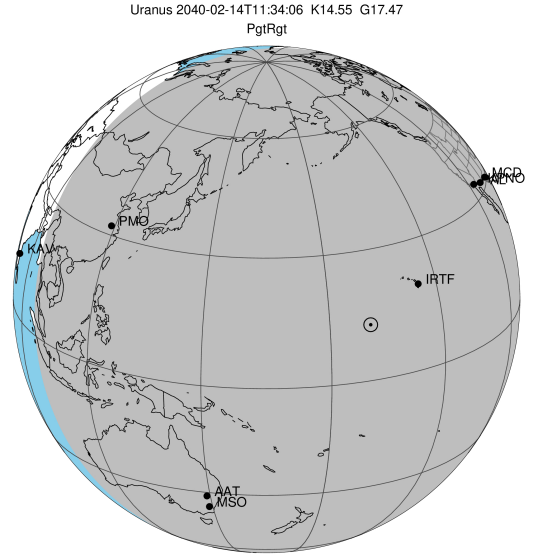


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-02-14T11:34:06.520
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 670663579973377920
 2Mass ID (if available) : 08083158+2046092

ICRS Star Coord at Epoch: 08h 08m 31.58193s +20:46:09.41792s

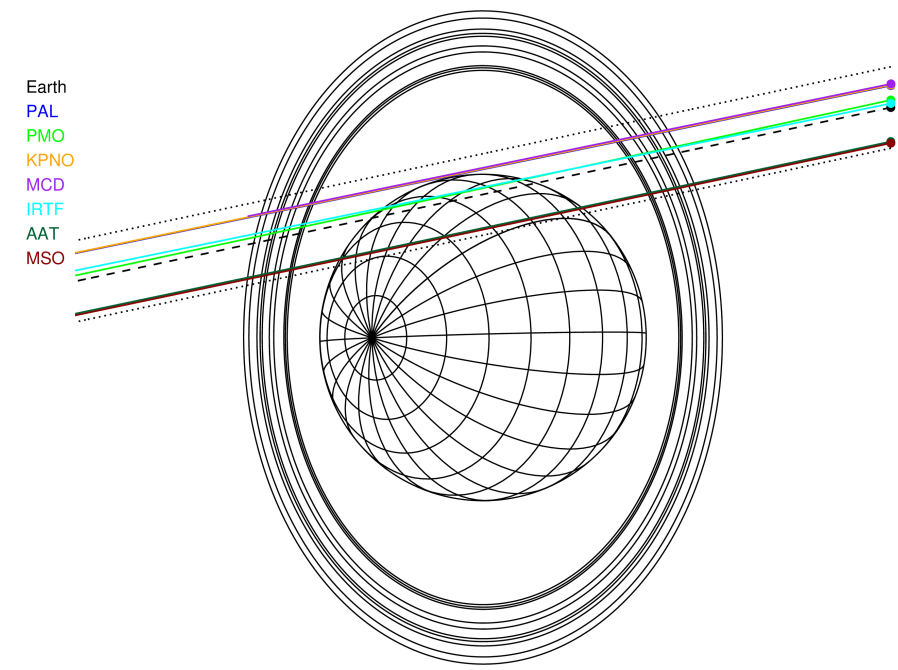
RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.548
 G magnitude : 17.474
 RP magnitude : 16.559
 BP magnitude : 18.350
 DUPflag : 0
 Distance (au) : 17.685
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.46
 Sun-Target sep (deg) : 154.99
 Sun-Moon sep (deg) : 129.58
 B (ring opening deg) : 47.13
 PA of pole (deg) : 90.17

#	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



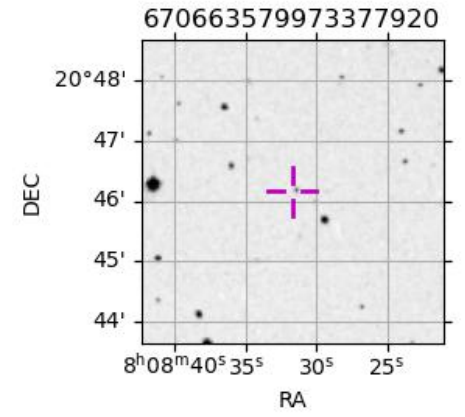
2040-02-14T11:34:06.5200 ex: 08 08 31.58193 s +20 46 09.418 C/A 1.716° PA 192.03 deg v_sky -20.46 km/s D 17.69 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2040-02-14T11:34:06 K14.55 G17.47 PgtRgt

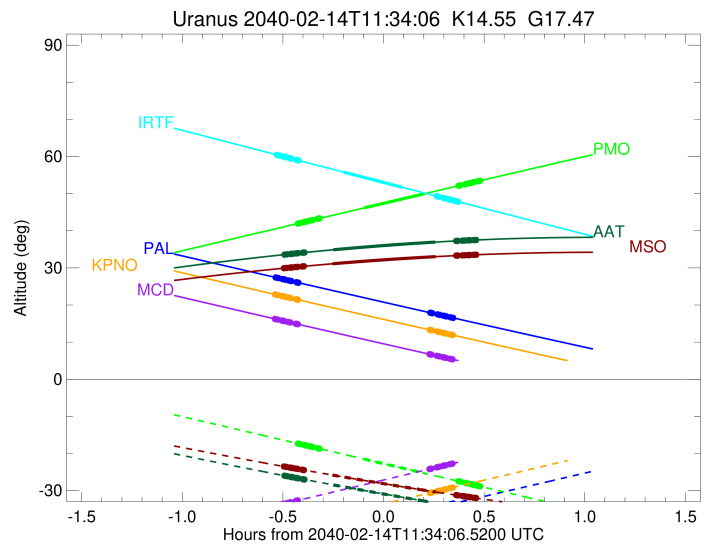
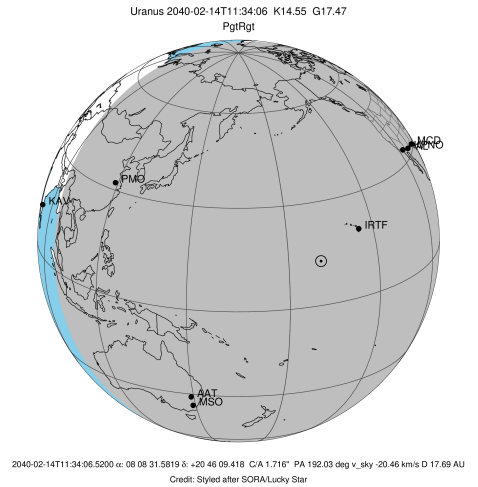


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++		+++++	FEB 14 11:01 - FEB 14 11:54	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	FEB 14 11:08 - FEB 14 12:02	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	FEB 14 11:01 - FEB 14 11:54	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	FEB 14 11:01 - FEB 14 11:54	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	FEB 14 11:02 - FEB 14 11:56	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	+++++	+ +	+++++	FEB 14 11:04 - FEB 14 12:01	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	FEB 14 11:04 - FEB 14 12:01	PieRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-02-14T11:30:18.450
 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 : 670663579973377920
 2Mass ID (if available) : 08083158+2046092
 ICRS Star Coord at Epoch: 08h 08m 31.58193s +20:46:09.41792s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.548
 G magnitude : 17.474
 RP magnitude : 16.559
 BP magnitude : 18.350
 DUPflag : 0
 Distance (au) : 17.685
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.46
