

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T05:32:44.830  
 Event type : PRgt  
 : Uranus occs: not geocentric or topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3382771256569843584  
 2Mass ID (if available) : 06391419+2327343

ICRS Star Coord at Epoch: 06h 39m 14.19035s +23:27:34.13011s

RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.265  
 G magnitude : 17.270  
 RP magnitude : 16.329  
 BP magnitude : 18.195  
 DUPflag : 0  
 Distance (au) : 17.991  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.74  
 Sun-Target sep (deg) : 155.69  
 Sun-Moon sep (deg) : 116.43  
 B (ring opening deg) : 67.25  
 PA of pole (deg) : 72.73

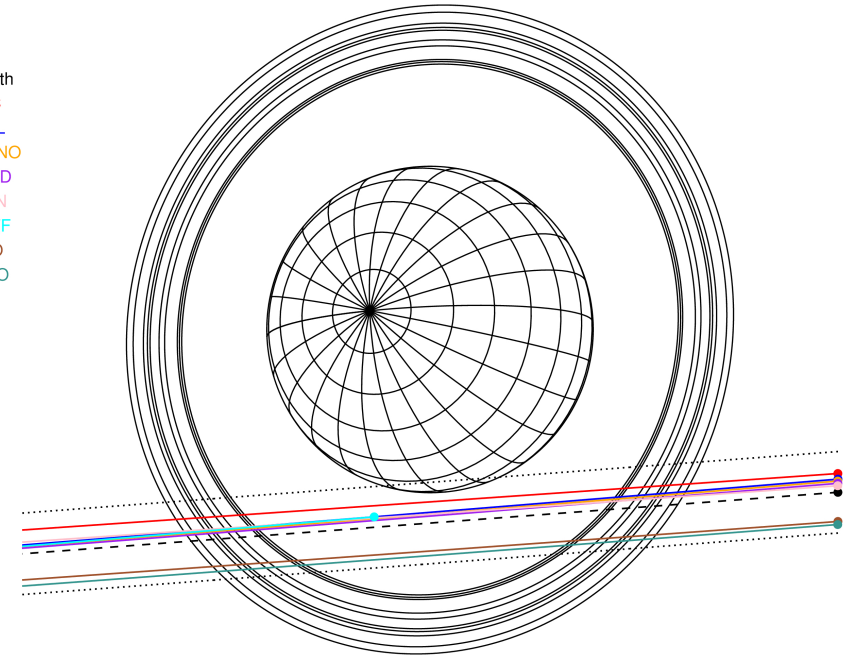
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2034-12-07T05:32:44.8300 α: 06 39 14.19035 δ: +23 27 34.130 C/A 2.308° PA 4.31 deg v\_sky -20.74 km/s D 17.99 AU  
 Credit: Styled after SORA/Lucky Star

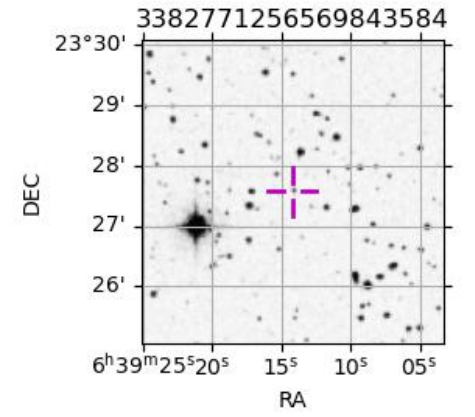
Uranus 2034-12-07T05:32:44 K14.27 G17.27 PRgt

Earth  
 PIC  
 PAL  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO

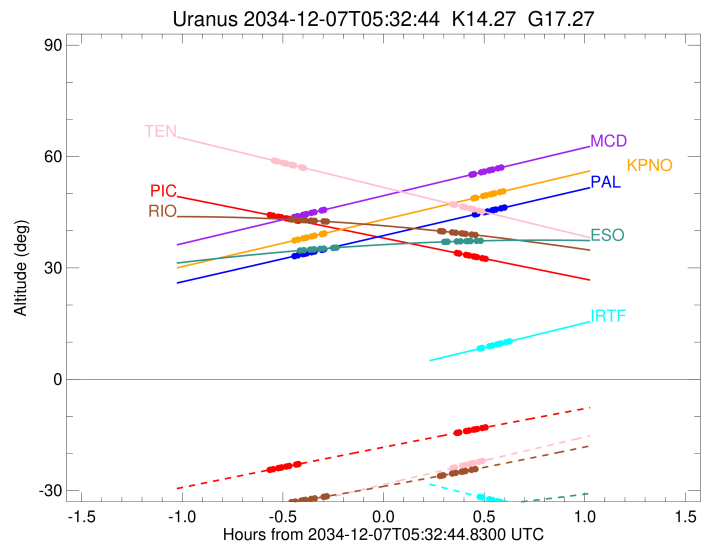
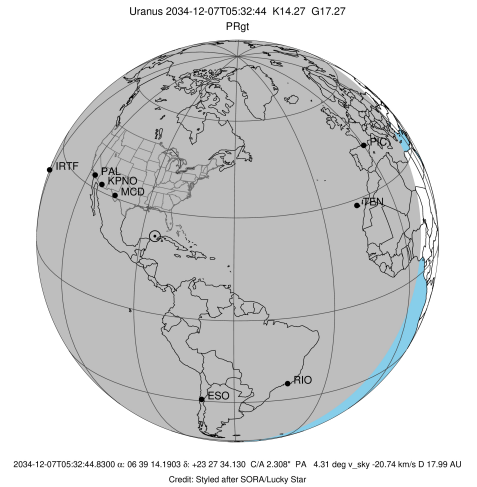


