

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-01-01T16:10:20.980
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3404550245452183552
 2Mass ID (if available) : 05342360+2327447

ICRS Star Coord at Epoch: 05h 34m 23.60359s +23:27:44.41422s

RUWE (>1.4 is poor) : 1.15
 K magnitude : 13.037
 G magnitude : 14.916
 RP magnitude : 14.300
 BP magnitude : 15.352
 DUPflag : 0
 Distance (au) : 18.138
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.25
 Sun-Target sep (deg) : 163.78
 Sun-Moon sep (deg) : 59.29
 B (ring opening deg) : 79.81
 PA of pole (deg) : 36.70

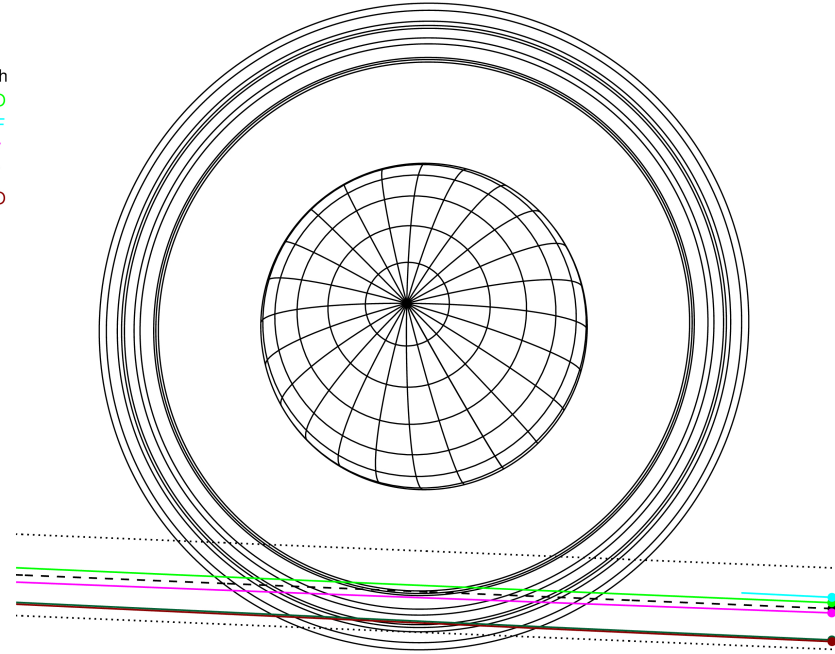
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2032-01-01T16:10:20.9800 ra: 05 34 23.603606 cr: +23 27 44.414 C/A 3.148° PA 357.63 deg v_sky -22.25 km/s D 18.14 AU
 Credit: Styled after SORA/Lucky Star

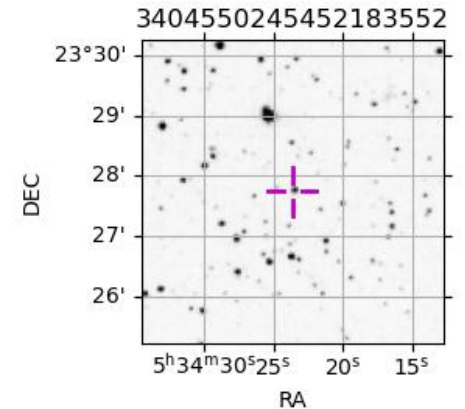
Uranus 2032-01-01T16:10:20 K13.04 G14.92 XRgt