 Sun-Target sep (deg) : 154.99
 Sun-Moon sep (deg) : 129.37
 B (ring opening deg) : 47.13
 PA of pole (deg) : 90.17
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.011
 C/A sky separation (km) : 25797.6
 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

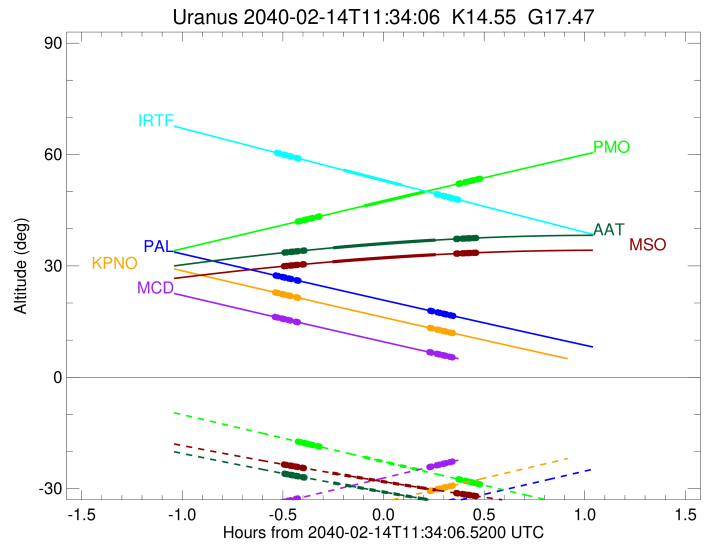
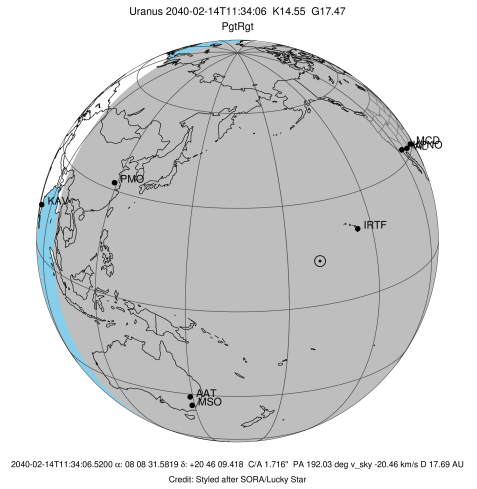


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-02-14T11:01:44.072		27.47	-44.41	51504.79	-24.04		
lambda	I	2040-02-14T11:02:46.013		27.26	-44.20	50026.71	-23.74		
delta	I	2040-02-14T11:03:59.240		27.00	-43.95	48300.35	-23.41		
gamma	I	2040-02-14T11:04:28.269		26.90	-43.85	47622.80	-23.27		
eta	I	2040-02-14T11:04:47.503		26.83	-43.79	47176.12	-23.17		
beta	I	2040-02-14T11:05:53.487		26.61	-43.56	45655.95	-22.82		
alpha	I	2040-02-14T11:06:34.168		26.47	-43.43	44741.80	-22.59		
4	I	2040-02-14T11:08:12.799		26.12	-43.09	42544.16	-21.96		
5	I	2040-02-14T11:08:29.785		26.07	-43.03	42157.46	-21.86		
6	I	2040-02-14T11:08:47.026		26.01	-42.98	41798.62	-21.73		

No planet occultations

6	E	2040-02-14T11:48:05.985		17.91	-34.89	41863.14	21.65		
5	E	2040-02-14T11:48:22.144		17.86	-34.83	42273.16	21.78		
4	E	2040-02-14T11:48:34.996		17.81	-34.79	42542.75	21.88		
alpha	E	2040-02-14T11:50:12.485		17.48	-34.45	44687.71	22.50		
beta	E	2040-02-14T11:50:54.752		17.34	-34.30	45644.75	22.72		
eta	E	2040-02-14T11:52:01.636		17.11	-34.07	47176.12	23.08		
gamma	E	2040-02-14T11:52:21.005		17.04	-34.00	47623.97	23.17		
delta	E	2040-02-14T11:52:50.112		16.94	-33.90	48300.35	23.31		
lambda	E	2040-02-14T11:54:03.674		16.69	-33.65	50026.71	23.63		
epsilon	E	2040-02-14T11:54:50.780		16.54	-33.48	51144.06	23.92		

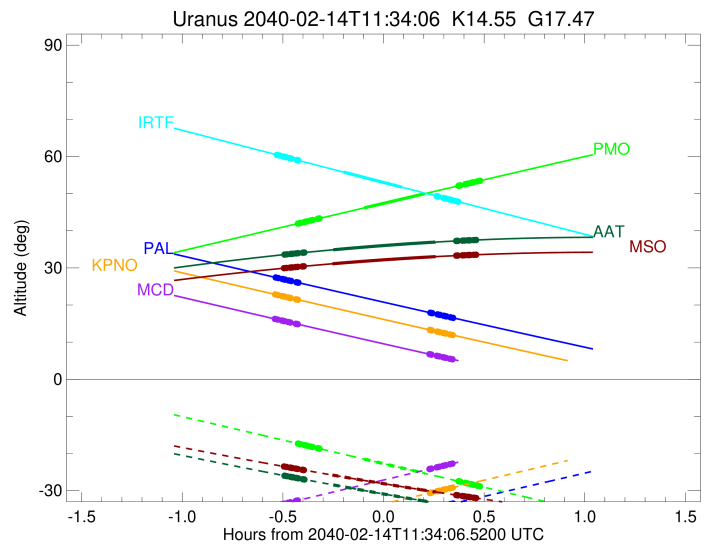
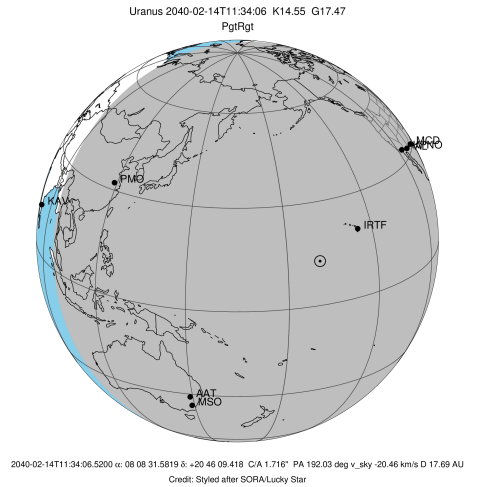
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-02-14T11:37:31.230
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 670663579973377920
 2Mass ID (if available) : 08083158+2046092
 ICRS Star Coord at Epoch: 08h 08m 31.58193s +20:46:09.41792s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.548
 G magnitude : 17.474
 RP magnitude : 16.559