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	DEC 07 04:58 - DEC 07 06:02	PnnRie
PAL	Palomar Mt (200")	33.4	243.1	+++++		+++++	DEC 07 05:05 - DEC 07 06:08	PnnRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	DEC 07 05:05 - DEC 07 06:08	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	DEC 07 05:05 - DEC 07 06:07	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++		+++++	DEC 07 04:59 - DEC 07 06:01	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5			+++++	DEC 07 06:01 - DEC 07 06:10	PnnRne
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++		+++++	DEC 07 05:05 - DEC 07 05:59	PnnRie
ESO	European Southern Obs	-29.3	289.3	+++++		+++++	DEC 07 05:07 - DEC 07 06:01	PnnRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T05:29:52.770  
 Event type : PRgt  
 : Uranus occs: not geocentric or topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3382771256569843584  
 2Mass ID (if available) : 06391419+2327343  
 ICRS Star Coord at Epoch: 06h 39m 14.19035s +23:27:34.13011s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.265  
 G magnitude : 17.270  
 RP magnitude : 16.329  
 BP magnitude : 18.195  
 DUPflag : 0  
 Distance (au) : 17.991  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.74  
 Sun-Target sep (deg) : 155.69  
 Sun-Moon sep (deg) : 117.18  
 B (ring opening deg) : 67.25  
 PA of pole (deg) : 72.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.064  
 C/A sky separation (km) : 26934.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

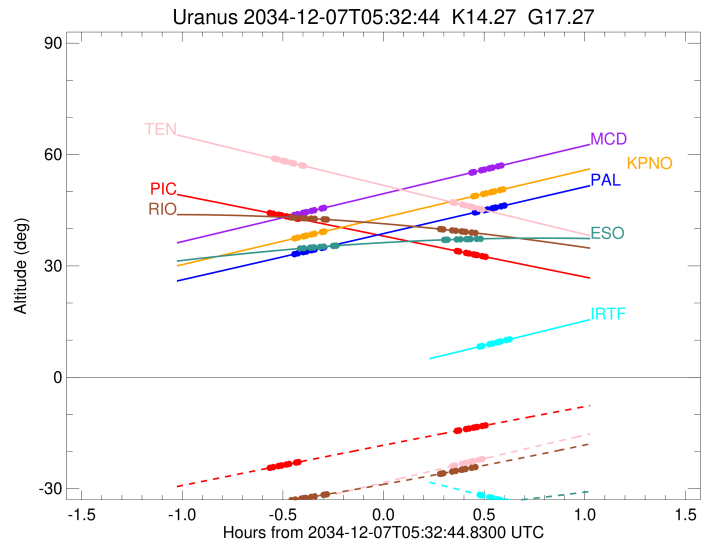
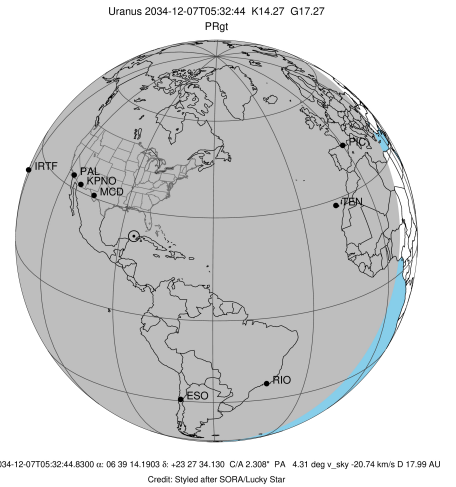


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-07T04:58:32.493		44.31	-24.45	51513.36	-19.04		
lambda	I	2034-12-07T04:59:50.855		44.07	-24.22	50026.71	-18.86		
delta	I	2034-12-07T05:01:23.108		43.79	-23.94	48300.35	-18.56		
gamma	I	2034-12-07T05:01:59.768		43.68	-23.83	47622.04	-18.44		
eta	I	2034-12-07T05:02:24.007		43.60	-23.76	47176.12	-18.35		
beta	I	2034-12-07T05:03:46.907		43.35	-23.51	45665.76	-18.04		
alpha	I	2034-12-07T05:04:41.542		43.18	-23.34	44687.54	-17.82		
4	I	2034-12-07T05:06:40.894		42.82	-22.98	42589.67	-17.26		
5	I	2034-12-07T05:07:06.150		42.74	-22.91	42173.06	-17.18		
6	I	2034-12-07T05:07:23.830		42.69	-22.85	41870.29	-17.06		

