

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-11-18T14:27:24.640  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3377578469309976704  
 2Mass ID (if available) : 06215408+2336271

Uranus 2033-11-18T14:27:24 K14.66 G17.23 PgtRgt

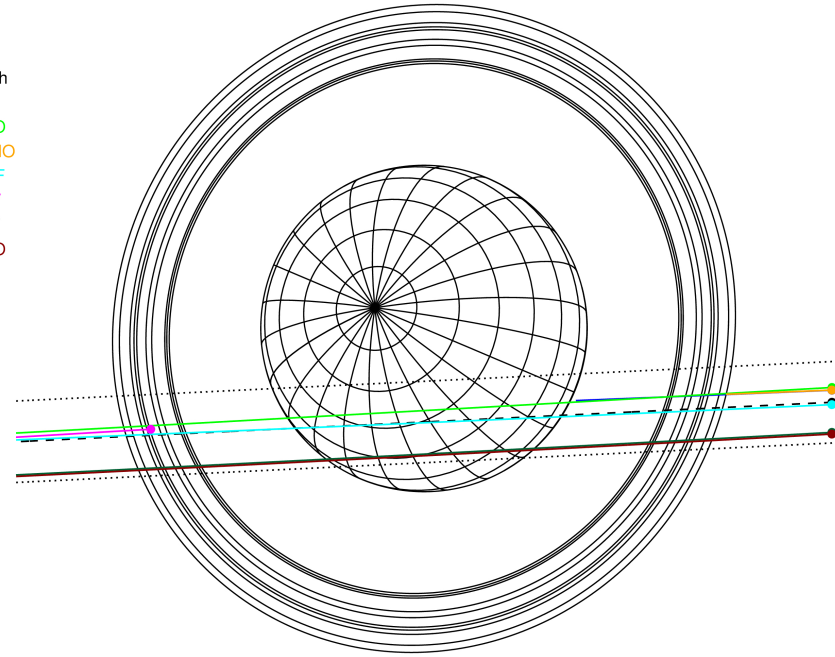
ICRS Star Coord at Epoch: 06h 21m 54.10118s +23:36:26.85923s

RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.659  
 G magnitude : 17.230  
 RP magnitude : 16.393  
 BP magnitude : 17.972  
 DUPflag : 0  
 Distance (au) : 18.181  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -16.79  
 Sun-Target sep (deg) : 141.07  
 Sun-Moon sep (deg) : 103.19  
 B (ring opening deg) : 70.93  
 PA of pole (deg) : 67.05



2033-11-18T14:27:24.6400 α: 06 21 54.1012 δ: +23 36 26.859 C/A 1.101" PA 2.77 deg v\_sky -16.79 km/s D 18.18 AU  
 Credit: Styled after SORA/Lucky Star

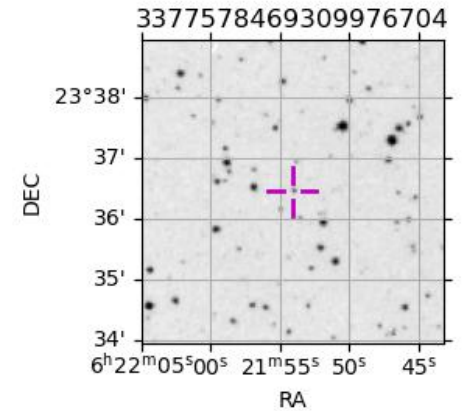
Earth  
 PAL  
 PMO  
 KPNO  
 IRTF  
 KAV  
 AAT  
 MSO