 BP magnitude : 18.350
 DUPflag : 0
 Distance (au) : 17.685
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.46
 Sun-Target sep (deg) : 154.99
 Sun-Moon sep (deg) : 130.54
 B (ring opening deg) : 47.13
 PA of pole (deg) : 90.17
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.783
 C/A sky separation (km) : 22868.0
 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_itrff93_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	2040-02-14T11:08:23.786		41.91	-17.28	51492.82	-25.06		
lambda	I	2040-02-14T11:09:22.620		42.12	-17.49	50026.71	-24.82		
delta	I	2040-02-14T11:10:32.502		42.37	-17.74	48300.35	-24.58		
gamma	I	2040-02-14T11:11:00.115		42.47	-17.83	47623.07	-24.47		
eta	I	2040-02-14T11:11:18.403		42.53	-17.90	47176.12	-24.40		
beta	I	2040-02-14T11:12:20.873		42.76	-18.12	45657.30	-24.14		
alpha	I	2040-02-14T11:12:59.274		42.89	-18.25	44743.50	-23.97		
4	I	2040-02-14T11:14:31.874		43.22	-18.58	42547.06	-23.50		
5	I	2040-02-14T11:14:47.917		43.28	-18.64	42156.09	-23.43		
6	I	2040-02-14T11:15:03.856		43.33	-18.69	41797.33	-23.33		
Uranus	I	2040-02-14T11:28:23.374		46.17	-21.51	25539.14		-9.78	-10.24
Uranus	E	2040-02-14T11:46:27.981		50.01	-25.35	25439.27		24.73	25.75
6	E	2040-02-14T11:56:30.647		52.13	-27.48	41866.16	23.37		
5	E	2040-02-14T11:56:45.812		52.19	-27.53	42279.48	23.47		
4	E	2040-02-14T11:56:57.553		52.23	-27.57	42546.06	23.55		
alpha	E	2040-02-14T11:58:28.358		52.55	-27.90	44686.62	24.02		
beta	E	2040-02-14T11:59:08.144		52.69	-28.04	45645.77	24.19		
eta	E	2040-02-14T12:00:11.061		52.91	-28.26	47176.12	24.46		
gamma	E	2040-02-14T12:00:29.359		52.97	-28.32	47624.35	24.53		
delta	E	2040-02-14T12:00:56.855		53.07	-28.42	48300.35	24.64		
lambda	E	2040-02-14T12:02:06.566		53.31	-28.67	50026.71	24.89		
epsilon	E	2040-02-14T12:02:50.173		53.47	-28.82	51115.09	25.13		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2040-02-14T11:30:10.940
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       : 670663579973377920
2Mass ID (if available) : 08083158+2046092
ICRS Star Coord at Epoch: 08h 08m 31.58193s +20:46:09.41792s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 14.548