No planet occultations

6	E	2034-12-07T05:54:33.650		34.02	-14.46	41805.71	17.02		
5	E	2034-12-07T05:55:02.187		33.93	-14.38	42295.82	17.14		
4	E	2034-12-07T05:55:15.906		33.89	-14.34	42527.17	17.22		
alpha	E	2034-12-07T05:57:22.154		33.50	-13.97	44739.90	17.77		
beta	E	2034-12-07T05:58:12.393		33.35	-13.82	45641.09	17.99		
eta	E	2034-12-07T05:59:36.989		33.09	-13.58	47176.12	18.30		
gamma	E	2034-12-07T06:00:01.774		33.02	-13.50	47630.75	18.38		
delta	E	2034-12-07T06:00:38.073		32.90	-13.40	48300.35	18.51		
lambda	E	2034-12-07T06:02:10.619		32.62	-13.13	50026.71	18.80		
epsilon	E	2034-12-07T06:02:53.152		32.49	-13.01	50828.77	18.98		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T05:36:20.370  
 Event type : PRgt  
 : Uranus occs: not geocentric or 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 : 3382771256569843584  
 2Mass ID (if available) : 06391419+2327343  
 ICRS Star Coord at Epoch: 06h 39m 14.19035s +23:27:34.13011s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.265  
 G magnitude : 17.270  
 RP magnitude : 16.329  
 BP magnitude : 18.195  
 DUPflag : 0  
 Distance (au) : 17.991  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.74  
 Sun-Target sep (deg) : 155.69  
 Sun-Moon sep (deg) : 116.64  
 B (ring opening deg) : 67.25  
 PA of pole (deg) : 72.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.188  
 C/A sky separation (km) : 28543.6  
 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



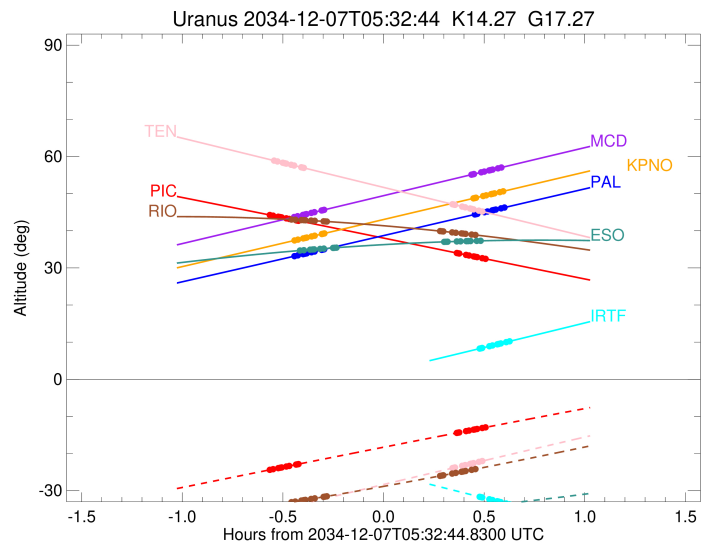
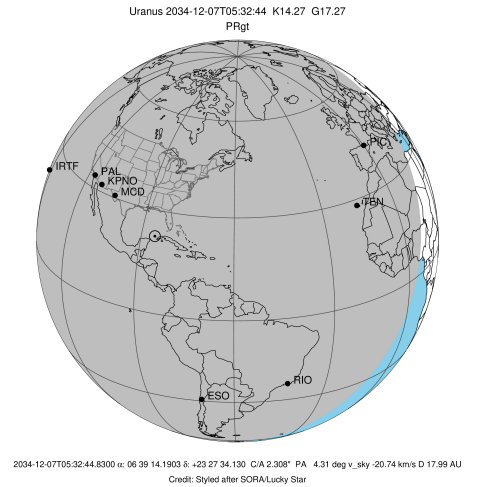
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-07T05:05:53.245		33.10	-54.83	51508.30	-18.53		
lambda	I	2034-12-07T05:07:13.544		33.38	-55.11	50026.71	-18.32		
delta	I	2034-12-07T05:08:48.621		33.71	-55.43	48300.35	-17.99		
gamma	I	2034-12-07T05:09:26.475		33.84	-55.57	47622.14	-17.85		
eta	I	2034-12-07T05:09:51.538		33.93	-55.65	47176.12	-17.75		
beta	I	2034-12-07T05:11:17.453		34.22	-55.95	45665.07	-17.38		
alpha	I	2034-12-07T05:12:14.153		34.42	-56.14	44688.07	-17.13		
4	I	2034-12-07T05:14:18.840		34.85	-56.57	42587.98	-16.48		
5	I	2034-12-07T05:14:45.039		34.94	-56.66	42175.22	-16.39		
6	I	2034-12-07T05:15:03.807		35.01	-56.73	41869.13	-16.25		

No planet occultations

6	E	2034-12-07T05:59:56.235		44.40	-65.83	41807.58	16.30		
5	E	2034-12-07T06:00:25.697		44.50	-65.92	42292.42	16.44		
4	E	2034-12-07T06:00:40.175		44.55	-65.97	42527.91	16.54		
alpha	E	2034-12-07T06:02:50.976		45.01	-66.40	44738.35	17.20		
beta	E	2034-12-07T06:03:42.918		45.19	-66.57	45641.06	17.45		
eta	E	2034-12-07T06:05:09.951		45.49	-66.85	47176.12	17.82		
gamma	E	2034-12-07T06:05:35.381		45.58	-66.93	47630.59	17.92		
delta	E	2034-12-07T06:06:12.603		45.71	-67.05	48300.35	18.07		
lambda	E	2034-12-07T06:07:47.261		46.04	-67.36	50026.71	18.40		
epsilon	E	2034-12-07T06:08:31.345		46.20	-67.50	50841.30	18.62		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2034-12-07T05:36:09.350
Event type           : PRgt
: Uranus occs: not geocentric or 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       : 3382771256569843584
2Mass ID (if available) : 06391419+2327343
ICRS Star Coord at Epoch: 06h 39m 14.19035s +23:27:34.13011s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 14.265
G magnitude           : 17.270
RP magnitude          : 16.329
BP magnitude          : 18.195
DUPflag              : 0
Distance (au)         : 17.991
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.74
Sun-Target sep (deg) : 155.69
Sun-Moon sep (deg)   : 116.70
B (ring opening deg) : 67.25
PA of pole (deg)     : 72.73
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.209
C/A sky separation (km) : 28822.3
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
    
