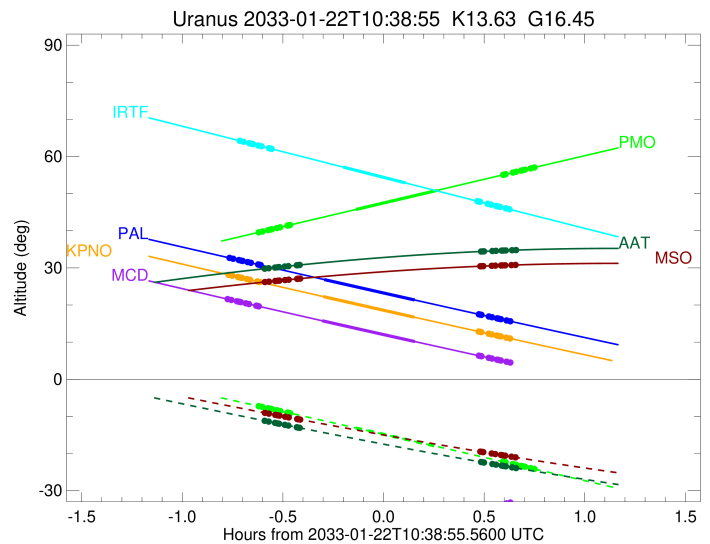
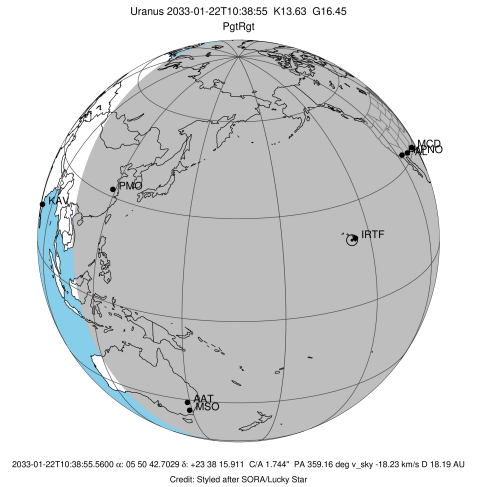
target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2033-01-22T10:34:02.390
Event type            : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : MCD
Location              : McDonald Obs. 2.7m
Latitude (deg)        : 30.67158
E. Longitude (deg)    : 255.97844
Altitude (km)         : 2.075
Gaia source ID        : 3427508357478120576
2Mass ID (if available) : 05504270+2338160
ICRS Star Coord at Epoch: 05h 50m 42.70288s +23:38:15.91089s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 13.628
G magnitude           : 16.454
RP magnitude          : 15.546
BP magnitude          : 17.277
DUPflag              : 0
Distance (au)         : 18.193
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -18.23
Sun-Target sep (deg) : 145.61
Sun-Moon sep (deg)   : 110.60
B (ring opening deg) : 77.08
PA of pole (deg)     : 50.96
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (" ) : 1.536
C/A sky separation (km) : 20265.2
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	2033-01-22T09:52:50.766		21.51	-51.25	50755.26	-17.02		
lambda	I	2033-01-22T09:53:33.594		21.36	-51.10	50026.71	-16.99		
delta	I	2033-01-22T09:55:15.606		21.00	-50.74	48300.35	-16.86		
gamma	I	2033-01-22T09:55:55.660		20.86	-50.59	47626.21	-16.80		
eta	I	2033-01-22T09:56:22.474		20.77	-50.50	47176.12	-16.77		
beta	I	2033-01-22T09:57:53.757		20.46	-50.17	45651.55	-16.63		
alpha	I	2033-01-22T09:58:51.698		20.26	-49.96	44692.59	-16.53		
4	I	2033-01-22T10:00:59.937		19.81	-49.51	42580.00	-16.30		
5	I	2033-01-22T10:01:26.879		19.72	-49.41	42154.87	-16.26		
6	I	2033-01-22T10:01:45.024		19.66	-49.34	41858.09	-16.23		
Uranus	I	2033-01-22T10:20:36.249		15.77	-45.29	25045.22		-12.39	-12.96
Uranus	E	2033-01-22T10:48:16.807		10.16	-39.33	25559.00		-0.03	-0.04
6	E	2033-01-22T11:07:21.610		6.35	-35.22	41857.81	16.12		
5	E	2033-01-22T11:07:47.895		6.27	-35.13	42279.85	16.15		
4	E	2033-01-22T11:08:03.553		6.21	-35.07	42529.06	16.18		
alpha	E	2033-01-22T11:10:17.557		5.77	-34.59	44715.83	16.41		
beta	E	2033-01-22T11:11:14.446		5.59	-34.39	45652.76	16.50		
eta	E	2033-01-22T11:12:46.405		5.28	-34.06	47176.12	16.63		
gamma	E	2033-01-22T11:13:13.196		5.20	-33.96	47622.19	16.67		
delta	E	2033-01-22T11:13:53.821		5.06	-33.82	48300.35	16.72		