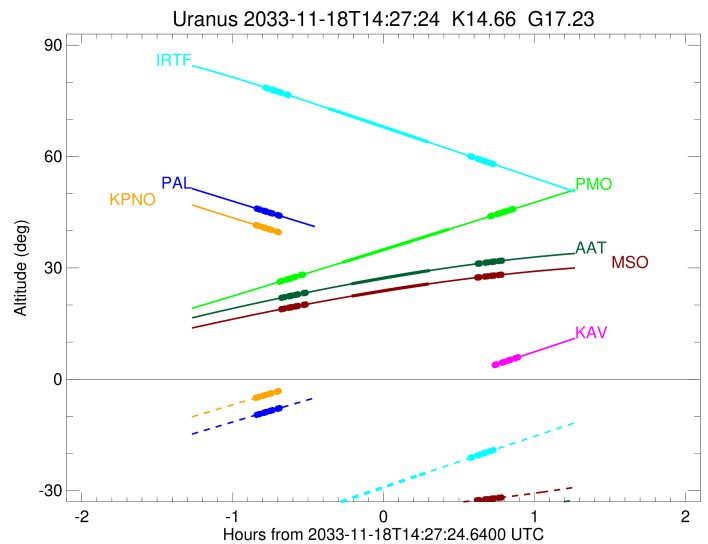
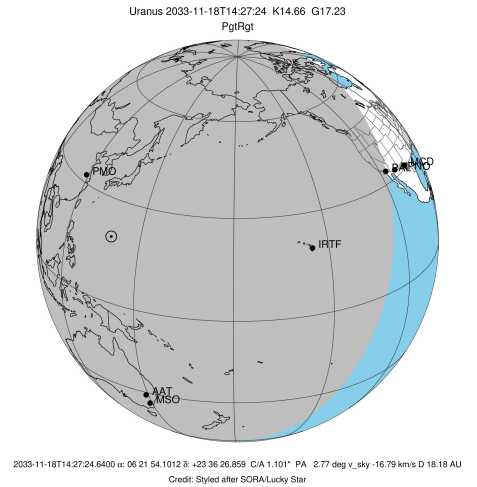
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++			NOV 18 13:37 - NOV 18 13:46	PnnRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	NOV 18 13:46 - NOV 18 15:19	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	NOV 18 13:40 - NOV 18 15:11	PieRie
KAV	Kavalur Observatory	12.6	78.8			++++	NOV 18 15:16 - NOV 18 15:21	PnnRne
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	+++++	+ +	+++++	NOV 18 13:47 - NOV 18 15:14	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	NOV 18 13:47 - NOV 18 15:14	PieRie



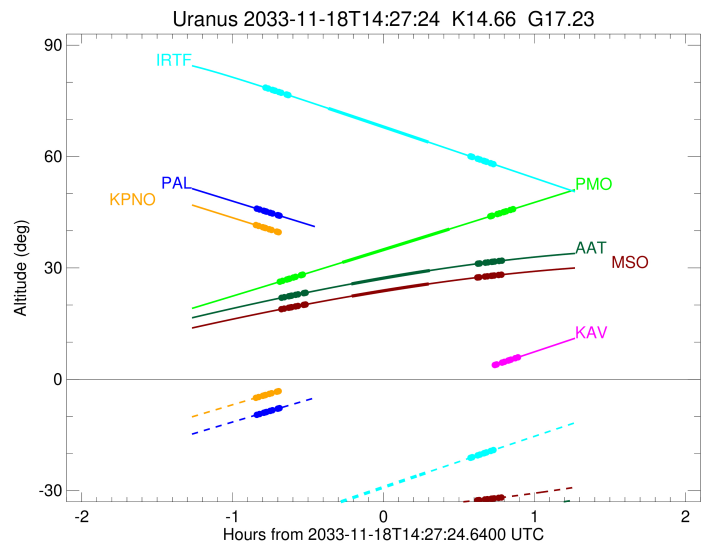
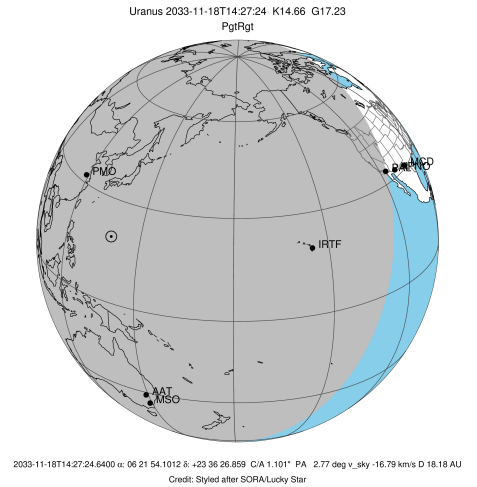
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-11-18T14:23:00.420  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3377578469309976704  
 2Mass ID (if available) : 06215408+2336271  
 ICRS Star Coord at Epoch: 06h 21m 54.10118s +23:36:26.85923s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.659  
 G magnitude : 17.230  
 RP magnitude : 16.393  
 BP magnitude : 17.972  
 DUPflag : 0  
 Distance (au) : 18.181  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -16.79  
 Sun-Target sep (deg) : 141.07  
 Sun-Moon sep (deg) : 103.85  
 B (ring opening deg) : 70.93  
 PA of pole (deg) : 67.05  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.928  
 C/A sky separation (km) : 12234.4  
 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