```

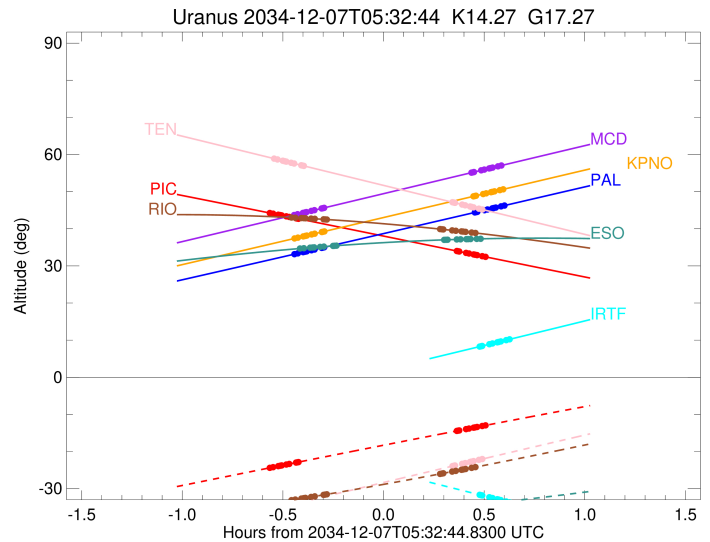
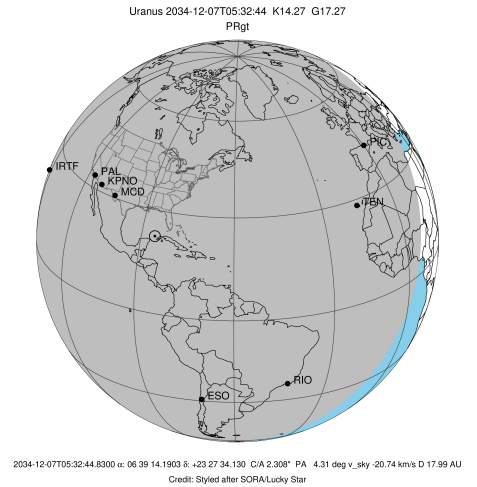


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-07T05:05:54.314		37.33	-59.43	51506.96	-18.48		
lambda	I	2034-12-07T05:07:14.787		37.62	-59.71	50026.71	-18.26		
delta	I	2034-12-07T05:08:50.203		37.95	-60.04	48300.35	-17.92		
gamma	I	2034-12-07T05:09:28.205		38.09	-60.17	47622.17	-17.77		
eta	I	2034-12-07T05:09:53.375		38.17	-60.26	47176.12	-17.67		
beta	I	2034-12-07T05:11:19.694		38.48	-60.56	45664.91	-17.29		
alpha	I	2034-12-07T05:12:16.675		38.68	-60.76	44688.20	-17.04		
4	I	2034-12-07T05:14:22.157		39.12	-61.20	42587.58	-16.37		
5	I	2034-12-07T05:14:48.474		39.22	-61.29	42175.73	-16.27		
6	I	2034-12-07T05:15:07.429		39.28	-61.36	41868.86	-16.13		

No planet occultations

6	E	2034-12-07T05:59:31.792		48.73	-70.39	41807.85	16.18		
5	E	2034-12-07T06:00:01.427		48.84	-70.48	42291.93	16.32		
4	E	2034-12-07T06:00:16.038		48.89	-70.53	42528.02	16.43		
alpha	E	2034-12-07T06:02:27.646		49.36	-70.96	44738.13	17.10		
beta	E	2034-12-07T06:03:19.882		49.54	-71.13	45641.06	17.36		
eta	E	2034-12-07T06:04:47.335		49.85	-71.41	47176.12	17.74		
gamma	E	2034-12-07T06:05:12.877		49.94	-71.49	47630.57	17.84		
delta	E	2034-12-07T06:05:50.255		50.08	-71.61	48300.35	17.99		
lambda	E	2034-12-07T06:07:25.273		50.41	-71.91	50026.71	18.34		
epsilon	E	2034-12-07T06:08:09.597		50.57	-72.05	50842.96	18.56		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T05:35:48.780  
 Event type : PRgt  
 : Uranus occs: not geocentric or 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 : 3382771256569843584  
 2Mass ID (if available) : 06391419+2327343  
 ICRS Star Coord at Epoch: 06h 39m 14.19035s +23:27:34.13011s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.265  
 G magnitude : 17.270  
 RP magnitude : 16.329  
 BP magnitude : 18.195  
 DUPflag : 0  
 Distance (au) : 17.991  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.74  
 Sun-Target sep (deg) : 155.69  