Earth
 PMO
 IRTF
 KAV
 AAT
 MSO

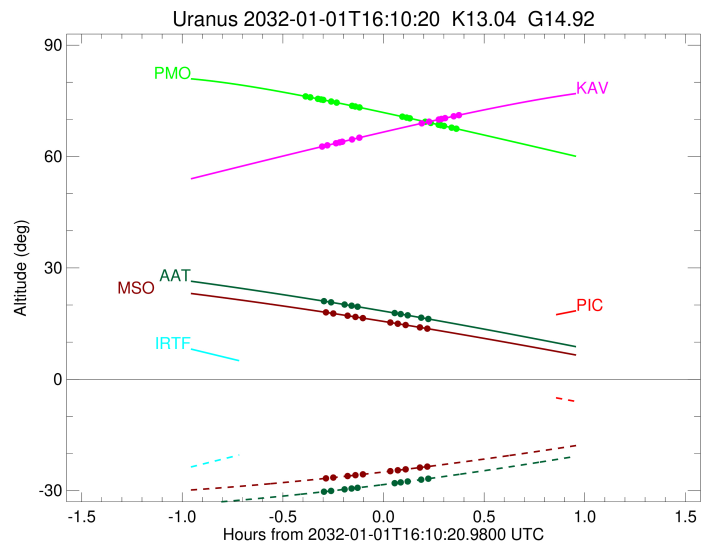
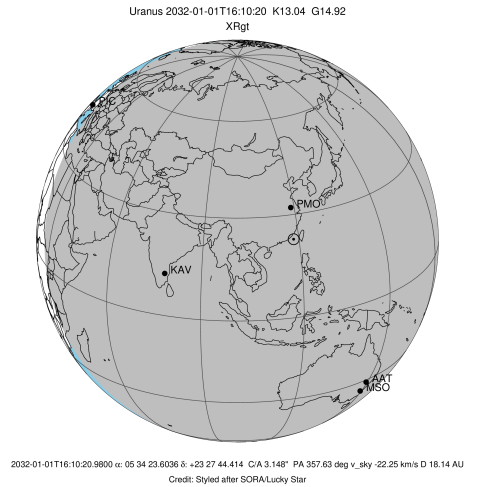


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	JAN 01 15:46 - JAN 01 16:31	PnnRie
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					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++		+++++	JAN 01 15:51 - JAN 01 16:32	PnnRie
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 01 15:52 - JAN 01 16:23	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	JAN 01 15:52 - JAN 01 16:23	PnnRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-01-01T16:09:07.280
 Event type : XRgt
 : No Uranus occs
 : 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 : 3404550245452183552
 2Mass ID (if available) : 05342360+2327447
 ICRS Star Coord at Epoch: 05h 34m 23.60359s +23:27:44.41422s
 RUWE (>1.4 is poor) : 1.15
 K magnitude : 13.037
 G magnitude : 14.916
 RP magnitude : 14.300
 BP magnitude : 15.352
 DUPflag : 0
 Distance (au) : 18.138
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.25
 Sun-Target sep (deg) : 163.78
 Sun-Moon sep (deg) : 59.91
 B (ring opening deg) : 79.81
 PA of pole (deg) : 36.70
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.081
 C/A sky separation (km) : 40530.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

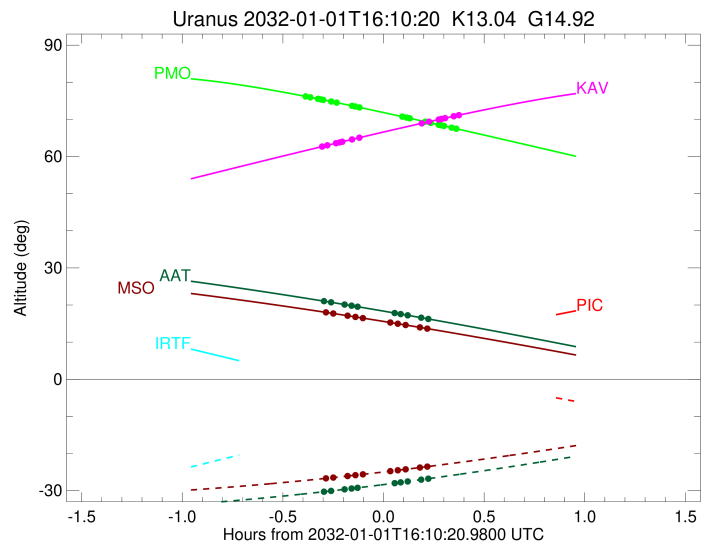
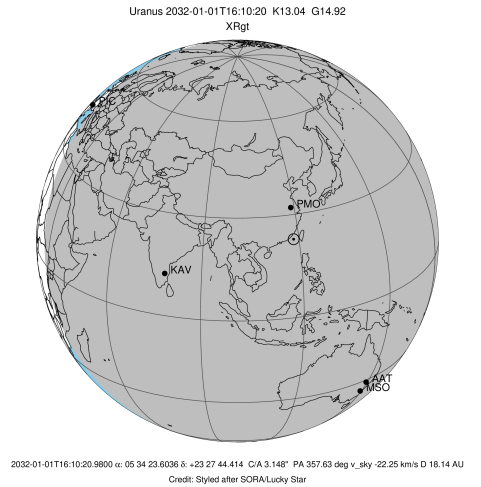