G magnitude           : 17.474
RP magnitude          : 16.559
BP magnitude          : 18.350
DUPflag              : 0
Distance (au)        : 17.685
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -20.46
Sun-Target sep (deg) : 154.99
Sun-Moon sep (deg)   : 129.30
B (ring opening deg) : 47.13
PA of pole (deg)     : 90.17
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.017
C/A sky separation (km) : 25876.1
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
    
```

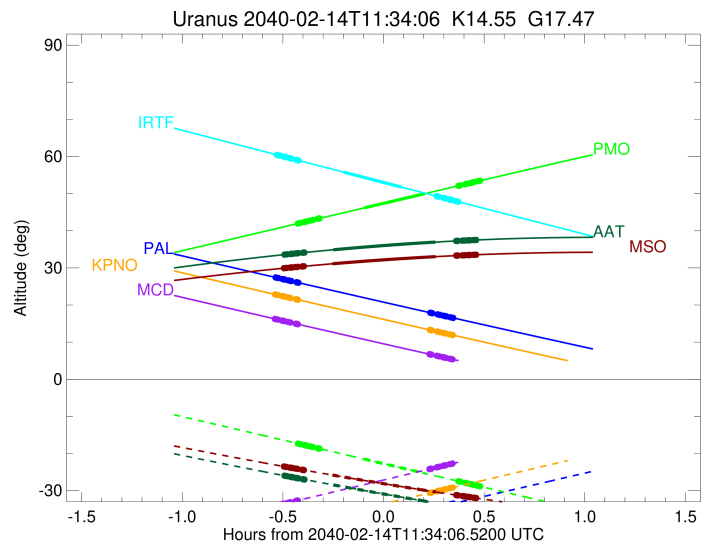
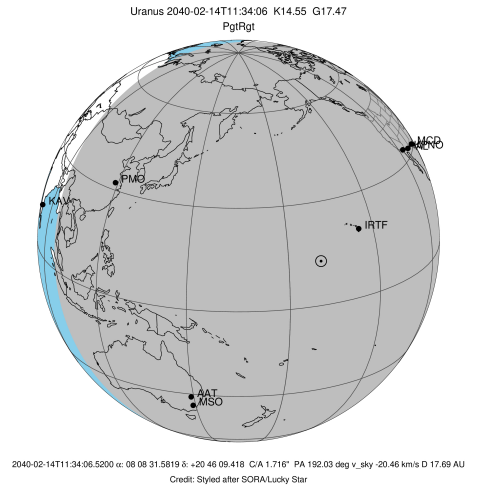


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-02-14T11:01:34.950		22.90	-40.41	51505.16	-23.98		
lambda	I	2040-02-14T11:02:37.074		22.68	-40.19	50026.71	-23.67		
delta	I	2040-02-14T11:03:50.508		22.42	-39.94	48300.35	-23.34		
gamma	I	2040-02-14T11:04:19.621		22.32	-39.84	47622.80	-23.20		
eta	I	2040-02-14T11:04:38.913		22.25	-39.77	47176.12	-23.11		
beta	I	2040-02-14T11:05:45.099		22.02	-39.54	45655.90	-22.75		
alpha	I	2040-02-14T11:06:25.909		21.88	-39.39	44741.74	-22.52		
4	I	2040-02-14T11:08:04.869		21.54	-39.05	42544.07	-21.89		
5	I	2040-02-14T11:08:21.908		21.48	-38.99	42157.51	-21.78		
6	I	2040-02-14T11:08:39.215		21.42	-38.93	41798.66	-21.65		

No planet occultations

6	E	2040-02-14T11:47:57.595		13.29	-30.62	41863.06	21.58		
5	E	2040-02-14T11:48:13.808		13.24	-30.57	42273.00	21.70		
4	E	2040-02-14T11:48:26.712		13.19	-30.52	42542.67	21.81		
alpha	E	2040-02-14T11:50:04.541		12.86	-30.17	44687.74	22.43		
beta	E	2040-02-14T11:50:46.944		12.71	-30.02	45644.73	22.65		
eta	E	2040-02-14T11:51:54.040		12.49	-29.79	47176.12	23.00		
gamma	E	2040-02-14T11:52:13.468		12.42	-29.72	47623.96	23.10		
delta	E	2040-02-14T11:52:42.664		12.32	-29.61	48300.35	23.24		
lambda	E	2040-02-14T11:53:56.443		12.07	-29.35	50026.71	23.56		
epsilon	E	2040-02-14T11:54:43.713		11.91	-29.19	51144.74	23.86		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-02-14T11:30:06.920
 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 : 670663579973377920
 2Mass ID (if available) : 08083158+2046092