 Sun-Moon sep (deg) : 116.79  
 B (ring opening deg) : 67.25  
 PA of pole (deg) : 72.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.233  
 C/A sky separation (km) : 29130.8  
 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

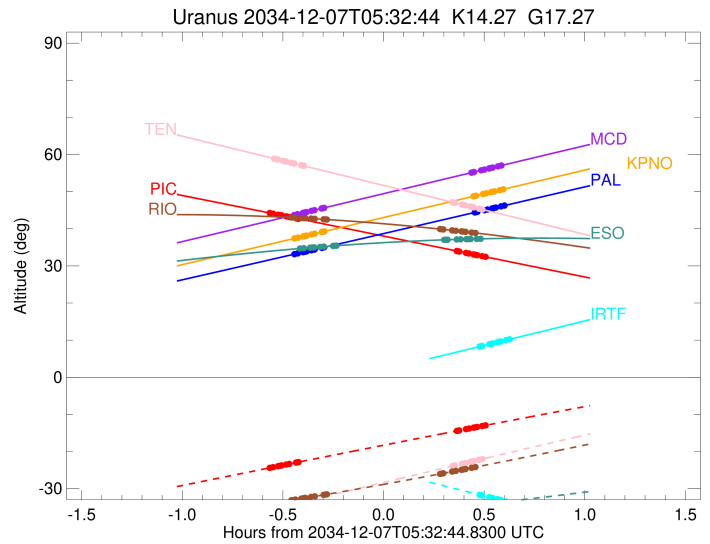
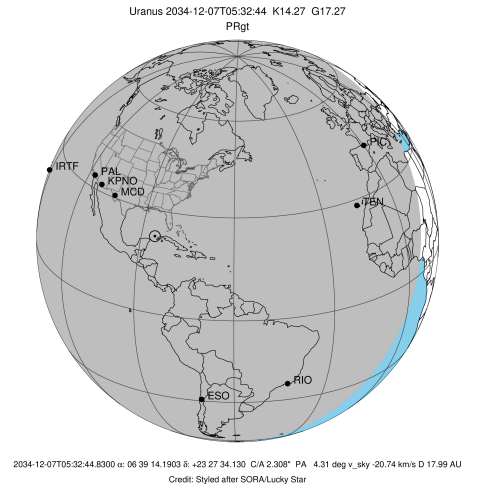


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-07T05:05:47.757		43.64	-66.02	51505.39	-18.42		
lambda	I	2034-12-07T05:07:08.399		43.93	-66.30	50026.71	-18.20		
delta	I	2034-12-07T05:08:44.168		44.27	-66.63	48300.35	-17.85		
gamma	I	2034-12-07T05:09:22.327		44.41	-66.76	47622.20	-17.70		
eta	I	2034-12-07T05:09:47.611		44.50	-66.85	47176.12	-17.59		
beta	I	2034-12-07T05:11:14.364		44.81	-67.15	45664.72	-17.20		
alpha	I	2034-12-07T05:12:11.645		45.02	-67.35	44688.35	-16.94		
4	I	2034-12-07T05:14:17.998		45.47	-67.79	42587.13	-16.25		
5	I	2034-12-07T05:14:44.443		45.57	-67.88	42176.32	-16.14		
6	I	2034-12-07T05:15:03.608		45.64	-67.95	41868.54	-16.00		

No planet occultations

6	E	2034-12-07T05:58:55.766		55.11	-76.61	41808.15	16.05		
5	E	2034-12-07T05:59:25.597		55.22	-76.70	42291.39	16.19		
4	E	2034-12-07T05:59:40.356		55.27	-76.74	42528.15	16.30		
alpha	E	2034-12-07T06:01:52.865		55.75	-77.13	44737.90	17.00		
beta	E	2034-12-07T06:02:45.427		55.94	-77.29	45641.06	17.26		
eta	E	2034-12-07T06:04:13.343		56.25	-77.54	47176.12	17.65		
gamma	E	2034-12-07T06:04:39.006		56.34	-77.62	47630.55	17.76		
delta	E	2034-12-07T06:05:16.557		56.48	-77.72	48300.35	17.91		
lambda	E	2034-12-07T06:06:51.966		56.82	-77.99	50026.71	18.27		
epsilon	E	2034-12-07T06:07:36.549		56.98	-78.12	50844.74	18.49		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T05:29:57.810  
 Event type : PRgt  
 : Uranus occs: not geocentric or topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : TEN  
 Location : Teide Obs./Tenerife  
 Latitude (deg) : 28.30050  
 E. Longitude (deg) : 343.48909  
 Altitude (km) : 2.395  
 Gaia source ID : 3382771256569843584  