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-11-18T13:37:25.348	45.88	-9.51	50781.34	-17.31		
lambda	I	2033-11-18T13:38:09.011	45.73	-9.36	50026.71	-17.27		
delta	I	2033-11-18T13:39:49.073	45.38	-9.03	48300.35	-17.23		
gamma	I	2033-11-18T13:40:28.342	45.24	-8.90	47624.06	-17.21		
eta	I	2033-11-18T13:40:54.375	45.15	-8.81	47176.12	-17.20		
beta	I	2033-11-18T13:42:21.322	44.85	-8.52	45681.20	-17.16		
alpha	I	2033-11-18T13:43:16.936	44.65	-8.34	44733.32	-17.12		
4	I	2033-11-18T13:45:24.403	44.21	-7.92	42544.38	-17.04		
5	I	2033-11-18T13:45:44.411	44.14	-7.85	42209.18	-17.04		
6	I	2033-11-18T13:46:04.521	44.07	-7.78	41871.68	-17.02		
Uranus	I	2033-11-18T14:01:33.874	40.82	-4.72x	25038.69		-19.02	-19.85
Uranus	E	2033-11-18T14:44:51.722	31.80	3.61x	25375.07		11.06	11.57
6	E	2033-11-18T15:00:59.017	28.47	6.61x	41794.76	16.93		
5	E	2033-11-18T15:01:28.931	28.36	6.70x	42298.66	16.95		
4	E	2033-11-18T15:01:44.885	28.31	6.75x	42573.35	16.95		
alpha	E	2033-11-18T15:03:49.151	27.88	7.13x	44689.81	17.02		
beta	E	2033-11-18T15:04:45.417	27.69	7.30x	45644.61	17.05		
eta	E	2033-11-18T15:06:15.056	27.38	7.57x	47176.12	17.09		
gamma	E	2033-11-18T15:06:41.634	27.29	7.65x	47630.59	17.11		
delta	E	2033-11-18T15:07:20.770	27.16	7.77x	48300.35	17.12		
lambda	E	2033-11-18T15:09:01.484	26.81	8.08x	50026.71	17.16		
epsilon	E	2033-11-18T15:10:30.453	26.51	8.35x	51554.84	17.19		