 ICRS Star Coord at Epoch: 08h 08m 31.58193s +20:46:09.41792s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.548
 G magnitude : 17.474
 RP magnitude : 16.559
 BP magnitude : 18.350
 DUPflag : 0
 Distance (au) : 17.685
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.46
 Sun-Target sep (deg) : 154.99
 Sun-Moon sep (deg) : 129.21
 B (ring opening deg) : 47.13
 PA of pole (deg) : 90.17
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.030
 C/A sky separation (km) : 26035.8
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

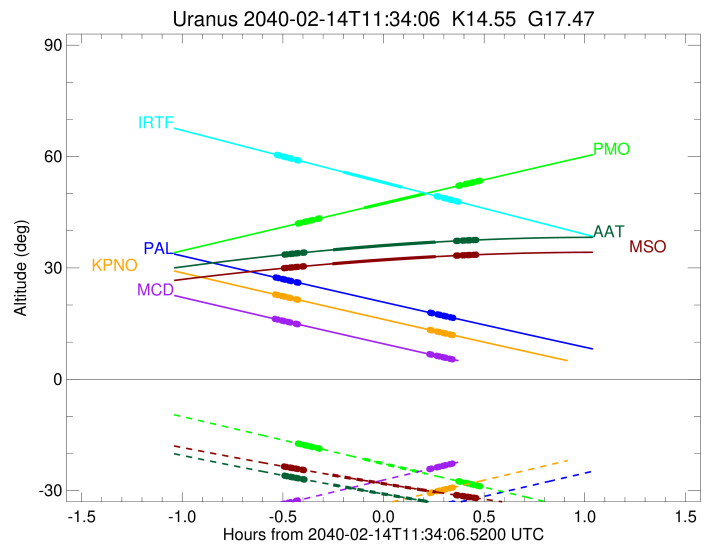
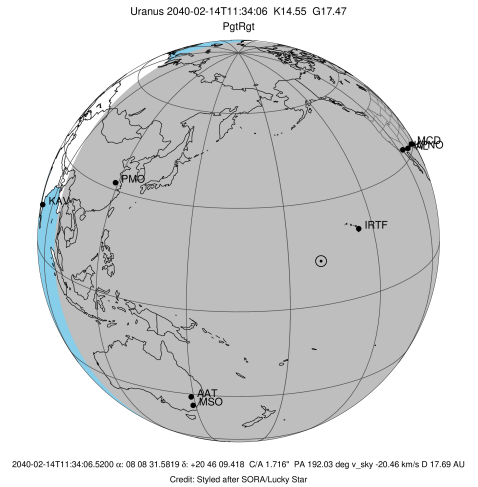


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-02-14T11:01:29.058		16.31	-34.17	51505.92	-23.86		
lambda	I	2040-02-14T11:02:31.510		16.09	-33.95	50026.71	-23.56		
delta	I	2040-02-14T11:03:45.310		15.83	-33.68	48300.35	-23.22		
gamma	I	2040-02-14T11:04:14.574		15.73	-33.58	47622.78	-23.08		
eta	I	2040-02-14T11:04:33.966		15.66	-33.51	47176.12	-22.98		
beta	I	2040-02-14T11:05:40.516		15.43	-33.27	45655.82	-22.62		
alpha	I	2040-02-14T11:06:21.557		15.29	-33.12	44741.62	-22.39		
4	I	2040-02-14T11:08:01.114		14.94	-32.76	42543.89	-21.75		
5	I	2040-02-14T11:08:18.249		14.89	-32.70	42157.62	-21.64		
6	I	2040-02-14T11:08:35.677		14.82	-32.64	41798.76	-21.51		

No planet occultations

6	E	2040-02-14T11:47:50.700		6.75	-24.19	41862.90	21.43		
5	E	2040-02-14T11:48:07.012		6.70	-24.13	42272.67	21.56		
4	E	2040-02-14T11:48:20.009		6.65	-24.08	42542.51	21.67		
alpha	E	2040-02-14T11:49:58.445		6.32	-23.73	44687.80	22.30		
beta	E	2040-02-14T11:50:41.084		6.18	-23.57	45644.68	22.52		
eta	E	2040-02-14T11:51:48.553		5.95	-23.33	47176.12	22.88		
gamma	E	2040-02-14T11:52:08.084		5.88	-23.26	47623.94	22.98		
delta	E	2040-02-14T11:52:37.434		5.78	-23.16	48300.35	23.12		
lambda	E	2040-02-14T11:53:51.587		5.53	-22.89	50026.71	23.44		
epsilon	E	2040-02-14T11:54:39.145		5.37	-22.72	51146.11	23.74		

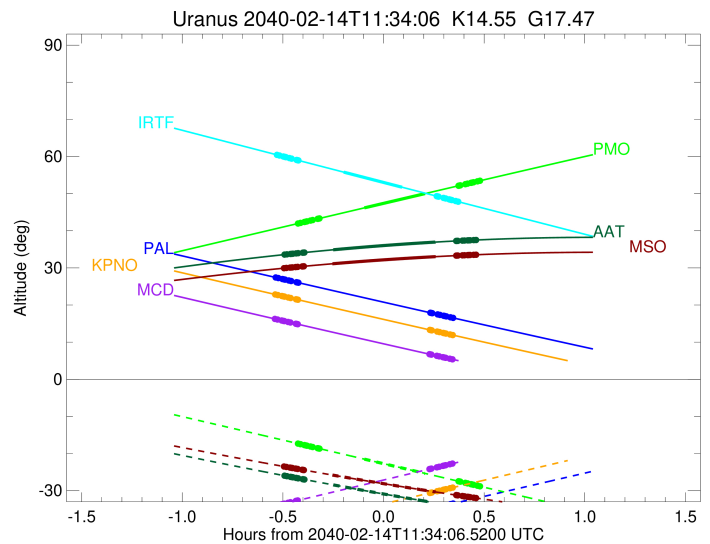
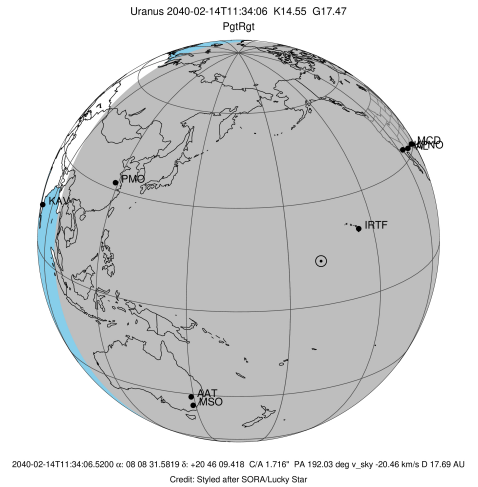
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-02-14T11:31:01.820
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 670663579973377920