 2Mass ID (if available) : 06391419+2327343  
 ICRS Star Coord at Epoch: 06h 39m 14.19035s +23:27:34.13011s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.265  
 G magnitude : 17.270  
 RP magnitude : 16.329  
 BP magnitude : 18.195  
 DUPflag : 0  
 Distance (au) : 17.991  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.74  
 Sun-Target sep (deg) : 155.69  
 Sun-Moon sep (deg) : 117.30  
 B (ring opening deg) : 67.25  
 PA of pole (deg) : 72.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.211  
 C/A sky separation (km) : 28849.0  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



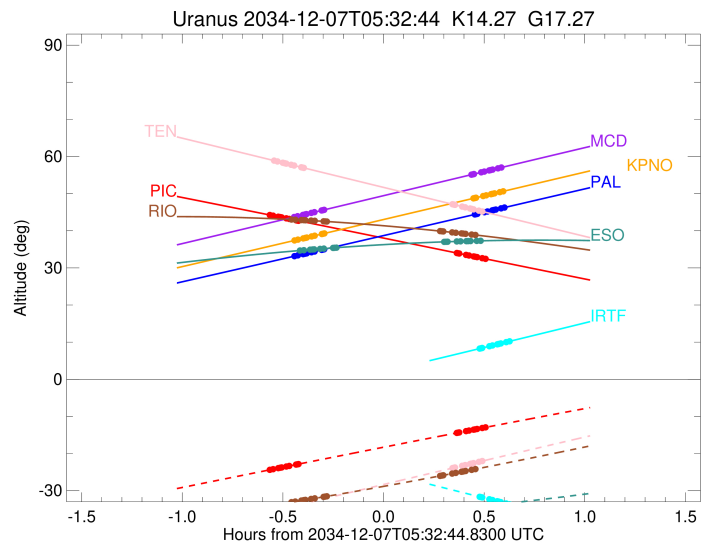
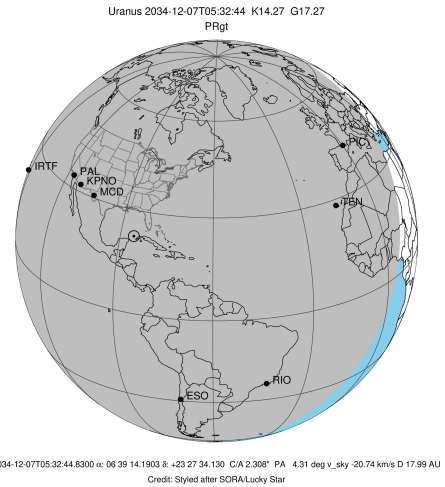
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-07T04:59:49.621		58.97	-35.48	51504.86	-18.59		
lambda	I	2034-12-07T05:01:09.499		58.67	-35.19	50026.71	-18.37		
delta	I	2034-12-07T05:02:44.360		58.32	-34.85	48300.35	-18.02		
gamma	I	2034-12-07T05:03:22.145		58.18	-34.71	47622.20	-17.87		
eta	I	2034-12-07T05:03:47.176		58.09	-34.62	47176.12	-17.77		
beta	I	2034-12-07T05:05:13.035		57.78	-34.31	45664.70	-17.39		
alpha	I	2034-12-07T05:06:09.694		57.57	-34.11	44688.36	-17.13		
4	I	2034-12-07T05:08:14.575		57.11	-33.65	42587.13	-16.45		
5	I	2034-12-07T05:08:40.691		57.01	-33.56	42176.31	-16.35		
6	I	2034-12-07T05:08:59.611		56.94	-33.49	41868.55	-16.21		

No planet occultations

6	E	2034-12-07T05:53:16.434		47.16	-23.94	41807.55	16.17		
5	E	2034-12-07T05:53:46.134		47.06	-23.83	42292.49	16.32		
4	E	2034-12-07T05:54:00.719		47.00	-23.78	42527.89	16.42		
alpha	E	2034-12-07T05:56:12.432		46.52	-23.31	44738.41	17.09		
beta	E	2034-12-07T05:57:04.692		46.33	-23.13	45641.06	17.35		
eta	E	2034-12-07T05:58:32.225		46.01	-22.81	47176.12	17.72		
gamma	E	2034-12-07T05:58:57.794		45.91	-22.72	47630.60	17.83		
delta	E	2034-12-07T05:59:35.211		45.77	-22.59	48300.35	17.97		
lambda	E	2034-12-07T06:01:10.342		45.43	-22.25	50026.71	18.32		
epsilon	E	2034-12-07T06:01:54.580		45.26	-22.10	50840.30	18.53		