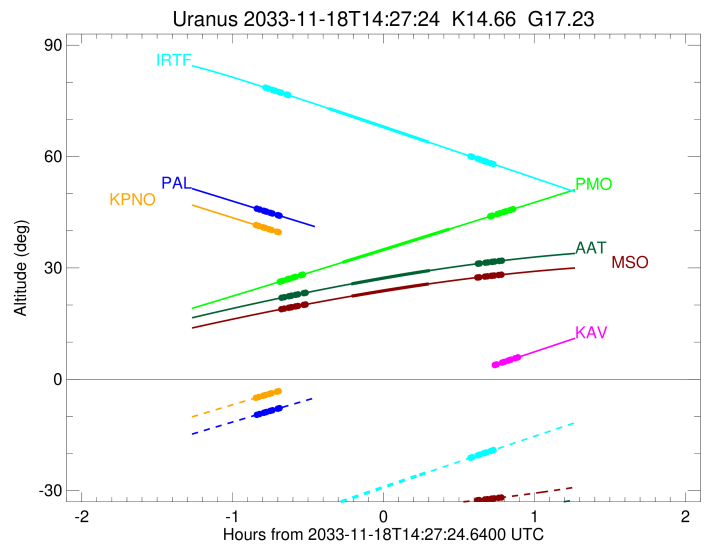
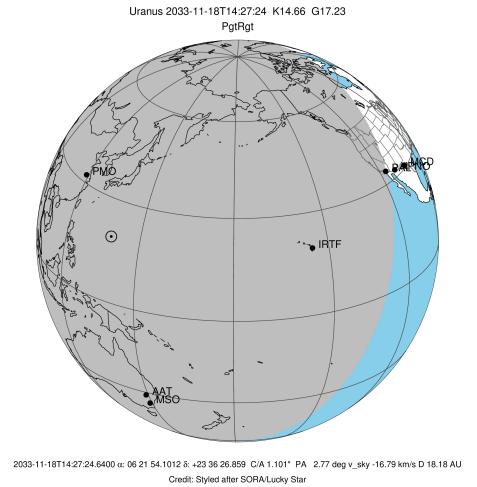
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-11-18T14:32:07.170  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 3377578469309976704  
 2Mass ID (if available) : 06215408+2336271  
 ICRS Star Coord at Epoch: 06h 21m 54.10118s +23:36:26.85923s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.659  
 G magnitude : 17.230  
 RP magnitude : 16.393  
 BP magnitude : 17.972  
 DUPflag : 0  
 Distance (au) : 18.181  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -16.79  
 Sun-Target sep (deg) : 141.07  
 Sun-Moon sep (deg) : 103.53  
 B (ring opening deg) : 70.93  
 PA of pole (deg) : 67.05  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.974  
 C/A sky separation (km) : 12836.8  
 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	2033-11-18T13:46:33.208		26.36	-59.65	50780.84	-17.12		
lambda	I	2033-11-18T13:47:17.322		26.51	-59.80	50026.71	-17.09		
delta	I	2033-11-18T13:48:58.480		26.86	-60.14	48300.35	-17.04		
gamma	I	2033-11-18T13:49:38.179		27.00	-60.28	47624.05	-17.03		
eta	I	2033-11-18T13:50:04.496		27.09	-60.37	47176.12	-17.01		
beta	I	2033-11-18T13:51:32.396		27.40	-60.66	45681.20	-16.97		
alpha	I	2033-11-18T13:52:28.618		27.59	-60.85	44733.35	-16.94		
4	I	2033-11-18T13:54:37.495		28.04	-61.28	42544.39	-16.85		
5	I	2033-11-18T13:54:57.726		28.11	-61.35	42209.18	-16.85		
6	I	2033-11-18T13:55:18.059		28.18	-61.42	41871.67	-16.83		
Uranus	I	2033-11-18T14:10:59.918		31.46	-64.53	25039.58		-19.00	-19.84
Uranus	E	2033-11-18T14:53:36.094		40.45	-72.21	25396.25		10.39	10.87
6	E	2033-11-18T15:09:49.021		43.89	-74.59	41794.75	16.96		
5	E	2033-11-18T15:10:18.952		44.00	-74.65	42300.12	16.98		
4	E	2033-11-18T15:10:34.687		44.06	-74.69	42571.98	16.99		
alpha	E	2033-11-18T15:12:38.692		44.50	-74.95	44689.29	17.08		
beta	E	2033-11-18T15:13:34.817		44.69	-75.07	45644.95	17.11		
eta	E	2033-11-18T15:15:04.107		45.01	-75.25	47176.12	17.16		
gamma	E	2033-11-18T15:15:30.582		45.11	-75.30	47630.68	17.18		
delta	E	2033-11-18T15:16:09.548		45.24	-75.37	48300.35	17.20		
lambda	E	2033-11-18T15:17:49.798		45.60	-75.57	50026.71	17.24		
epsilon	E	2033-11-18T15:19:18.272		45.91	-75.73	51554.15	17.28		