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-01-01T15:46:42.062		76.27	-79.92	51510.20	-13.76		
lambda	I	2032-01-01T15:48:32.246		75.95	-80.10	50026.71	-13.09		
delta	I	2032-01-01T15:50:49.272		75.54	-80.31	48300.35	-12.09		
gamma	I	2032-01-01T15:51:46.525		75.37	-80.39	47621.10	-11.64		
eta	I	2032-01-01T15:52:25.290		75.25	-80.45	47176.12	-11.32		
beta	I	2032-01-01T15:54:46.604		74.82	-80.62	45661.27	-10.08		
alpha	I	2032-01-01T15:56:22.225		74.52	-80.73	44738.86	-9.18		
4	I	2032-01-01T16:01:08.030		73.63	-80.97	42528.39	-6.19		
5	I	2032-01-01T16:01:58.448		73.47	-81.00	42241.66	-5.65		
6	I	2032-01-01T16:03:06.915		73.25	-81.03	41879.74	-4.81		

No planet occultations

6	E	2032-01-01T16:16:03.511		70.72	-80.93	41876.17	4.81		
5	E	2032-01-01T16:17:19.385		70.47	-80.87	42279.35	5.65		
4	E	2032-01-01T16:18:04.629		70.32	-80.83	42542.46	6.19		
alpha	E	2032-01-01T16:22:45.727		69.38	-80.53	44712.19	9.17		
beta	E	2032-01-01T16:24:22.670		69.06	-80.40	45645.25	10.07		
eta	E	2032-01-01T16:26:45.746		68.57	-80.19	47176.12	11.31		
gamma	E	2032-01-01T16:27:24.685		68.44	-80.13	47622.72	11.63		
delta	E	2032-01-01T16:28:21.852		68.25	-80.04	48300.35	12.08		
lambda	E	2032-01-01T16:30:39.019		67.78	-79.80	50026.71	13.08		
epsilon	E	2032-01-01T16:31:56.996		67.52	-79.66	51067.09	13.74		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-01-01T16:11:57.790
 Event type : XRgt
 : No Uranus occs
 : 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 : 3404550245452183552
 2Mass ID (if available) : 05342360+2327447
 ICRS Star Coord at Epoch: 05h 34m 23.60359s +23:27:44.41422s
 RUWE (>1.4 is poor) : 1.15
 K magnitude : 13.037
 G magnitude : 14.916
 RP magnitude : 14.300
 BP magnitude : 15.352
 DUPflag : 0
 Distance (au) : 18.138
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.25
 Sun-Target sep (deg) : 163.78
 Sun-Moon sep (deg) : 60.16
 B (ring opening deg) : 79.81
 PA of pole (deg) : 36.70
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.228
 C/A sky separation (km) : 42461.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