 2Mass ID (if available) : 08083158+2046092
 ICRS Star Coord at Epoch: 08h 08m 31.58193s +20:46:09.41792s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.548
 G magnitude : 17.474
 RP magnitude : 16.559
 BP magnitude : 18.350
 DUPflag : 0
 Distance (au) : 17.685
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.46
 Sun-Target sep (deg) : 154.99
 Sun-Moon sep (deg) : 129.81
 B (ring opening deg) : 47.13
 PA of pole (deg) : 90.17
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.798
 C/A sky separation (km) : 23062.9
 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	2040-02-14T11:02:07.837		60.50	-80.87	51492.02	-25.15		
lambda	I	2040-02-14T11:03:06.446		60.27	-80.71	50026.71	-24.90		
delta	I	2040-02-14T11:04:16.120		60.00	-80.51	48300.35	-24.65		
gamma	I	2040-02-14T11:04:43.656		59.89	-80.43	47623.09	-24.54		
eta	I	2040-02-14T11:05:01.897		59.82	-80.38	47176.12	-24.47		
beta	I	2040-02-14T11:06:04.213		59.58	-80.20	45657.36	-24.19		
alpha	I	2040-02-14T11:06:42.532		59.43	-80.08	44743.57	-24.02		
4	I	2040-02-14T11:08:14.972		59.07	-79.80	42547.16	-23.54		
5	I	2040-02-14T11:08:30.999		59.01	-79.76	42156.06	-23.46		
6	I	2040-02-14T11:08:46.913		58.95	-79.71	41797.30	-23.36		
Uranus	I	2040-02-14T11:22:13.915		55.80	-77.07	25540.26		-9.50	-9.94
Uranus	E	2040-02-14T11:39:39.566		51.73	-73.35	25447.42		23.81	24.80
6	E	2040-02-14T11:50:00.058		49.32	-71.06	41865.78	23.29		
5	E	2040-02-14T11:50:15.251		49.26	-71.00	42278.67	23.39		
4	E	2040-02-14T11:50:27.059		49.21	-70.95	42545.62	23.47		
alpha	E	2040-02-14T11:51:58.197		48.86	-70.61	44686.76	23.94		
beta	E	2040-02-14T11:52:38.094		48.70	-70.46	45645.62	24.11		
eta	E	2040-02-14T11:53:41.219		48.46	-70.23	47176.12	24.38		
gamma	E	2040-02-14T11:53:59.572		48.39	-70.16	47624.29	24.46		
delta	E	2040-02-14T11:54:27.155		48.28	-70.05	48300.35	24.56		
lambda	E	2040-02-14T11:55:37.079		48.01	-69.79	50026.71	24.81		
epsilon	E	2040-02-14T11:56:20.993		47.84	-69.62	51119.49	25.06		

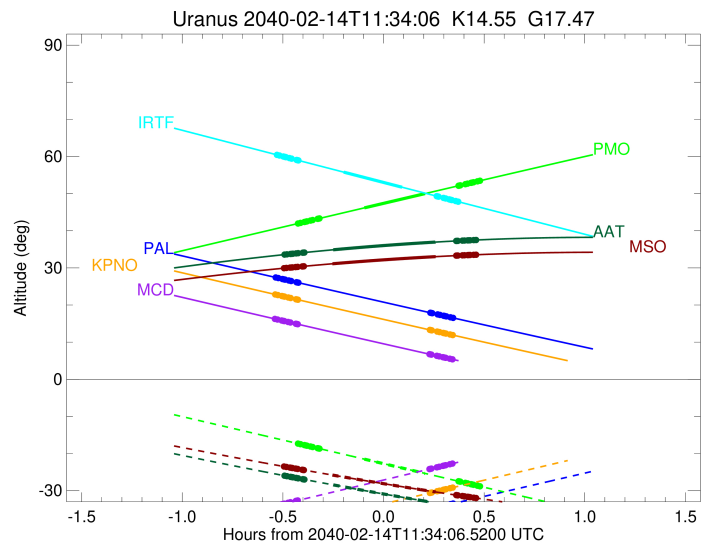
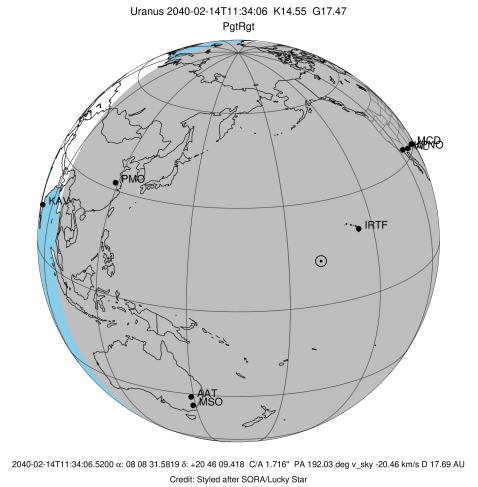
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2040-02-14T11:34:25.180