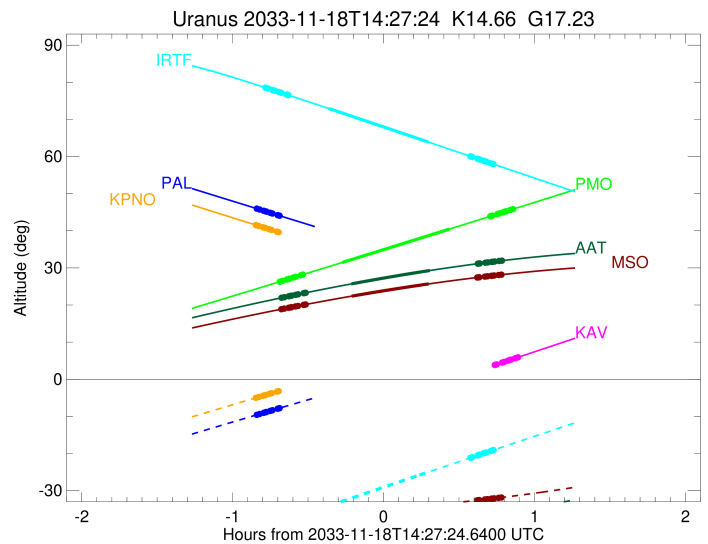
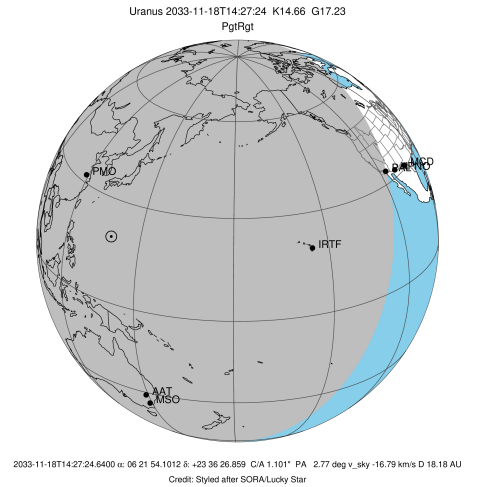
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-11-18T14:25:10.060
Event type           : PgtRgt
: 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       : 3377578469309976704
2Mass ID (if available) : 06215408+2336271
ICRS Star Coord at Epoch: 06h 21m 54.10118s +23:36:26.85923s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 14.659
G magnitude           : 17.230
RP magnitude          : 16.393
BP magnitude          : 17.972
DUPflag              : 0
Distance (au)        : 18.181
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -16.79
Sun-Target sep (deg) : 141.07
Sun-Moon sep (deg)   : 104.08
B (ring opening deg) : 70.93
PA of pole (deg)     : 67.05
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.119
C/A sky separation (km) : 14753.3
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	2033-11-18T13:40:51.111		78.48	-39.86	50789.97	-17.24		
lambda	I	2033-11-18T13:41:35.474		78.32	-39.69	50026.71	-17.19		
delta	I	2033-11-18T13:43:16.068		77.95	-39.30	48300.35	-17.13		
gamma	I	2033-11-18T13:43:55.562		77.81	-39.15	47624.31	-17.10		
eta	I	2033-11-18T13:44:21.779		77.71	-39.04	47176.12	-17.09		
beta	I	2033-11-18T13:45:49.358		77.39	-38.71	45681.23	-17.02		
alpha	I	2033-11-18T13:46:45.534		77.18	-38.49	44731.58	-16.98		
4	I	2033-11-18T13:48:54.250		76.70	-37.99	42542.26	-16.86		
5	I	2033-11-18T13:49:14.146		76.63	-37.91	42213.79	-16.86		
6	I	2033-11-18T13:49:34.857		76.55	-37.83	41870.10	-16.82		
Uranus	I	2033-11-18T14:05:31.880		72.96	-34.14	25053.48		-18.73	-19.55
Uranus	E	2033-11-18T14:45:16.137		63.89	-24.98	25432.07		9.16	9.58
6	E	2033-11-18T15:01:56.255		60.06	-21.17	41794.78	16.79		
5	E	2033-11-18T15:02:26.573		59.95	-21.05	42301.77	16.82		
4	E	2033-11-18T15:02:42.249		59.89	-20.99	42570.36	16.82		
alpha	E	2033-11-18T15:04:47.445		59.41	-20.52	44688.73	16.94		
beta	E	2033-11-18T15:05:44.061		59.19	-20.30	45645.34	16.98		
eta	E	2033-11-18T15:07:13.978		58.85	-19.96	47176.12	17.04		
gamma	E	2033-11-18T15:07:40.637		58.75	-19.86	47630.77	17.06		
delta	E	2033-11-18T15:08:19.851		58.60	-19.71	48300.35	17.09		
lambda	E	2033-11-18T15:10:00.700		58.21	-19.32	50026.71	17.15		
epsilon	E	2033-11-18T15:11:29.594		57.87	-18.99	51553.19	17.19		