lambda	E	2033-01-22T11:15:36.701		4.73x	-33.45	50026.71	16.84		
epsilon	E	2033-01-22T11:16:54.675		4.47x	-33.17	51343.05	16.87		

```

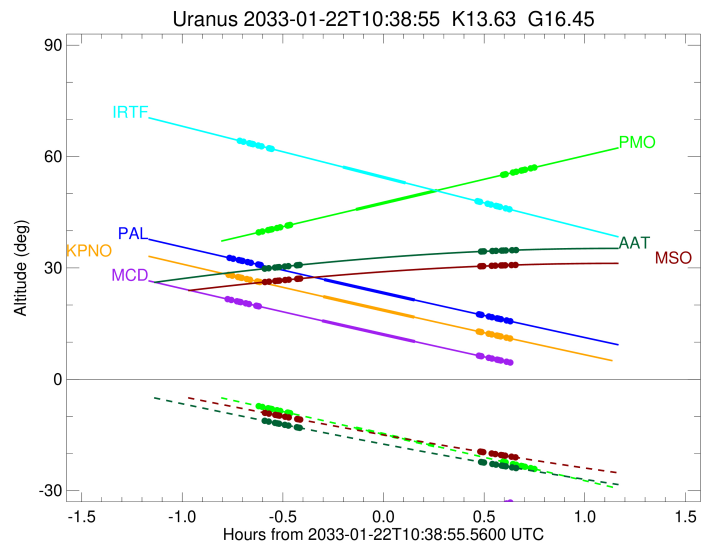
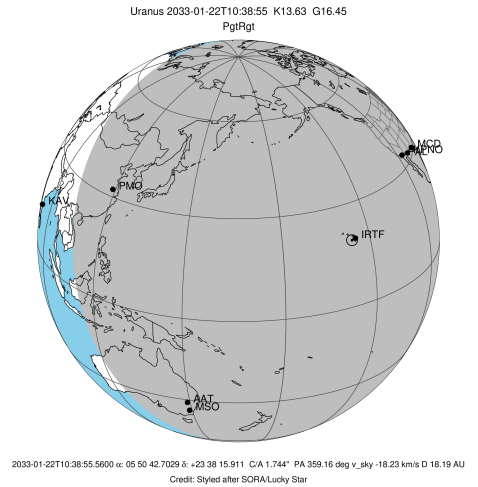
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-01-22T10:35:42.540
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : IRTF
Location             : Mauna Kea/IRTF
Latitude (deg)       : 19.82622
E. Longitude (deg)   : 204.52800
Altitude (km)        : 4.168
Gaia source ID       : 3427508357478120576
2Mass ID (if available) : 05504270+2338160
ICRS Star Coord at Epoch: 05h 50m 42.70288s +23:38:15.91089s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 13.628
G magnitude           : 16.454
RP magnitude          : 15.546
BP magnitude          : 17.277
DUPflag              : 0
Distance (au)         : 18.193
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -18.23
Sun-Target sep (deg) : 145.61
Sun-Moon sep (deg)   : 111.02
B (ring opening deg) : 77.08
PA of pole (deg)     : 50.96
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation ("): 1.750
C/A sky separation (km): 23090.5
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	2033-01-22T09:56:28.816		64.15	-81.29	50750.29	-16.79		
lambda	I	2033-01-22T09:57:11.967		63.98	-81.46	50026.71	-16.74		
delta	I	2033-01-22T09:58:55.648		63.59	-81.87	48300.35	-16.56		
gamma	I	2033-01-22T09:59:36.459		63.43	-82.03	47625.87	-16.49		
eta	I	2033-01-22T10:00:03.774		63.33	-82.13	47176.12	-16.44		
beta	I	2033-01-22T10:01:37.079		62.97	-82.50	45650.38	-16.25		
alpha	I	2033-01-22T10:02:36.450		62.74	-82.73	44691.13	-16.13		
4	I	2033-01-22T10:04:48.413		62.24	-83.25	42576.66	-15.80		
5	I	2033-01-22T10:05:15.962		62.13	-83.36	42155.30	-15.75		
6	I	2033-01-22T10:05:34.518		62.06	-83.43	41860.86	-15.71		
Uranus	I	2033-01-22T10:26:48.870		57.18	-88.42	25129.08		-11.29	-11.81
Uranus	E	2033-01-22T10:45:29.351		52.90	-87.17	25531.62		-2.80	-2.93
6	E	2033-01-22T11:06:56.318		47.98	-82.12	41860.81	15.64		
5	E	2033-01-22T11:07:22.828		47.87	-82.02	42274.26	15.68		
4	E	2033-01-22T11:07:39.153		47.81	-81.95	42527.86	15.73		
alpha	E	2033-01-22T11:09:56.505		47.29	-81.41	44713.27	16.05		
beta	E	2033-01-22T11:10:54.680		47.06	-81.19	45651.43	16.17		
eta	E	2033-01-22T11:12:28.422		46.71	-80.82	47176.12	16.36		