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       : 670663579973377920
2Mass ID (if available) : 08083158+2046092
ICRS Star Coord at Epoch: 08h 08m 31.58193s +20:46:09.41792s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 14.548
G magnitude           : 17.474
RP magnitude          : 16.559
BP magnitude          : 18.350
DUPflag              : 0
Distance (au)        : 17.685
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.46
Sun-Target sep (deg) : 154.99
Sun-Moon sep (deg)   : 130.11
B (ring opening deg) : 47.13
PA of pole (deg)     : 90.17
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.308
C/A sky separation (km) : 16777.8
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	2040-02-14T11:04:24.900		33.57	-25.95	51460.97	-26.62		
lambda	I	2040-02-14T11:05:18.962		33.65	-26.10	50026.71	-26.48		
delta	I	2040-02-14T11:06:24.303		33.76	-26.29	48300.35	-26.36		
gamma	I	2040-02-14T11:06:50.000		33.80	-26.37	47623.72	-26.30		
eta	I	2040-02-14T11:07:07.028		33.82	-26.41	47176.12	-26.27		
beta	I	2040-02-14T11:08:04.787		33.91	-26.58	45660.36	-26.13		
alpha	I	2040-02-14T11:08:40.187		33.97	-26.68	44746.78	-26.05		
4	I	2040-02-14T11:10:04.958		34.10	-26.92	42553.78	-25.82		
5	I	2040-02-14T11:10:19.902		34.12	-26.97	42154.83	-25.78		
6	I	2040-02-14T11:10:34.031		34.14	-27.01	41795.43	-25.72		
Uranus	I	2040-02-14T11:19:07.599		34.88	-28.45	25444.32		-24.16	-25.17
Uranus	E	2040-02-14T11:49:34.819		36.95	-33.30	25322.01		36.20	37.46
6	E	2040-02-14T11:55:48.545		37.26	-34.22	41870.89	25.73		
5	E	2040-02-14T11:56:02.738		37.27	-34.26	42289.74	25.79		
4	E	2040-02-14T11:56:13.146		37.28	-34.28	42552.45	25.83		
alpha	E	2040-02-14T11:57:36.096		37.34	-34.48	44685.25	26.06		
beta	E	2040-02-14T11:58:13.049		37.37	-34.57	45647.83	26.14		
eta	E	2040-02-14T11:59:11.340		37.41	-34.71	47176.12	26.28		
gamma	E	2040-02-14T11:59:28.410		37.42	-34.75	47625.06	26.32		
delta	E	2040-02-14T11:59:54.042		37.44	-34.82	48300.35	26.37		
lambda	E	2040-02-14T12:00:59.347		37.49	-34.97	50026.71	26.50		
epsilon	E	2040-02-14T12:01:38.436		37.51	-35.07	51063.86	26.64		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-02-14T11:34:19.640