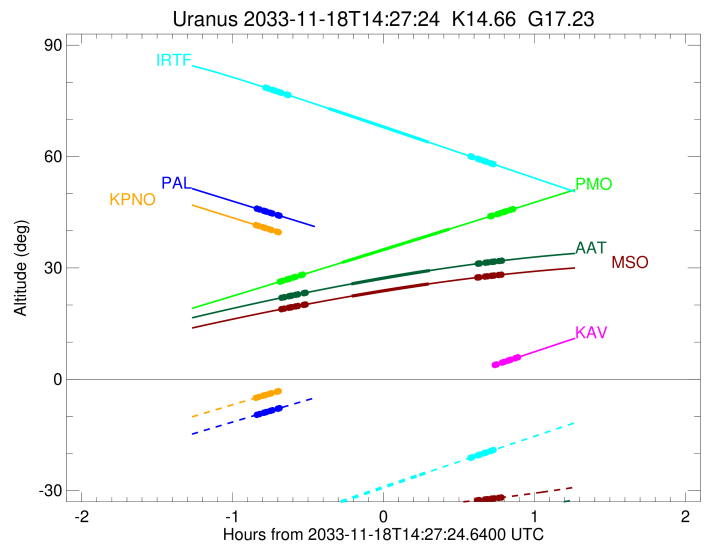
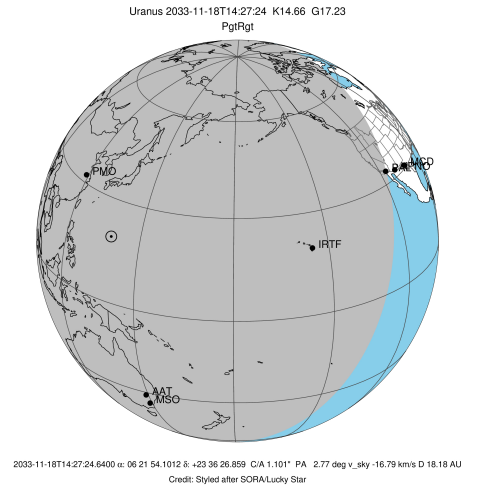
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-11-18T14:33:25.200  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : KAV  
 Location : Kavalur Observatory  
 Latitude (deg) : 12.57556  
 E. Longitude (deg) : 78.83167  
 Altitude (km) : 0.722  
 Gaia source ID : 3377578469309976704  
 2Mass ID (if available) : 06215408+2336271  
 ICRS Star Coord at Epoch: 06h 21m 54.10118s +23:36:26.85923s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.659  
 G magnitude : 17.230  
 RP magnitude : 16.393  
 BP magnitude : 17.972  
 DUPflag : 0  
 Distance (au) : 18.181  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -16.79  
 Sun-Target sep (deg) : 141.07  
 Sun-Moon sep (deg) : 102.90  
 B (ring opening deg) : 70.93  
 PA of pole (deg) : 67.05  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.002  
 C/A sky separation (km) : 13217.0  
 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



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-11-18T13:47:12.160	-14.76x	-22.13	50781.73	-16.79		
lambda	I	2033-11-18T13:47:57.187	-14.60x	-22.30	50026.71	-16.76		
delta	I	2033-11-18T13:49:40.331	-14.23x	-22.71	48300.35	-16.72		
gamma	I	2033-11-18T13:50:20.811	-14.09x	-22.87	47624.08	-16.70		
eta	I	2033-11-18T13:50:47.651	-13.99x	-22.97	47176.12	-16.68		
beta	I	2033-11-18T13:52:17.298	-13.67x	-23.32	45681.20	-16.64		
alpha	I	2033-11-18T13:53:14.658	-13.47x	-23.55	44733.16	-16.60		
4	I	2033-11-18T13:55:26.141	-12.99x	-24.06	42544.14	-16.52		
5	I	2033-11-18T13:55:46.745	-12.92x	-24.14	42209.70	-16.52		
6	I	2033-11-18T13:56:07.538	-12.84x	-24.22	41871.50	-16.49		
Uranus	I	2033-11-18T14:12:10.907	-9.36x	-28.00	25040.90		-18.98	-19.81
Uranus	E	2033-11-18T14:55:01.576	0.11x	-38.09	25406.32		10.06	10.52
6	E	2033-11-18T15:11:36.276	3.83x	-42.00	41794.75	16.65		
5	E	2033-11-18T15:12:06.783	3.94x	-42.12	42300.73	16.68		
4	E	2033-11-18T15:12:22.723	4.00x	-42.18	42571.38	16.68		
alpha	E	2033-11-18T15:14:28.973	4.47x	-42.67	44689.07	16.78		
beta	E	2033-11-18T15:15:26.101	4.69x	-42.90	45645.10	16.82		
eta	E	2033-11-18T15:16:56.932	5.03	-43.26	47176.12	16.87		
gamma	E	2033-11-18T15:17:23.865	5.13	-43.36	47630.71	16.89		
delta	E	2033-11-18T15:18:03.495	5.28	-43.52	48300.35	16.91		
lambda	E	2033-11-18T15:19:45.442	5.66	-43.92	50026.71	16.96		
epsilon	E	2033-11-18T15:21:15.372	6.00	-44.27	51553.77	17.00		