```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2034-12-07T05:37:28.980
Event type            : PRgt
: Uranus occs: not geocentric or 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        : 3382771256569843584
2Mass ID (if available) : 06391419+2327343
ICRS Star Coord at Epoch: 06h 39m 14.19035s +23:27:34.13011s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 14.265
G magnitude           : 17.270
RP magnitude          : 16.329
BP magnitude          : 18.195
DUPflag              : 0
Distance (au)         : 17.991
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.74
Sun-Target sep (deg) : 155.69
Sun-Moon sep (deg)   : 116.08
B (ring opening deg) : 67.25
PA of pole (deg)     : 72.73
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (" ) : 2.185
C/A sky separation (km) : 28513.5
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
    
```



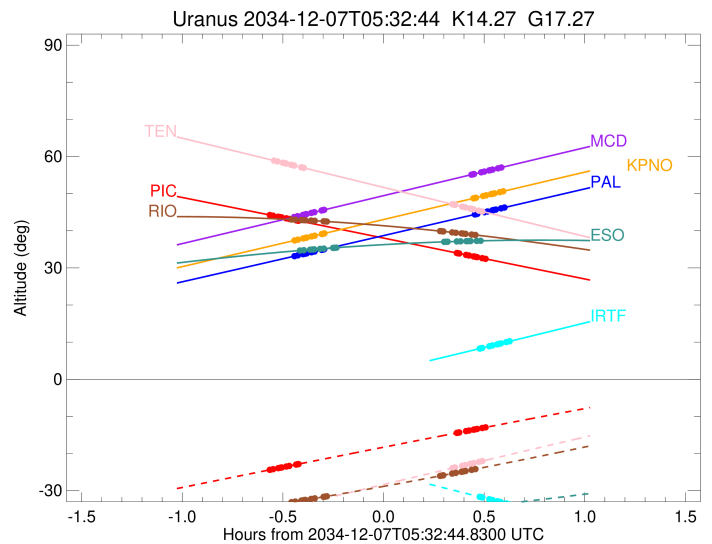
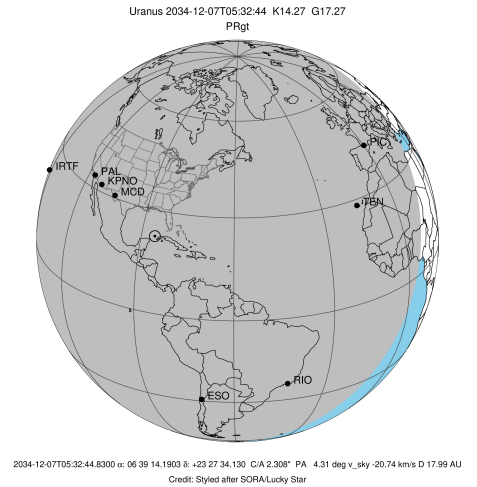
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-07T05:06:38.960	-3.53x	-19.30	51508.92	-18.31			
lambda	I	2034-12-07T05:08:00.271	-3.24x	-19.61	50026.71	-18.10			
delta	I	2034-12-07T05:09:36.499	-2.90x	-19.97	48300.35	-17.77			
gamma	I	2034-12-07T05:10:14.809	-2.77x	-20.11	47622.13	-17.63			
eta	I	2034-12-07T05:10:40.173	-2.68x	-20.20	47176.12	-17.54			
beta	I	2034-12-07T05:12:07.111	-2.37x	-20.53	45665.14	-17.18			
alpha	I	2034-12-07T05:13:04.491	-2.17x	-20.74	44688.01	-16.93			
4	I	2034-12-07T05:15:10.633	-1.72x	-21.21	42588.13	-16.29			
5	I	2034-12-07T05:15:37.161	-1.63x	-21.31	42175.03	-16.20			
6	I	2034-12-07T05:15:56.128	-1.56x	-21.38	41869.23	-16.06			

No planet occultations

6	E	2034-12-07T06:01:22.781	8.26	-31.66	41807.65	16.13			
5	E	2034-12-07T06:01:52.540	8.36	-31.77	42292.29	16.27			
4	E	2034-12-07T06:02:07.177	8.42	-31.82	42527.94	16.37			
alpha	E	2034-12-07T06:04:19.348	8.90	-32.32	44738.28	17.02			
beta	E	2034-12-07T06:05:11.841	9.09	-32.52	45641.06	17.27			
eta	E	2034-12-07T06:06:39.793	9.41	-32.86	47176.12	17.63			
gamma	E	2034-12-07T06:07:05.492	9.51	-32.95	47630.58	17.73			
delta	E	2034-12-07T06:07:43.107	9.65	-33.10	48300.35	17.88			
lambda	E	2034-12-07T06:09:18.766	10.00	-33.46	50026.71	18.21			
epsilon	E	2034-12-07T06:10:03.353	10.16	-33.63	50841.98	18.42			

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T05:31:18.990  
 Event type : PRgt  
 : Uranus occs: not geocentric or topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : RIO  
 Location : Rio de Janeiro  
 Latitude (deg) : -22.89506  
 E. Longitude (deg) : 316.77708  
 Altitude (km) : 0.033  
 Gaia source ID : 3382771256569843584  
 2Mass ID (if available) : 06391419+2327343  
 ICRS Star Coord at Epoch: 06h 39m 14.19035s +23:27:34.13011s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.265  
 G magnitude : 17.270  
 RP magnitude : 16.329  
 BP magnitude : 18.195  
 DUPflag : 0  
 Distance (au) : 17.991  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.74  
 Sun-Target sep (deg) : 155.69  
 Sun-Moon sep (deg) : 117.06  
 B (ring opening deg) : 67.25  
 PA of pole (deg) : 72.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.653  
 C/A sky separation (km) : 34610.5  
 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\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



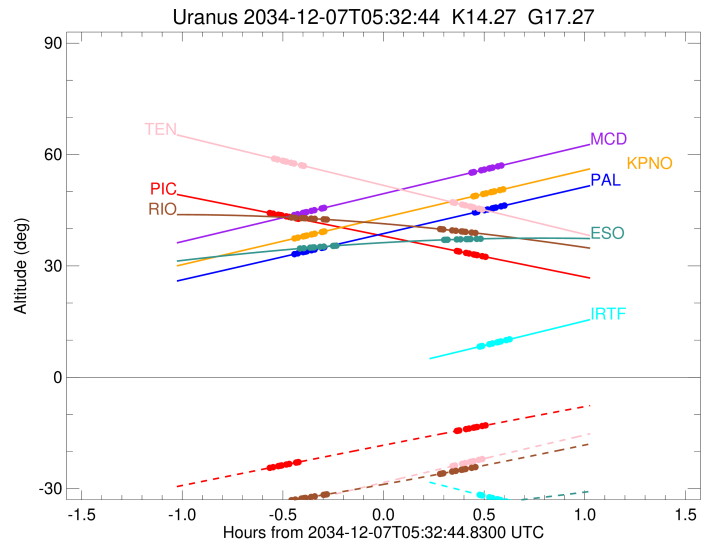
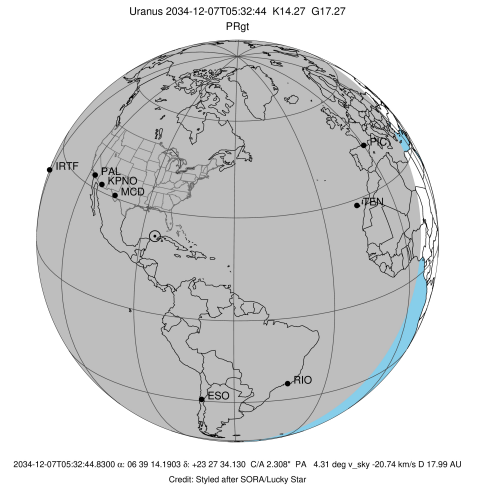
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-07T05:05:00.198		43.04	-33.16	51473.07	-16.58		