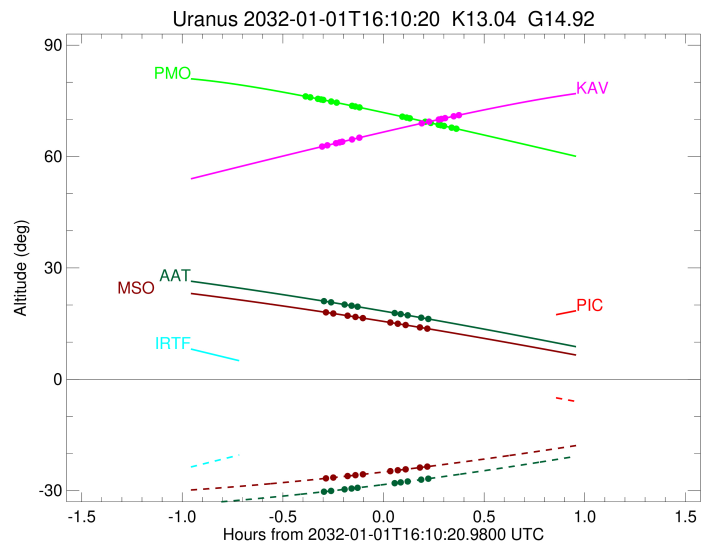
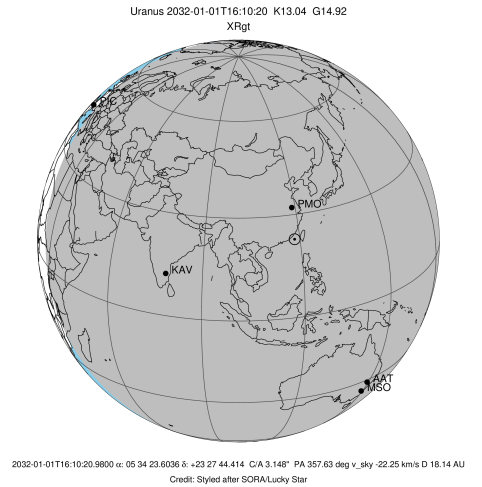
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-01-01T15:51:36.432		62.59	-46.86	51498.19	-12.54		
lambda	I	2032-01-01T15:53:37.228		63.03	-47.32	50026.71	-11.73		
delta	I	2032-01-01T15:56:12.470		63.58	-47.92	48300.35	-10.48		
gamma	I	2032-01-01T15:57:19.081		63.82	-48.17	47621.02	-9.91		
eta	I	2032-01-01T15:58:04.931		63.99	-48.34	47176.12	-9.50		
beta	I	2032-01-01T16:00:59.745		64.61	-49.01	45659.18	-7.81		
alpha	I	2032-01-01T16:03:08.657		65.07	-49.50	44735.41	-6.47		

No planet occultations

alpha	E	2032-01-01T16:21:42.371		68.94	-53.72	44716.64	6.48		
beta	E	2032-01-01T16:23:52.444		69.38	-54.21	45646.75	7.82		
eta	E	2032-01-01T16:26:48.778		69.97	-54.87	47176.12	9.51		
gamma	E	2032-01-01T16:27:34.726		70.12	-55.04	47622.37	9.92		
delta	E	2032-01-01T16:28:41.140		70.34	-55.29	48300.35	10.50		
lambda	E	2032-01-01T16:31:16.226		70.84	-55.87	50026.71	11.75		
epsilon	E	2032-01-01T16:32:44.721		71.13	-56.21	51095.57	12.55		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-01-01T16:07:37.030
Event type           : XRgt
: No Uranus occs
: 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       : 3404550245452183552
2Mass ID (if available) : 05342360+2327447
ICRS Star Coord at Epoch: 05h 34m 23.60359s +23:27:44.41422s
RUWE (>1.4 is poor) : 1.15
K magnitude           : 13.037
G magnitude           : 14.916
RP magnitude          : 14.300
BP magnitude          : 15.352
DUPflag              : 0
Distance (au)         : 18.138
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -22.25
Sun-Target sep (deg) : 163.78
Sun-Moon sep (deg)   : 59.22
B (ring opening deg) : 79.81
PA of pole (deg)     : 36.70
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.507
C/A sky separation (km) : 46135.4
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ura111.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ura111.bsp
ura161.bsp
vgr2.ura161.bsp
peph.ura160.bsp
earthstns_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```