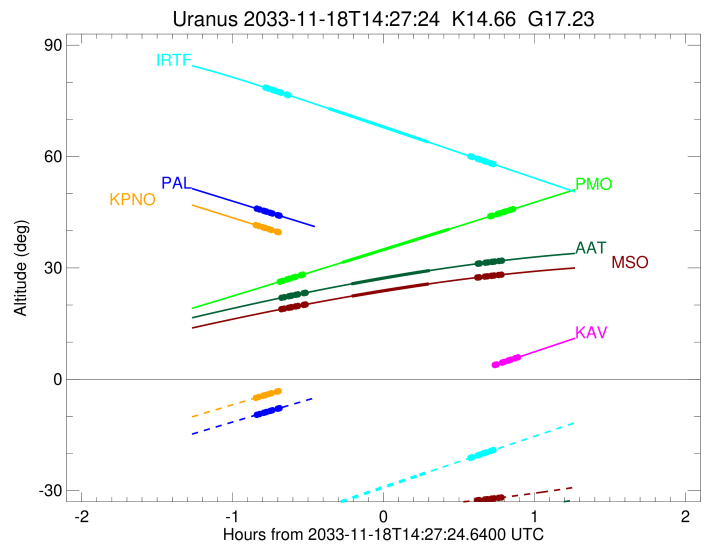
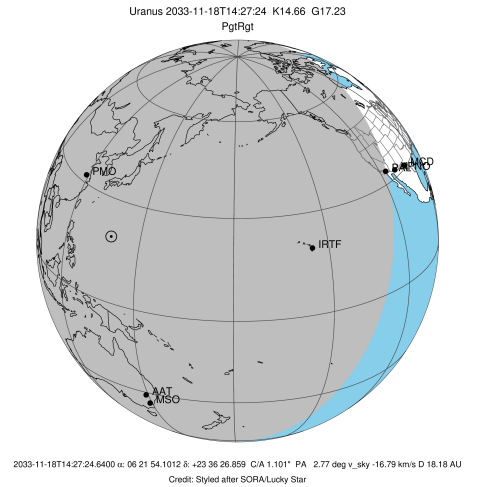
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-11-18T14:29:54.660  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : AAT  
 Location : Siding Spring (AAT)  
 Latitude (deg) : -31.27703  
 E. Longitude (deg) : 149.06608  
 Altitude (km) : 1.164  
 Gaia source ID : 3377578469309976704  
 2Mass ID (if available) : 06215408+2336271  
 ICRS Star Coord at Epoch: 06h 21m 54.10118s +23:36:26.85923s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.659  
 G magnitude : 17.230  
 RP magnitude : 16.393  
 BP magnitude : 17.972  
 DUPflag : 0  
 Distance (au) : 18.181  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -16.79  
 Sun-Target sep (deg) : 141.07  
 Sun-Moon sep (deg) : 103.50  
 B (ring opening deg) : 70.93  
 PA of pole (deg) : 67.05  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.490  
 C/A sky separation (km) : 19650.9  
 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