gamma	E	2033-01-22T11:12:55.641		46.60	-80.71	47621.96	16.40		
delta	E	2033-01-22T11:13:36.905		46.45	-80.55	48300.35	16.48		
lambda	E	2033-01-22T11:15:21.152		46.05	-80.14	50026.71	16.64		
epsilon	E	2033-01-22T11:16:38.576		45.75	-79.84	51319.64	16.69		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-01-22T10:40:21.610
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: 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       : 3427508357478120576
2Mass ID (if available) : 05504270+2338160
ICRS Star Coord at Epoch: 05h 50m 42.70288s +23:38:15.91089s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 13.628
G magnitude           : 16.454
RP magnitude          : 15.546
BP magnitude          : 17.277
DUPflag              : 0
Distance (au)        : 18.193
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -18.23
Sun-Target sep (deg) : 145.61
Sun-Moon sep (deg)   : 110.52
B (ring opening deg) : 77.08
PA of pole (deg)     : 50.96
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.137
C/A sky separation (km) : 28197.9
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
  
```



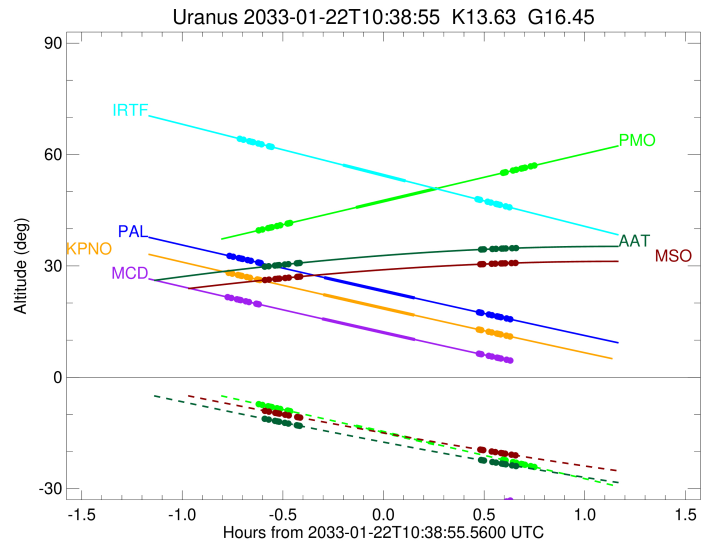
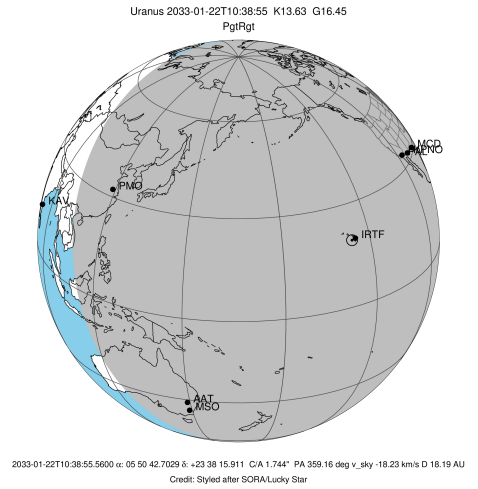
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-22T10:03:56.797		29.83	-11.27	50744.60	-15.62		
lambda	I	2033-01-22T10:04:42.899		29.91	-11.41	50026.71	-15.52		
delta	I	2033-01-22T10:06:35.108		30.09	-11.75	48300.35	-15.25		
gamma	I	2033-01-22T10:07:19.557		30.17	-11.89	47625.23	-15.13		
eta	I	2033-01-22T10:07:49.319		30.21	-11.98	47176.12	-15.05		
beta	I	2033-01-22T10:09:31.811		30.38	-12.29	45648.27	-14.75		
alpha	I	2033-01-22T10:10:37.481		30.48	-12.48	44688.70	-14.54		
4	I	2033-01-22T10:13:05.282		30.71	-12.93	42570.07	-14.02		
5	I	2033-01-22T10:13:35.717		30.76	-13.02	42157.45	-13.93		
6	I	2033-01-22T10:13:56.462		30.79	-13.08	41865.87	-13.85		

No planet occultations

6	E	2033-01-22T11:08:01.668		34.42	-22.29	41866.32	13.86		
5	E	2033-01-22T11:08:30.224		34.44	-22.37	42262.34	13.94		
4	E	2033-01-22T11:08:49.174		34.45	-22.42	42526.32	14.03		
alpha	E	2033-01-22T11:11:21.656		34.55	-22.82	44708.32	14.56		
beta	E	2033-01-22T11:12:25.751		34.59	-22.99	45648.98	14.77		
eta	E	2033-01-22T11:14:08.117		34.66	-23.25	47176.12	15.07		
gamma	E	2033-01-22T11:14:37.604		34.67	-23.33	47621.58	15.15		