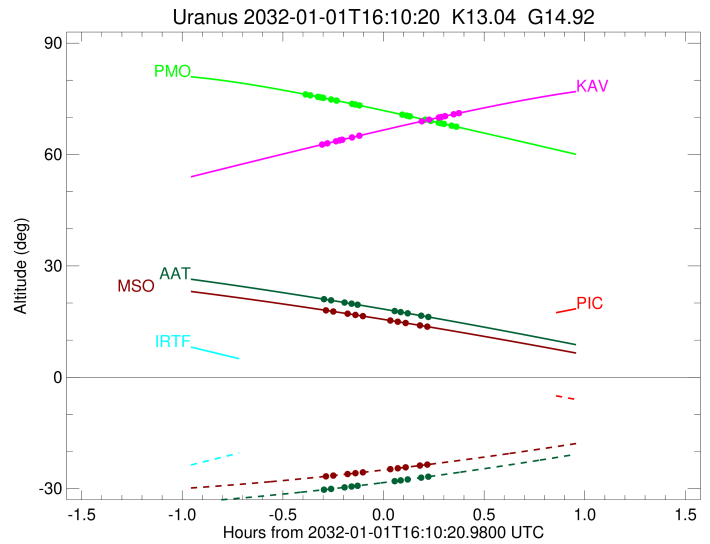
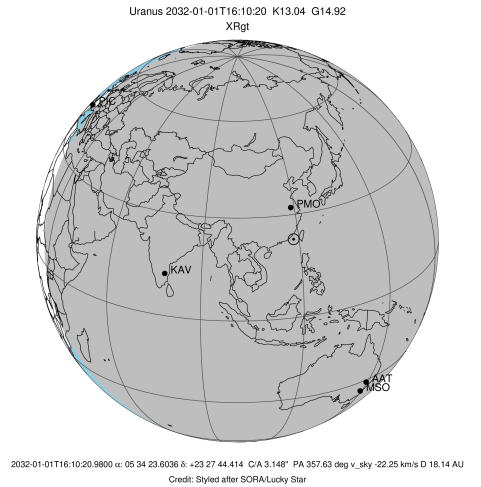


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-01-01T15:52:04.926		21.12	-30.34	51461.28	-9.53		
lambda	I	2032-01-01T15:54:45.082		20.72	-30.07	50026.71	-8.26		
delta	I	2032-01-01T15:58:46.800		20.13	-29.65	48300.35	-5.98		
gamma	I	2032-01-01T16:00:53.946		19.81	-29.42	47620.98	-4.69		
eta	I	2032-01-01T16:02:41.574		19.54	-29.23	47176.12	-3.57		

No planet occultations

eta	E	2032-01-01T16:13:36.726		17.85	-28.00	47176.12	3.56		
gamma	E	2032-01-01T16:15:24.576		17.57	-27.79	47621.64	4.69		
delta	E	2032-01-01T16:17:31.705		17.23	-27.53	48300.35	5.98		
lambda	E	2032-01-01T16:21:33.749		16.59	-27.05	50026.71	8.25		
epsilon	E	2032-01-01T16:23:41.632		16.25	-26.78	51152.63	9.51		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-01-01T16:07:45.370
 Event type : XRgt
 : No Uranus occs
 : 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 : 3404550245452183552
 2Mass ID (if available) : 05342360+2327447
 ICRS Star Coord at Epoch: 05h 34m 23.60359s +23:27:44.41422s
 RUWE (>1.4 is poor) : 1.15
 K magnitude : 13.037
 G magnitude : 14.916
 RP magnitude : 14.300
 BP magnitude : 15.352
 DUPflag : 0
 Distance (au) : 18.138
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.25
 Sun-Target sep (deg) : 163.78
 Sun-Moon sep (deg) : 59.19
 B (ring opening deg) : 79.81
 PA of pole (deg) : 36.70
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.528
 C/A sky separation (km) : 46406.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itrf93_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	2032-01-01T15:52:39.452		18.09	-26.74	51457.95	-9.26		
lambda	I	2032-01-01T15:55:24.752		17.71	-26.48	50026.71	-7.93		
delta	I	2032-01-01T15:59:41.196		17.12	-26.06	48300.35	-5.49		
gamma	I	2032-01-01T16:02:03.809		16.78	-25.83	47621.00	-4.03		
eta	I	2032-01-01T16:04:17.714		16.46	-25.60	47176.12	-2.61		

No planet occultations

eta	E	2032-01-01T16:12:17.626		15.30	-24.77	47176.12	2.61		
gamma	E	2032-01-01T16:14:31.750		14.97	-24.52	47621.57	4.03		
delta	E	2032-01-01T16:16:54.340		14.62	-24.26	48300.35	5.48		
lambda	E	2032-01-01T16:21:11.097		13.98	-23.79	50026.71	7.92		
epsilon	E	2032-01-01T16:23:24.101		13.64	-23.53	51157.96	9.24		