lambda	I	2034-12-07T05:06:28.162		42.98	-32.94	50026.71	-16.23		
delta	I	2034-12-07T05:08:16.435		42.89	-32.68	48300.35	-15.65		
gamma	I	2034-12-07T05:09:00.067		42.86	-32.57	47622.81	-15.40		
eta	I	2034-12-07T05:09:29.232		42.83	-32.49	47176.12	-15.23		
beta	I	2034-12-07T05:11:10.709		42.75	-32.24	45661.14	-14.58		
alpha	I	2034-12-07T05:12:18.384		42.69	-32.07	44691.74	-14.13		
4	I	2034-12-07T05:14:54.319		42.55	-31.68	42578.03	-12.92		
5	I	2034-12-07T05:15:25.768		42.52	-31.60	42189.11	-12.72		
6	I	2034-12-07T05:15:51.886		42.49	-31.53	41861.63	-12.45		

No planet occultations

6	E	2034-12-07T05:49:33.888		39.92	-26.04	41814.96	12.44		
5	E	2034-12-07T05:50:10.671		39.86	-25.94	42279.12	12.71		
4	E	2034-12-07T05:50:30.433		39.83	-25.88	42531.65	12.91		
alpha	E	2034-12-07T05:53:12.974		39.57	-25.41	44732.85	14.13		
beta	E	2034-12-07T05:54:16.132		39.47	-25.23	45641.36	14.57		
eta	E	2034-12-07T05:55:59.146		39.30	-24.93	47176.12	15.22		
gamma	E	2034-12-07T05:56:28.800		39.25	-24.85	47630.03	15.39		
delta	E	2034-12-07T05:57:11.997		39.17	-24.72	48300.35	15.64		
lambda	E	2034-12-07T05:59:00.357		38.99	-24.40	50026.71	16.21		
epsilon	E	2034-12-07T05:59:52.735		38.90	-24.25	50882.71	16.56		



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T05:33:19.790  
 Event type : PRgt  
 : Uranus occs: not geocentric or topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : ESO  
 Location : European Southern Obs. (3.6m)  
 Latitude (deg) : -29.26097  
 E. Longitude (deg) : 289.26831  
 Altitude (km) : 2.400  
 Gaia source ID : 3382771256569843584  
 2Mass ID (if available) : 06391419+2327343  
 ICRS Star Coord at Epoch: 06h 39m 14.19035s +23:27:34.13011s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.265  
 G magnitude : 17.270  
 RP magnitude : 16.329  
 BP magnitude : 18.195  
 DUPflag : 0  
 Distance (au) : 17.991  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.74  
 Sun-Target sep (deg) : 155.69  
 Sun-Moon sep (deg) : 116.83  
 B (ring opening deg) : 67.25  
 PA of pole (deg) : 72.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.707  
 C/A sky separation (km) : 35317.5  
 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\_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	2034-12-07T05:07:31.853		34.66	-37.68	51469.11	-16.25		
lambda	I	2034-12-07T05:09:01.432		34.77	-37.62	50026.71	-15.87		
delta	I	2034-12-07T05:10:52.272		34.91	-37.55	48300.35	-15.26		
gamma	I	2034-12-07T05:11:37.039		34.96	-37.52	47622.89	-15.00		
eta	I	2034-12-07T05:12:07.008		35.00	-37.50	47176.12	-14.82		
beta	I	2034-12-07T05:13:51.573		35.12	-37.43	45660.71	-14.12		
alpha	I	2034-12-07T05:15:01.501		35.20	-37.37	44692.22	-13.64		
4	I	2034-12-07T05:17:44.038		35.38	-37.25	42576.81	-12.33		
5	I	2034-12-07T05:18:16.735		35.42	-37.22	42190.96	-12.11		
6	I	2034-12-07T05:18:44.456		35.45	-37.20	41860.62	-11.82		

No planet occultations

6	E	2034-12-07T05:50:47.313		37.01	-35.11	41816.26	11.83		
5	E	2034-12-07T05:51:25.660		37.03	-35.06	42276.77	12.12		
4	E	2034-12-07T05:51:46.594		37.04	-35.03	42532.41	12.34		
alpha	E	2034-12-07T05:54:35.504		37.13	-34.80	44731.92	13.66		
beta	E	2034-12-07T05:55:40.796		37.16	-34.70	45641.46	14.14		
eta	E	2034-12-07T05:57:26.722		37.20	-34.55	47176.12	14.83		
gamma	E	2034-12-07T05:57:57.127		37.21	-34.51	47629.93	15.02		
delta	E	2034-12-07T05:58:41.375		37.23	-34.44	48300.35	15.28		
lambda	E	2034-12-07T06:00:32.083		37.27	-34.28	50026.71	15.89		
epsilon	E	2034-12-07T06:01:25.914		37.29	-34.20	50889.78	16.27		