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-11-18T13:47:13.030	22.00	-39.52	50809.40	-16.48		
lambda	I	2033-11-18T13:48:00.676	22.11	-39.52	50026.71	-16.40		
delta	I	2033-11-18T13:49:46.262	22.36	-39.52	48300.35	-16.29		
gamma	I	2033-11-18T13:50:27.779	22.46	-39.52	47624.83	-16.25		
eta	I	2033-11-18T13:50:55.424	22.53	-39.52	47176.12	-16.22		
beta	I	2033-11-18T13:52:27.871	22.74	-39.51	45681.12	-16.10		
alpha	I	2033-11-18T13:53:27.544	22.88	-39.51	44728.00	-16.02		
4	I	2033-11-18T13:55:44.375	23.20	-39.49	42538.32	-15.81		
5	I	2033-11-18T13:56:04.892	23.24	-39.49	42223.24	-15.79		
6	I	2033-11-18T13:56:27.843	23.30	-39.49	41866.57	-15.73		
Uranus	I	2033-11-18T14:14:39.450	25.69	-39.14	25130.59		-17.15	-17.92
Uranus	E	2033-11-18T14:45:45.772	29.29	-37.70	25528.60		4.45	4.66
6	E	2033-11-18T15:04:51.585	31.13	-36.32	41795.41	15.81		
5	E	2033-11-18T15:05:24.017	31.18	-36.28	42307.24	15.87		
4	E	2033-11-18T15:05:39.849	31.20	-36.25	42564.21	15.88		
alpha	E	2033-11-18T15:07:52.379	31.40	-36.07	44686.90	16.09		
beta	E	2033-11-18T15:08:52.055	31.48	-35.99	45647.02	16.18		
eta	E	2033-11-18T15:10:26.159	31.61	-35.85	47176.12	16.30		
gamma	E	2033-11-18T15:10:54.041	31.65	-35.81	47631.07	16.33		
delta	E	2033-11-18T15:11:34.955	31.71	-35.75	48300.35	16.38		
lambda	E	2033-11-18T15:13:19.964	31.85	-35.59	50026.71	16.50		
epsilon	E	2033-11-18T15:14:51.810	31.98	-35.46	51546.07	16.58		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-11-18T14:29:46.750  
 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 : 3377578469309976704  
 2Mass ID (if available) : 06215408+2336271  
 ICRS Star Coord at Epoch: 06h 21m 54.10118s +23:36:26.85923s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.659  
 G magnitude : 17.230  
 RP magnitude : 16.393  
 BP magnitude : 17.972  
 DUPflag : 0  
 Distance (au) : 18.181  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -16.79  
 Sun-Target sep (deg) : 141.07  
 Sun-Moon sep (deg) : 103.46  
 B (ring opening deg) : 70.93  
 PA of pole (deg) : 67.05  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.509  
 C/A sky separation (km) : 19901.7  
 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	2033-11-18T13:47:09.530		18.92	-35.49	50810.64	-16.43		
lambda	I	2033-11-18T13:47:57.402		19.03	-35.49	50026.71	-16.35		
delta	I	2033-11-18T13:49:43.339		19.26	-35.49	48300.35	-16.24		
gamma	I	2033-11-18T13:50:24.998		19.36	-35.49	47624.86	-16.19		
eta	I	2033-11-18T13:50:52.743		19.42	-35.49	47176.12	-16.16		
beta	I	2033-11-18T13:52:25.532		19.62	-35.48	45681.11	-16.04		
alpha	I	2033-11-18T13:53:25.449		19.75	-35.48	44727.79	-15.95		
4	I	2033-11-18T13:55:42.854		20.05	-35.47	42538.10	-15.74		
5	I	2033-11-18T13:56:03.421		20.09	-35.46	42223.80	-15.72		
6	I	2033-11-18T13:56:26.525		20.14	-35.46	41866.35	-15.66		
Uranus	I	2033-11-18T14:14:48.812		22.40	-35.15	25137.06		-17.02	-17.77
Uranus	E	2033-11-18T14:45:21.150		25.68	-33.87	25532.27		4.18	4.37
6	E	2033-11-18T15:04:38.590		27.41	-32.61	41795.47	15.73		
5	E	2033-11-18T15:05:11.184		27.46	-32.57	42307.47	15.79		
4	E	2033-11-18T15:05:27.053		27.48	-32.55	42563.91	15.81		
alpha	E	2033-11-18T15:07:40.180		27.66	-32.38	44686.82	16.03		
beta	E	2033-11-18T15:08:40.108		27.74	-32.31	45647.11	16.12		
eta	E	2033-11-18T15:10:14.572		27.86	-32.18	47176.12	16.24		
gamma	E	2033-11-18T15:10:42.558		27.90	-32.14	47631.08	16.27		
delta	E	2033-11-18T15:11:23.621		27.95	-32.09	48300.35	16.32		
lambda	E	2033-11-18T15:13:08.998		28.08	-31.95	50026.71	16.44		
epsilon	E	2033-11-18T15:14:41.120		28.20	-31.82	51545.61	16.52		