delta	E	2033-01-22T11:15:22.242		34.70	-23.45	48300.35	15.26		
lambda	E	2033-01-22T11:17:14.316		34.76	-23.74	50026.71	15.54		
epsilon	E	2033-01-22T11:18:34.000		34.80	-23.94	51272.06	15.64		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-01-22T10:40:18.310
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: 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       : 3427508357478120576
2Mass ID (if available) : 05504270+2338160
ICRS Star Coord at Epoch: 05h 50m 42.70288s +23:38:15.91089s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 13.628
G magnitude          : 16.454
RP magnitude         : 15.546
BP magnitude         : 17.277
DUPflag             : 0
Distance (au)        : 18.193
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -18.23
Sun-Target sep (deg) : 145.61
Sun-Moon sep (deg)   : 110.47
B (ring opening deg) : 77.08
PA of pole (deg)     : 50.96
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation ("): 2.156
C/A sky separation (km): 28446.4
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	2033-01-22T10:04:00.966		26.23	-9.13	50744.43	-15.54		
lambda	I	2033-01-22T10:04:47.290		26.30	-9.26	50026.71	-15.44		
delta	I	2033-01-22T10:06:40.100		26.47	-9.59	48300.35	-15.16		
gamma	I	2033-01-22T10:07:24.805		26.54	-9.72	47625.20	-15.04		
eta	I	2033-01-22T10:07:54.741		26.58	-9.80	47176.12	-14.96		
beta	I	2033-01-22T10:09:37.882		26.73	-10.10	45648.16	-14.65		
alpha	I	2033-01-22T10:10:43.998		26.83	-10.29	44688.58	-14.44		
4	I	2033-01-22T10:13:12.932		27.04	-10.72	42569.71	-13.90		
5	I	2033-01-22T10:13:43.576		27.09	-10.80	42157.62	-13.81		
6	I	2033-01-22T10:14:04.487		27.12	-10.86	41866.13	-13.73		

No planet occultations

6	E	2033-01-22T11:07:47.820		30.44	-19.49	41866.57	13.74		
5	E	2033-01-22T11:08:16.553		30.46	-19.56	42261.74	13.82		
4	E	2033-01-22T11:08:35.697		30.47	-19.61	42526.28	13.91		
alpha	E	2033-01-22T11:11:09.328		30.57	-19.99	44708.08	14.46		
beta	E	2033-01-22T11:12:13.871		30.60	-20.15	45648.87	14.67		
eta	E	2033-01-22T11:13:56.893		30.66	-20.40	47176.12	14.98		
gamma	E	2033-01-22T11:14:26.556		30.68	-20.48	47621.56	15.06		
delta	E	2033-01-22T11:15:11.454		30.70	-20.58	48300.35	15.18		
lambda	E	2033-01-22T11:17:04.139		30.76	-20.86	50026.71	15.46		
epsilon	E	2033-01-22T11:18:24.081		30.80	-21.05	51269.79	15.56		