 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 : 670663579973377920
 2Mass ID (if available) : 08083158+2046092
 ICRS Star Coord at Epoch: 08h 08m 31.58193s +20:46:09.41792s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.548
 G magnitude : 17.474
 RP magnitude : 16.559
 BP magnitude : 18.350
 DUPflag : 0
 Distance (au) : 17.685
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.46
 Sun-Target sep (deg) : 154.99
 Sun-Moon sep (deg) : 130.06
 B (ring opening deg) : 47.13
 PA of pole (deg) : 90.17
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.289
 C/A sky separation (km) : 16530.5
 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_itrff93_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	2040-02-14T11:04:15.921		29.91	-23.48	51459.64	-26.65		
lambda	I	2040-02-14T11:05:09.878		29.99	-23.62	50026.71	-26.51		
delta	I	2040-02-14T11:06:15.145		30.08	-23.80	48300.35	-26.39		
gamma	I	2040-02-14T11:06:40.809		30.12	-23.87	47623.75	-26.34		
eta	I	2040-02-14T11:06:57.816		30.14	-23.91	47176.12	-26.30		
beta	I	2040-02-14T11:07:55.488		30.23	-24.07	45660.47	-26.17		
alpha	I	2040-02-14T11:08:30.833		30.28	-24.16	44746.89	-26.09		
4	I	2040-02-14T11:09:55.454		30.40	-24.39	42554.04	-25.87		
5	I	2040-02-14T11:10:10.382		30.42	-24.43	42154.82	-25.83		
6	I	2040-02-14T11:10:24.468		30.44	-24.47	41795.38	-25.78		
Uranus	I	2040-02-14T11:18:51.252		31.11	-25.80	25440.49		-24.59	-25.61
Uranus	E	2040-02-14T11:49:40.202		33.03	-30.36	25318.58		36.50	37.77
6	E	2040-02-14T11:55:49.073		33.31	-31.21	41871.06	25.79		
5	E	2040-02-14T11:56:03.257		33.32	-31.24	42290.12	25.84		
4	E	2040-02-14T11:56:13.634		33.33	-31.26	42552.72	25.88		
alpha	E	2040-02-14T11:57:36.427		33.38	-31.45	44685.21	26.10		
beta	E	2040-02-14T11:58:13.333		33.41	-31.53	45647.93	26.18		
eta	E	2040-02-14T11:59:11.539		33.45	-31.66	47176.12	26.32		
gamma	E	2040-02-14T11:59:28.589		33.46	-31.70	47625.09	26.35		
delta	E	2040-02-14T11:59:54.189		33.47	-31.76	48300.35	26.40		
lambda	E	2040-02-14T12:00:59.422		33.52	-31.90	50026.71	26.52		
epsilon	E	2040-02-14T12:01:38.394		33.54	-31.99	51061.78	26.66		